ORGANIZATION OF TOPICS AND LITERATURE REFERENCES IN THE EARTH SCIENCES FOR MACHINE STORAGE AND RETRIEVAL

G. B. La Monica

TECHNICAL REPORT NO. 7
ONR Task No. 389-150
(Formerly No. 388-078)
Contract Nonr-1228(36)
Geography Branch
Office of Naval Research

Department of Geology
Northwestern University
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PREFATORY REMARKS

This is the seventh in a series of Technical Reports arising from continuing research in the general field of quantification as related to the classical aspects of geology and physical geography. The idea for this study arose during my stay at the Institute of Geology and Paleontology of the University of Rome during the early part of 1966. At that time Dr. LaMonica and some of his associates were engaged in problems of compilation, organization, and methods of analysis of quantitative data in sedimentology, geomorphology, and other aspects of the geological sciences.

As a result of interest aroused by two lectures given by me at the invitation of Professor Bruno Accordi, Director of the Institute, Dr. LaMonica and I prepared a first version of the general problem of organizing quantitative data for computer analysis. This was published in Geologica Romana, and issued as Technical Report No. 4 of this series. With Professor Accordi's approval, Dr. LaMonica spent three months at Northwestern University preparing the present report under auspices of the Geography Branch of the Office of Naval Research.

It was originally thought that several topics could be covered in this time, but it became apparent that full development of even one aspect of a given problem could easily consume three months. As a result, the general topic of a drainage basin was selected for a "first run," inasmuch as this topic has a number of interrelations between landforms, geological processes, and sedimentary deposits. During his researches Dr. LaMonica went through more than 800 books and papers, mainly in English, and the topics expanded so rapidly that it was decided to develop the theme as an information storage and retrieval system.

For this purpose a subject-matter tabulation was first prepared and coded on punched cards. This tabulation was then tied in with the literature, so that each topic is supported by one or more references. In its present version the system permits direct search for pertinent literature from the subject tabulations, but the reverse process of finding the particular topics covered in a given reference could not be completed in the time available.

This report will be formally published in English in Geologica Romana, and it is issued in its present format in order to make the material immediately available to others who face similar problems of tying the rapidly-growing literature to an equally rapid growth of new concepts and methodology. Some readers may wish to extend the coding system, or to rearrange the topics into other forms, but as it stands the present system provides a framework for including additional topics and references to the subjects covered, as well as for organizing subjects and literature in other fields.

I have not attempted to impose any fixed form on Dr. LaMonica's tabulations; it seemed preferable to allow them to develop within the framework of his own background of training and research. Dr. LaMonica prepared this report in English, and my editing efforts were directed primarily toward smoothing the grammar. Some readers may detect a slight "Italian flavor" in the presentation, which has the advantage of acquainting English-speaking researchers with ways in which somewhat different schools of thought express essentially the same ideas.

Toward the end of his report, Dr. LaMonica emphasizes the need for additional study of drainage-basin attributes within a quantitative framework that seeks for interrelations among the many variables that influence drainage-basin development. This theme emphasizes the multivariate nature of most natural phenomena, which Dr. LaMonica sought to convey in his "comment cards" as he sifted through the voluminous literature referred to above.

One aspect of the present study that needs more attention is the problem of retrieving the substantive content of a given literature reference in terms of the subject-matter code. This aspect of classification systems is being considered by me now in terms of recent statistical literature in geology.

W. C. Krumbein
February, 1968

ORGANIZATION OF TOPICS AND LITERATURE REFERENCES IN THE EARTH SCIENCES FOR MACHINE STORAGE AND RETRIEVAL

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ABSTRACT

This report describes a system for organizing a set of topics and related literature references in a selected field of the earth sciences. The concept of a drainage basin was selected to illustrate a conceptually-distinct field of research of interest to geologists and physical geographers. Problems associated with coding and integration of the relevant literature are pointed out.

The concept of a drainage basin, initially selected as a fairly self-contained subject, was found to be more complex than originally realized. To keep the report within reasonable bounds, the subject was subdivided into several major topics, which include first the geometry of the basin considered as a physical object definable as a natural subdivision of the earth's land surface. This is followed by various attributes associated with the basin, such as soils and bedrock, streams and subsurface water in the basin, and climatic features.

The system used here includes three types of punched cards. The first relates to the topics discussed, the second ties in the relevant literature, and the third provides comments and specific references to individual items. Machine print-outs provide tabulated examples of the system, and a condensed bibliography of drainage-basin literature is given in an Appendix.

INTRODUCTION

During 1966 the writer collaborated with Professor W. C. Krumbein in the presentation of a paper on the organization and classification of observational data in geology and physical geography. This was published in Geologica Romana, vol. V, 1966, and was distributed as Technical Report No. 4 in this present series. As an outgrowth of that study, the writer had the privilege of spending three months during the Spring of 1967 at Northwestern University, to examine some further aspects of this problem under the general guidance of Professor Krumbein. This work was supported by the Geography Branch of the Office of Naval Research.

Our original intention had been to expand the underlying thesis that observational data from many fields in geology and geography can be arranged into similar data matrices for computer processing. From this viewpoint it should be possible to structure the observational data into variables $X_1, X_2, \cdots, X_k$, measured on a set of samples (or field localities) designated as $1, 2, \cdots, N$, where in general $N > k$. The specific meaning of the variables may be greatly different in different kinds of studies, but essentially the matrix itself can be processed by the same kinds of computer programs. Thus, in a sedimentary study X_1 might represent mean grain size, X_2 might represent the degree of particle sorting, and so on; an equivalent study in geomorphology might assign X_1 to surface relief, X_2 to valley-wall slope, etc. Nevertheless, both of these matrices can be analyzed by regression techniques, factor analysis, etc.

The point to this approach is that the researcher in any field makes his own decisions regarding variables to be studied on the basis of substantive judgment; once this decision is made and the data collected, the study can in general move into the same stream of analysis as a data matrix from an apparently widely separated field. In order for a study to be reasonably complete, the researcher needs first to organize his subject into categories of variables suitable to the objectives of his work. It is here, during the past two decades especially, that many problems arose regarding the specific kinds of variables to be chosen.

The large influx of new kinds of observational data into many geological and geographical fields, especially numerical measurement data, suggests that it would be useful to organize various subjects in these fields into some comprehensive classification of topics, associated literature references, operational definitions, etc., as a guide to the selection of variables appropriate to specific studies. Some tabulations were included in the 1966 paper as examples, and the original intent of this present study was to develop the form of the tables into a more systematic arrangement. The 1966 paper did not discuss the importance of having the information (definitions, references, sources of data, etc.) directly retrievable by use of a mechanized storage and retrieval system.

It is this problem--the organization for machine handling of a subject in a logical classificatory manner, tied in with appropriate reference material--that forms the basis of this report. The approach is experimental, inasmuch as the three months that were available imposed severe limitations on the perfection of any scheme. This report accordingly examines one approach to the very large problem of storage and retrieval of literature references, operational definitions used in measurement procedures, subdivisions of topics within a larger subject, and so on.

It was agreed in preliminary discussions that some single relatively confined subject should be used for experimentation. The subject selected is the concept of a drainage basin. As work proceeded, it was early seen that the drainage basin, as a geological-geographic topic, is not an easily defined or circumscribed topic, inasmuch as it is related to many other topics, such as stream flow, vegetation, soil attributes, etc. Moreover, the literature on the subject proved to be surprisingly large, and not very homogeneous In examining some 850 references, the writer found that the significant characteristics of a drainage basin were expressed in many different ways by different authors, who also differ in the ways they measure certain variables, and in the kinds of statistical or other analysis used for data reduction by hand methods or by computer.

As the magnitude of the study emerged, it was realized that time limitations required the setting of certain boundaries on the project. The principle objective became one of developing in a logical system those features that have been observed or measured by preceding workers, with some concern for the numerous interrelations among the many variables that can be included in the study of drainage basins.

On this basis, the purposes of this study are first, the organization of drainage basin characteristics in a logical order, according to a system which permits automatic storage and retrieval of the topics and relevant references. In addition, the system should outline interrelations among the topics or variables to see which ones are controlled by others. The first aim is to supply a common basis for future work in such a way that it will be possible to select variables suitable for studying any attributes of drainage basins. The second aim is to make explicit correlations among these variables, so that future studies may include such interrelationships as a basis for formulating general laws about interlocked characteristics in drainage basin phenomena.

ORGANIZATION OF TOPICS

For purposes of this study the drainage basin was first considered as a physical object with certain inherent attributes. These included its geometrical properties (drainage basin geometry); then the "internal" features were considered, including its lithology (drainage basin lithology); streams (streams in the drainage basin); the material eroded and carried by the streams (stream transportation); the sediments laid down by streams (stream deposits); the climate in the basin (drainage basin climate); and the subsurface water (subsurface water in the drainage basin). Each of these topics, of course, includes many variables, and these also must be ordered in a logical way.

From this preliminary outline it is evident that the number of variables connected with a drainage basin may be very large, although at the start this was not fully apparent. For this reason it was necessary to use methods different from the usual hand-sorted outlines. Each variable was punched on an IBM card and the name of the variable was preceded by a numerical code. The card also carries a code (as will be explained further on) which defines the "quality" of the card. In this way each variable is characterized by a different numerical code which permits direct retrieval of the topics as well as reference cards with the literature regarding the variable. Comment cards which note relationships between one variable and others in the basin are also retrievable.

As it was stated earlier, this report is not exhaustive; rather it is hoped that the present approach may suggest other ways in which the code may be changed according to individual needs that its use will indicate. It is also recognized that some "internal" characteristics of the basin are neglected, especially those that belong to other fields of science rather than to geology, such as botany (for ecological aspects of the basin), etc.

THE CODING SYSTEM

The numerical code for classification was divided into ten groups of numbers, each made of one or two digits. These groups provide a hierarchial subdivision among the topics and variables in each major subdivision.

The "main subject" was defined in this paper as the Drainage Basin, and it was identified by the number 01 at the beginning of the code. This code number is constant for all the variables, whatever their level of distinction, because all the variables here belong to the drainage basin. Two digits were chosen to have a flexibility of the code and to provide for as many as 99 main subjects in an expanded classification scheme. Thus, coastal morphology, for instance, could be coded as 02 for the main subject, volcanic morphology as 03, and so on.

Table A shows the punched card format for the coding system. The several levels of coding are illustrated in subsequent tables. All table printouts have these levels indicated by a set of heading cards, as shown in Table B.

The blank columns between code numbers in Table A permit more convenient reading of the codes when the cards are listed, and they provide in essence a total field of 29 columns for a coding scheme. This flexibility was decided upon in order to leave ample room for other kinds of coding schemes that may occur to workers in the field. Basically, the intent is to provide for a hierarchial classification scheme to represent successively greater detail as the code is followed from the main subject (top level) to the seventh class at the lowest

TABLE A

HIERARCHIAL CODING SCHEME FOR PUNCHED CARDS

Columns 1, 2	Main subject
Column 3	Blank
Columns 4, 5	Primary code
Column 6	Blank
Columns 7, 8	First subject class
Column 9	Blank
Columns 10, 11	Second subject class
Column 12	Blank
Columns 13, 14	Third subject class
Column 15	Blank
Columns 16, 17	Fourth subject class
Column 18	Blank
Columns 19, 20	Fifth subject class
Column 21	Blank
Column 22	Sixth subject class
Column 23	Blank
Column 24	Seventh subject class
Columns 25, 26	Blank
Column 27	Card type code
Columns 28, 29	Blank

TABLE B

SUBJECT HEADINGS FOR SYSTEM TABULATIONS

DRAINAGE BASIN (MAIN SUBJECT = 01)

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	SUBJECT CLASSES: FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	01	00	00	00	00	00	0	0	1	DRAINAGE BASIN GEOMETRY	

level. In fact, the seventh level of classification was not used here, inasmuch as full coverage was achieved in six categorical levels.

The main subject code (01) was divided into seven primary subjects, with code numbers as follows:

01 01	Drainage basin Geometry
01 02	Drainage basin Lithology
01 03	Streams in the Drainage basin
01 04	Stream Transportation
01 05	Stream Deposits
01 06	Drainage basin Climate
01 07	Subsurface water in the Drainage basin

The primary code is also flexible and permits as many as 99 main subjects. Thus, 01 08 might be Vegetation in the Drainage basin, 01 09 the Human influence in the Drainage basin, 01 10 the Fauna in the Drainage basin, etc.

The other seven code groups of Table A (the first five having two digits and the last two one digit each) represent seven hierarchial classes in which the variables for each primary code can be divided.

The first subject class is the highest level of subdivision under the primary code, and the seventh subject class is the lowest; this means that the detail is always greater in going from the first to the seventh class. Thus, in the primary code for <u>Drainage Basin Geometry</u> (01 01), there are 11 items under the first subject class, ranging from 01 01 01 to 01 01 11.

Table 1 lists the subject cards (code 1) for Drainage Basin Geometry. The cards all contain the code 01 01, and in the third code position, which represents the first subject class, there are eleven subdivisions, including area, width, length, etc., to the last class,

TABLE 1

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT CODE	PRIMARY CODE	SUBJECT CLASSES FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARD CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	01	00	00	00	00	00	0	0	1	DRAINAGE BASIN GEOMETRY	
01	01	01	00	00	00	00	0	0	1	AREA	L**2
01	01	02	00	00	00	00	0	0	1	WIDTH	L
01	01	03	00	00	00	00	0	0	1	LENGTH	L
01	01	04	00	00	00	00	0	0	1	PERIMETER LENGTH	L
01	01	05	00	00	00	00	0	0	1	SHAPE	
01	01	05	01	00	00	00	0	0	1	CIRCULARITY RATIO	
01	01	05	02	00	00	00	0	0	1	ELONGATION RATIO	
01	01	05	03	00	00	00	0	0	1	RATIO BTWN LENGTH AND WIDTH	
01	01	06	00	00	00	00	0	0	1	RELIEF (ELEVATION)	L
01	01	06	01	00	00	00	0	0	1	MAXIMUM	L
01	01	06	02	00	00	00	0	0	1	MINIMUM	L
01	01	06	03	00	00	00	0	0	1	TOTAL	L
01	01	06	03	01	00	00	0	0	1	RELIEF RATIO	
01	01	06	04	00	00	00	0	0	1	RELATIVE	
01	01	06	05	00	00	00	0	0	1	HYPSOMETRY	L
01	01	06	05	01	00	00	0	0	1	HYPSOMETRIC CURVE	
01	01	06	05	01	01	00	0	0	1	AREA BELOW THE CURVE	L**2
01	01	06	05	01	02	00	0	0	1	SLOPE OF THE CURVE	DEGREES
01	01	06	05	01	03	00	0	0	1	INFLECTION POINTS	
01	01	07	00	00	00	00	0	0	1	SLOPE	DEGREES
01	01	07	01	00	00	00	0	0	1	GROUND SLOPE	
01	01	07	01	01	00	00	0	0	1	CURVATURE	
01	01	07	01	01	01	00	0	0	1	CONCAVITY	
01	01	07	01	01	02	00	0	0	1	CONVEXITY	
01	01	07	01	02	00	00	0	0	1	MEAN SLOPE CURVE	
01	01	07	01	03	00	00	0	0	1	SLOPE FREQUENCY DISTRIBUTION	
01	01	07	01	03	01	00	0	0	1	STATISTICAL PARAMETERS	
01	01	08	00	00	00	00	0	0	1	ORDER OF BASIN	
01	01	08	01	00	00	00	0	0	1	BASINS OF LOWER ORDER IN MAIN BASIN	
01	01	08	01	01	00	00	0	0	1	NUMBER	
01	01	08	01	02	00	00	0	0	1	AREA	L**2
01	01	08	01	02	01	00	0	0	1	RATIOS BTWN SUCCESSIVE AREAS	
01	01	09	00	00	00	00	0	0	1	TEXTURE OF BASIN TOPOGRAPHY	
01	01	09	01	00	00	00	0	0	1	COARSE	
01	01	09	02	00	00	00	0	0	1	MEDIUM	
01	01	09	03	00	00	00	0	0	1	FINE	
01	01	09	04	00	00	00	0	0	1	ULTRA FINE	
01	01	10	00	00	00	00	0	0	1	BELT OF NO EROSION	
01	01	10	01	00	00	00	0	0	1	WIDTH	L
01	01	10	02	00	00	00	0	0	1	AREA	L**2
01	01	11	00	00	00	00	0	0	1	DEPRESSION STORAGE (LAKES, ETC.)	
01	01	11	01	00	00	00	0	0	1	AREA OF DEPRESSIONS	L**2
01	01	11	01	01	00	00	0	0	1	PERCENTAGE TO BASIN AREA	
01	01	11	02	00	00	00	0	0	1	VOLUME OF WATER	L**3

depression storage. Some of these first subject class items are further subdivided, such as 01 01 03 on the length of the basin. Here 01 01 03 01 refers to the length-width ratio of the basin. Similarly, the relief of the basin, 01 01 06, has maximum relief as 01 01 06 01, with additional topics up to code 01 01 06 05

The most detailed classification in Table 1 extends to the fourth subject level, as illustrated by 01 01 06 05 01 01, which represents the area below the hypsometric curve of the basin. Hence, in this table the geometric details of the basin are covered with no more than a total of six code positions, leaving classes 5, 6, and 7 open for further fine detail. As will be seen shortly, some topics extend to the sixth class level, but no subdivisions go as far as class seven. This code position was retained, however, for possible future use.

The complete code for any given item in Table 1 permits tracing the hierarchy back to its top level. Thus, the code 01 01 06 05 01 03 refers to the inflexion points (03) of the hypsometric curve (01) of the hypsometry (05) of the relief (06) of the geometry (01) of the drainage basin (01).

CARD TYPE CODES

Besides the groups of numbers which classify the variables, the last code number in Table 1 defines the type of card involved. In this paper the numbers 1, 2, 3, in column 27 of Table A indicate, respectively, subject code cards with the name of the variables, cards with literature references for each variable; and "comment cards" in which some remarks and the relevant literature are recorded. These three card types are perhaps the basic ones in relating the subject matter to its corresponding body of literature. However, it had been hoped that a larger variety of card types could have been included in the present version. For example, additional card types could include examples of statistical or other mathematical analysis of the variables in the subject hierarchy, with their literature references. Additionally, for a much expanded system, references could be included under card type codes to indicate sources of observational data, or publications containing data on particular subjects. As with other considerations, time limitations prevented this larger system.

The card type codes are punched on each card to facilitate automatic sorting procedures, and to obtain subsets of literature references, etc. Thus, in preparing subject outlines, such as shown in Table 1, the type 1 cards alone are required, and these are directly recoverable by sorting on column 27. Table 1 was made, in fact, by first sorting subject codes 01 01 in columns 1 through 5, and then sorting for card type 1 in column 27.

Card code 1

These cards, as stated, refer directly to the subject matter, whatever the subdivision level. Almost all of these are expressed as quantitative variables, to provide as far as possible, a listing of objective definitions or descriptions of the characteristics of a drainage basin.

Referring back to Table 1, for example, an attempt was made here to include not only features that belong to drainage basin geometry, but, where applicable, to indicate the dimensions of the variable in terms of length, time, and mass. These units are abbreviated (L = length, T = time, and M = mass), and the dimensional formulas are expressed as nominal Fortran symbols. Thus, in Table 1 in the second line, basin area is given as L**2, to indicate L^2. If angular measurements are involved, they are indicated as degrees, which are non-dimensional.

With respect to the subject classification of Table 1, the eleven topics appear to cover the significant variables for the geometrical description of a drainage basin as an object. By use of these variables it should be possible to draw distinctions among different basins, to compare mean areas or other attributes, and to derive statistical correlations among the geometrical properties of drainage basins.

Tables 2 through 7, inclusive, are printouts of the type 1 cards in the present system. These tables (including Table 1) cover primary codes 01 01 to 01 07, which represent all the major subdivisions of drainage basins that are included in this report, as listed on a previous page. It is evident that these seven subjects do not by any means cover all possible topics related to drainage basins. As stated earlier, basin vegetation is not included, nor is provision made for certain major geographical subjects related to man's occupancy of the basin; road and other transportation networks that may be involved; and so on. It is evident also that other hierarchial schemes could have been used for the assignment of specific topics to a given major heading. Soils in the basin, for example, are directly related to the bedrock present (at least in non-glaciated areas), but the soils also reflect climatic factors, and could perhaps have been grouped under 01 06 rather than with lithology (01 02).

These remarks are included to indicate the somewhat preliminary nature of the present organization. The writer does not wish to convey the idea that the organization of subjects followed here is either the most logical or the most efficient. It is nevertheless hoped that the reader will gain ideas for the classification of subjects of particular interest to himself in research or teaching

TABLE 2

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARD CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	02	00	00	00	00	00	0	0	1	BASIN LITHOLOGY	
01	02	01	00	00	00	00	0	0	1	SOILS	
01	02	01	01	00	00	00	0	0	1	MEAN ELEVATION	L
01	02	01	02	00	00	00	0	0	1	MEAN SLOPE	DEGREES
01	02	01	03	00	00	00	0	0	1	PROFILE	
01	02	01	03	01	00	00	0	0	1	ORGANIC HORIZONS	
01	02	01	03	01	01	00	0	0	1	HORIZON O	
01	02	01	03	01	01	01	0	0	1	HORIZON 01	
01	02	01	03	01	01	02	0	0	1	HORIZON 02	
01	02	01	03	02	00	00	0	0	1	MINERAL HORIZONS	
01	02	01	03	02	01	00	0	0	1	HORIZON A	
01	02	01	03	02	01	01	0	0	1	HORIZON A1	
01	02	01	03	02	01	02	0	0	1	HORIZON A2	
01	02	01	03	02	01	03	0	0	1	HORIZON A3	
01	02	01	03	02	01	04	0	0	1	HORIZON AB	
01	02	01	03	02	01	05	0	0	1	HORIZON A+B	
01	02	01	03	02	01	06	0	0	1	HORIZON AC	
01	02	01	03	02	02	00	0	0	1	HORIZON B	
01	02	01	03	02	02	01	0	0	1	HORIZON B1	
01	02	01	03	02	02	02	0	0	1	HORIZON B2	
01	02	01	03	02	02	03	0	0	1	HORIZON B3	
01	02	01	03	02	02	04	0	0	1	HORIZON B+A	
01	02	01	03	02	03	00	0	0	1	HORIZON C	
01	02	01	03	02	04	00	0	0	1	HORIZON R	
01	02	01	04	00	00	00	0	0	1	THICKNESS	L
01	02	01	05	00	00	00	0	0	1	COLOR	
01	02	01	06	00	00	00	0	0	1	COMPOSITION	
01	02	01	06	01	00	00	0	0	1	MINERALOGICAL	
01	02	01	06	01	01	00	0	0	1	SILT FRACTION	
01	02	01	06	01	02	00	0	0	1	CLAY FRACTION	
01	02	01	06	02	00	00	0	0	1	CHEMICAL	
01	02	01	06	02	01	00	0	0	1	PH	
01	02	01	06	02	02	00	0	0	1	CATION EXCHANGE CAPACITY	
01	02	01	06	02	03	00	0	0	1	EXTRACTABLE CATIONS	
01	02	01	06	02	04	00	0	0	1	BASE SATURATION	
01	02	01	06	03	00	00	0	0	1	BIOLOGICAL	
01	02	01	06	03	01	00	0	0	1	AMOUNT OF ORGANIC MATTER	
01	02	01	07	00	00	00	0	0	1	TEXTURE	
01	02	01	07	01	00	00	0	0	1	PARTICLE SIZE COMPOSITION	
01	02	01	07	01	01	00	0	0	1	GRAVEL	
01	02	01	07	01	02	00	0	0	1	SAND	
01	02	01	07	01	03	00	0	0	1	SILT	
01	02	01	07	01	04	00	0	0	1	CLAY	
01	02	01	07	01	04	01	0	0	1	DISPERSION RATIO	
01	02	01	07	01	04	02	0	0	1	SURFACE AGGREGATION RATIO	
01	02	01	07	01	05	00	0	0	1	GRAIN SIZE FREQ. DISTRIBUTION	
01	02	01	07	01	05	01	0	0	1	STATISTICAL PARAMETERS	
01	02	01	07	01	06	00	0	0	1	COLLOIDS	
01	02	01	07	01	06	01	0	0	1	HUMUS COLLOIDS	
01	02	01	07	01	06	02	0	0	1	INORGANIC COLLOIDS	
01	02	01	07	01	06	03	0	0	1	COLLOIDS TO MOISTURE EQUIV RATIO	
01	02	01	08	00	00	00	0	0	1	STRUCTURE	
01	02	01	08	01	00	00	0	0	1	BLOCKY	
01	02	01	08	02	00	00	0	0	1	GRANULAR	
01	02	01	08	03	00	00	0	0	1	COLUMNAR	
01	02	01	08	04	00	00	0	0	1	PRISMATIC	
01	02	01	08	05	00	00	0	0	1	PLATY	
01	02	01	09	00	00	00	0	0	1	POROSITY	
01	02	01	10	00	00	00	0	0	1	PERMEABILITY	L/T
01	02	01	10	01	00	00	0	0	1	COEFFICIENT OF PERMEABILITY	L/T
01	02	01	10	02	00	00	0	0	1	COEFFICIENT OF TRANSMISSIBILITY	L**2/T
01	02	01	11	00	00	00	0	0	1	STRENGTH	
01	02	01	11	01	00	00	0	0	1	SOIL BULK DENSITY	M/L**3
01	02	01	11	02	00	00	0	0	1	PLASTICITY	
01	02	01	11	03	00	00	0	0	1	DEGREE OF CONSISTENCY	
01	02	01	11	04	00	00	0	0	1	SHEAR STRENGTH	M/L**2
01	02	01	11	04	01	00	0	0	1	INDEX OF RESISTANCE	
01	02	01	11	05	00	00	0	0	1	ERODABILITY	
01	02	01	11	05	01	00	0	0	1	EROSION RATIO	
01	02	01	11	05	02	00	0	0	1	FACTOR OF EROSION	T/L
01	02	01	11	05	03	00	0	0	1	INDEX OF ERODABILITY	
01	02	01	12	00	00	00	0	0	1	SOIL MOISTURE	
01	02	01	12	01	00	00	0	0	1	INFILTRATION	L/T
01	02	01	12	01	01	00	0	0	1	RATE OF INFILTRATION	L/T
01	02	01	12	02	00	00	0	0	1	WILTING POINT	L
01	02	01	12	02	01	00	0	0	1	AVAILABLE WATER STORAGE CAPACITY	L**3
01	02	02	00	00	00	00	0	0	1	BEDROCK	
01	02	02	01	00	00	00	0	0	1	COMPOSITION	
01	02	02	01	01	00	00	0	0	1	PETROGRAPHICAL	
01	02	02	01	02	00	00	0	0	1	MINERALOGICAL	
01	02	02	01	03	00	00	0	0	1	CHEMICAL	
01	02	02	02	00	00	00	0	0	1	LITHOLOGY	
01	02	02	02	01	00	00	0	0	1	IGNEOUS ROCKS	
01	02	02	02	01	01	00	0	0	1	INTRUSIVE	
01	02	02	02	01	02	00	0	0	1	EXTRUSIVE	
01	02	02	02	02	00	00	0	0	1	METAMORPHIC ROCKS	
01	02	02	02	03	00	00	0	0	1	PYROCLASTIC ROCKS	
01	02	02	02	04	00	00	0	0	1	SEDIMENTARY ROCKS	
01	02	02	02	04	01	00	0	0	1	CLASTIC ROCKS	
01	02	02	02	04	01	01	0	0	1	GRAINSIZE FREQ. DISTRIBUTION	
01	02	02	02	04	01	01	1	0	1	STATISTICAL PARAMETERS	
01	02	02	02	04	02	00	0	0	1	NON CLASTIC ROCKS	
01	02	02	02	04	02	01	0	0	1	CARBONATE	
01	02	02	02	04	02	01	1	0	1	LIMESTONE	
01	02	02	02	04	02	01	2	0	1	DOLOMITIC	
01	02	02	02	04	02	02	0	0	1	EVAPORITES	
01	02	02	03	00	00	00	0	0	1	MASS PROPERTIES	
01	02	02	03	01	00	00	0	0	1	POROSITY	
01	02	02	03	02	00	00	0	0	1	PERMEABILITY	L/T
01	02	02	04	00	00	00	0	0	1	STRUCTURE	
01	02	02	04	01	00	00	0	0	1	MASSIVE	
01	02	02	04	02	00	00	0	0	1	BEDDED	
01	02	02	04	02	01	00	0	0	1	BEDS	
01	02	02	04	02	01	01	0	0	1	THICKNESS	L
01	02	02	04	02	01	01	1	0	1	MAXIMUM	L
01	02	02	04	02	01	01	2	0	1	MINIMUM	L
01	02	02	04	02	01	01	3	0	1	FREQUENCY DISTRIBUTION	
01	02	02	04	02	01	01	4	0	1	MEAN THICKNESS	L
01	02	02	04	02	01	02	0	0	1	STRIKE	DEGREES
01	02	02	04	02	01	03	0	0	1	DIP	DEGREES
01	02	02	04	02	02	00	0	0	1	FRACTURES	
01	02	02	05	00	00	00	0	0	1	TECTONICS (REGIONAL STRUCTURE)	
01	02	02	05	01	00	00	0	0	1	STRIKE	DEGREES
01	02	02	05	02	00	00	0	0	1	DIP	DEGREES

TABLE 3

MAIN SUBJECT	PRIMARY CODE	SUBJECT CLASSES FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS CARD CODE 1 = SUBJECT CARD CODE 2 = REFERENCES CARD CODE 3 = REMARKS	DIMENSIONS
01	03	00	00	00	00	00	0	0	1	STREAMS IN DRAINAGE BASIN	
01	03	01	00	00	00	00	0	0	1	ORIENTATION	DEGREES
01	03	02	00	00	00	00	0	0	1	LENGTH	L
01	03	03	00	00	00	00	0	0	1	CROSS SECTION	
01	03	03	01	00	00	00	0	0	1	WIDTH	L
01	03	03	02	00	00	00	0	0	1	DEPTH	L
01	03	03	02	01	00	00	0	0	1	AVERAGE	L
01	03	03	03	00	00	00	0	0	1	AREA	L002
01	03	03	04	00	00	00	0	0	1	WETTED PERIMETER	L
01	03	03	04	01	00	00	0	0	1	HYDRAULIC RADIUS	L
01	03	04	00	00	00	00	0	0	1	PROFILE ALONG STREAM	
01	03	04	01	00	00	00	0	0	1	CURVATURE	
01	03	05	90	00	00	00	0	0	1	GRADIENT	L
01	03	05	01	00	00	00	0	0	1	SLOPE OF WATER SURFACE	DEGREES
01	03	06	00	00	00	00	0	0	1	DEPTH OF WATER	L
01	03	06	01	00	00	00	0	0	1	MAXIMUM	
01	03	06	02	00	00	00	0	0	1	MINIMUM	L
01	03	06	02	01	00	00	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	L
01	03	06	03	00	00	00	0	0	1	AVERAGE	L
01	03	06	03	01	00	00	0	0	1	VARIATION IN TIME	
01	03	07	00	00	00	00	0	0	1	DISCHARGE	L003/T
01	03	07	01	00	00	00	0	0	1	MAXIMUM	L003/T
01	03	07	02	00	00	00	0	0	1	MINIMUM	L003/T
01	03	07	02	01	00	00	0	0	1	DIFFERENCE BTWN. MAX. AND MIN.	L003/T
01	03	07	03	00	00	00	0	0	1	AVERAGE	L003/T
01	03	07	04	00	00	00	0	0	1	RELATIVE	
01	03	07	05	00	00	00	0	0	1	VARIATION IN TIME	
01	03	07	06	00	00	00	0	0	1	FLOW DURATION CURVE	
01	03	07	07	00	00	00	0	0	1	FLOW DISTRIBUTION GRAPH	
01	03	07	08	00	00	00	0	0	1	BASE DISCHARGE	L003/T
01	03	07	09	00	00	00	0	0	1	FLOOD DISCHARGE	L003/T
01	03	07	09	01	00	00	0	0	1	FLOODED CHANNEL WIDTH	L
01	03	07	09	02	00	00	0	0	1	WATER HEIGHT IN FLOOD	L
01	03	07	09	03	00	00		0	1	FLOOD WAVE	
01	03	07	09	03	01	00	0	0	1	FLOOD ROUTING	
01	03	07	09	04	00	00	0	0	1	FLOOD PEAK	L003/T
01	03	07	09	04	01	00	0	0	1	MAXIMUM	L003/T
01	03	07	09	04	01	01	0	0	1	MAXIMUM PROBABLE	L003/T
01	03	07	09	04	02	00	0	0	1	MEAN	L003/T
01	03	07	09	04	03	00	0	0	1	VARIATION THROUGH TIME	
01	03	07	09	04	04	00	0	0	1	PARTIAL DURATION SERIES	
01	03	07	09	05	00	00	0	0	1	RECURRENCE INTERVAL	T
01	03	07	09	05	01	00	0	0	1	PROBABILITY OF RECURRENCE	
01	03	07	09	05	02	00	0	0	1	FLOOD FREQUENCY	
01	03	07	09	06	00	00	0	0	1	BANKFULL STAGE	L
01	03	08	00	00	00	00	0	0	1	VELOCITY	L/T
01	03	08	01	00	00	00	0	0	1	MAXIMUM	L/T
01	03	08	02	00	00	00	0	0	1	MINIMUM	L/T
01	03	08	02	01	00	00	0	0	1	DIFFERENCE BTWN. MAX. AND MIN.	L/T
01	03	08	03	00	00	00	0	0	1	MEAN	L/T
01	03	09	00	00	00	00	0	0	1	TURBULENCE	
01	03	09	01	00	00	00	0	0	1	REYNOLDS NUMBER	
01	03	09	02	00	00	00	0	0	1	SHEAR STRESS	M/L002T002
01	03	09	02	01	00	00	0	0	1	RESISTANCE	M/L004
01	03	10	00	00	00	00	0	0	1	KINETIC ENERGY	ML002/T002
01	03	11	00	00	00	00	0	0	1	BED	
01	03	11	01	00	00	00	0	0	1	PHYSICAL NATURE OF BED	
01	03	11	01	01	00	00	0	0	1	CHANNEL BED ROUGHNESS	
01	03	12	00	00	00	00	0	0	1	VALLEY OF MAIN STREAM	
01	03	12	01	00	00	00	0	0	1	LENGTH	L
01	03	12	02	00	00	00	0	0	1	WIDTH	L
01	03	12	02	01	00	00	0	0	1	MAXIMUM	L
01	03	12	02	02	00	00	0	0	1	MINIMUM	L
01	03	12	03	00	00	00	0	0	1	DEPTH	L
01	03	12	03	01	00	00	0	0	1	VARIATION DOWNSTREAM	
01	03	12	04	00	00	00	0	0	1	ELEVATION OF VALLEY DIVIDE	L
01	03	12	05	00	00	00	0	0	1	FLOOD PLAIN	
01	03	12	05	01	00	00	0	0	1	PRESENT DAY FLOOD PLAIN	
01	03	12	05	01	01	00	0	0	1	DIMENSIONS	L
01	03	12	05	01	02	00	0	0	1	HEIGHT OF LOW TERRACES	L
01	03	12	05	02	00	00	0	0	1	FLOOD PLAIN OF A PREVIOUS AGE	
01	03	12	05	02	01	00	0	0	1	DIMENSIONS	L
01	03	12	05	02	02	00	0	0	1	HEIGHT OF HIGH TERRACES	L
01	03	12	06	00	00	00	0	0	1	VALLEY ASYMMETRY	
01	03	12	07	00	00	00	0	0	1	VALLEY WALL SLOPES	DEGREES
01	03	13	00	00	00	00	0	0	1	BRAIDING (ANASTOMOSIS)	
01	03	14	00	00	00	00	0	0	1	MEANDERS	
01	03	14	01	00	00	00	0	0	1	AMPLITUDE	L
01	03	14	02	00	00	00	0	0	1	LENGTH	L
01	03	14	03	00	00	00	0	0	1	BELT WIDTH	L
01	03	14	04	00	00	00	0	0	1	RADIUS OF CURVATURE	L
01	03	14	04	01	00	00	0	0	1	MEAN	L
01	03	15	00	00	00	00	0	0	1	BANKS	
01	03	15	01	00	00	00	0	0	1	LITHOLOGICAL COMPOSITION	
01	03	15	02	00	00	00	0	0	1	HEIGHT	L
01	03	16	00	0(	00	00	0	0	1	STREAM ORDER	
01	03	16	01	0(	00	00	0	0	1	CHANNELS OF ORDER LOWER THAN THE MAIN STREAM	
01	03	16	01	0	00	00	0	0	1	NUMBER	
01	03	16	01	C1	01	00	0	0	1	BIFURCATION RATIO	
01	03	16	31	/1	01	01	0	0	1	AVERAGE FOR ALL THE BASIN	
01	03	16	01	02	00	00	0	0	1	LENGTH	
01	03	16	01	02	01	00	0	0	1	MEAN	L
01	03	16	01	02	01	01	0	0	1	RATIO BTWN SUCCESSIVE ORDERS	L
01	03	16	01	03	00	00	0	0	1	SLOPE	DEGREES
01	03	16	01	03	01	00	0	0	1	MEAN	DEGREES
01	03	16	01	03	01	01	0	0	1	RATIO BTWN SUCCESSIVE ORDERS	
01	03	16	01	04	00	00	0	0	1	ENTRANCE ANGLE OF TRIBUTARIES	DEGREES
01	03	16	01	04	01	00	0	0	1	MEAN	DEGREES
01	03	17	00	00	00	00	0	0	1	STORAGE	L003
01	03	17	01	00	00	00	0	0	1	CHANNEL STORAGE	L003
01	03	17	02	00	00	00	0	0	1	BANK STORAGE	L003
01	03	18	00	00	00	00	0	0	1	WORKS OF MAN	
01	03	18	01	00	00	00	0	0	1	DAMS	
01	03	18	01	01	00	00	0	0	1	DIMENSIONS	L
01	03	18	01	02	00	00	0	0	1	RESERVOIR	
01	03	18	01	02	01	00	0	0	1	LENGTH	L
01	03	18	01	02	02	00	0	0	1	WIDTH	L
01	03	18	01	02	03	00	0	0	1	AVERAGE DEPTH	L
01	03	18	01	02	04	00	0	0	1	AREA	L002
01	03	18	01	02	05	00	0	0	1	VOLUME OF WATER	L003
01	03	18	01	02	05	01	0	0	1	EVAPORATION RATE	L003
01	03	18	01	02	05	01	1	0	1	VARIATION THROUGH TIME	
01	03	18	01	02	05	02	0	0	1	STAGE CAPACITY CURVE	
01	03	18	01	02	05	02	1	0	1	DEAD STORAGE	L003
01	03	18	02	00	00	00	0	0	1	DIVERSION CHANNEL	
01	03	18	02	01	00	00	0	0	1	DISCHARGE	L003/T
01	03	18	02	01	01	00	0	0	1	MAXIMUM	L003/T
01	03	18	02	01	02	00	0	0	1	MINIMUM	L003/T
01	03	18	02	01	03	00	0	0	1	AVERAGE	L003/T
01	03	18	02	01	03	01	0	0	1	VARIATION IN TIME	

TABLE 4

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	SUBJECT CLASSES FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	04	00	00	00	00	00	0	0	1	STREAM TRANSPORTATION	
01	04	01	00	00	00	00	0	0	1	TRACTIVE CAPACITY	ML/T
01	04	01	01	00	00	00	0	0	1	MAXIMUM	ML/T
01	04	01	02	00	00	00	0	0	1	MINIMUM	ML/T
01	04	01	02	01	00	00	0	0	1	DIFFERENCE BTWN. MAX. AND MIN.	ML/T
01	04	01	03	00	00	00	0	0	1	MEAN	ML/T
01	04	01	04	00	00	00	0	0	1	VARIATION IN TIME	
01	04	01	04	01	00	00	0	0	1	FREQUENCY DISTRIBUTION	
01	04	01	04	01	01	00	0	0	1	STATISTICAL PARAMETERS	
01	04	02	00	00	00	00	0	0	1	TRACTIVE COMPETENCE	L**3
01	04	02	01	00	00	00	0	0	1	MAXIMUM	L**3
01	04	02	02	00	00	00	0	0	1	MINIMUM	L**3
01	04	02	02	01	00	00	0	0	1	DIFFERENCE BTWN. MAX. AN MIN.	L**3
01	04	02	03	00	00	00	0	0	1	MEAN	L**3
01	04	02	04	00	00	00	0	0	1	VARIATION IN TIME	
01	04	02	04	01	00	00	0	0	1	FREQUENCY DISTRIBUTION	
01	04	02	04	01	01	00	0	0	1	STATISTICAL PARAMETERS	
01	04	03	00	00	00	00	0	0	1	SEDIMENT CONCENTRATION	M/L**3
01	04	03	01	00	00	00	0	0	1	MAXIMUM	M/L**3
01	04	03	02	00	00	00	0	0	1	MINIMUM	M/L**3
01	04	03	02	01	00	00	0	0	1	DIFFERENCE BTWN. MAX. AND MIN.	M/L**3
01	04	03	03	00	00	00	0	0	1	MEAN	M/L**3
01	04	03	04	00	00	00	0	0	1	VARIATION IN TIME	
01	04	03	04	01	00	00	0	0	1	FREQUENCY DISTRIBUTION	
01	C4	03	04	01	01	00	0	0	1	STATISTICAL PARAMETERS	
01	04	04	00	00	00	00	0	0	1	SEDIMENT LOAD	M
01	04	04	01	00	00	00	0	0	1	BED LOAD	M
01	04	04	01	01	00	00	0	0	1	PEBBLES	
01	04	04	01	01	01	00	0	0	1	LITHOLOGICAL COMPOSITION	
01	04	04	01	01	01	01	0	0	1	DOWNSTREAM VARIATION	
01	04	04	01	02	00	00	0	0	1	FINEGRAINED SEDIMENTS	
01	04	04	01	02	01	00	0	0	1	MINERALOGICAL COMPOSITION	
01	04	04	01	02	01	01	0	0	1	DOWNSTREAM VARIATION	
01	04	04	01	03	00	00	0	0	1	GRAINSIZE FREQUENCY DISTRIBUTION	
01	04	04	01	03	01	00	0	0	1	DOWNSTREAM VARIATION	
01	04	04	01	03	02	00	0	0	1	STATISTICAL PARAMETERS	
01	04	04	01	03	02	01	0	0	1	DOWNSTREAM VARIATION	
01	04	04	02	00	00	00	0	0	1	SUSPENDED LOAD	M
01	04	04	02	01	00	00	0	0	1	CONCENTRATION	M/L**3
01	04	04	02	01	01	00	0	0	1	DOWNSTREAM VARIATION	
01	04	04	02	02	00	00	0	0	1	MINERALOGICAL COMPOSOTION	
01	04	04	02	02	01	00	0	0	1	DOWNSTREAM VARIATION	
01	04	04	02	03	00	00	0	0	1	GRAINSIZE FREQ. DISTRIBUTION	
01	04	04	02	03	01	00	0	0	1	DOWNSTREAM VARIATION	
01	04	04	02	03	02	00	0	0	1	STATISTICAL PARAMETERS	
01	04	04	02	03	02	01	0	0	1	DOWNSTREAM VARIATION	
01	04	04	03	00	00	00	0	0	1	DISSOLVED LOAD	M
01	04	04	03	01	00	00	0	0	1	CONCENTRATION	M/L**3
01	04	04	03	01	01	00	0	0	1	DOWNSTREAM VARIATION	
01	04	04	03	02	00	00	0	0	1	CHEMICAL COMPOSTION	
01	04	04	03	02	01	00	0	0	1	DOWNSTREAM VARIATION	

TABLE 5

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	SUBJECT CLASSES FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	05	00	00	00	00	00	0	0	1	STREAM DEPOSITS	
01	05	01	00	00	00	00	0	0	1	COMPOSITION	
01	05	01	01	00	00	00	0	0	1	PETROGRAPHICAL	
01	05	01	02	00	00	00	0	0	1	MINERALOGICAL	
01	05	02	00	00	00	00	0	0	1	TEXTURE	
01	05	02	01	00	00	00	0	0	1	VARIATION DOWNSTREAM	
01	05	03	00	00	00	00	0	0	1	STRUCTURE	
01	05	03	01	00	00	00	0	0	1	CROSS BEDDING	
01	05	04	00	00	00	00	0	0	1	ALLUVIAL FANS	
01	05	04	01	00	00	00	0	0	1	DIMENSIONS	
01	05	04	02	00	00	00	0	0	1	SHAPE	
01	05	04	02	01	00	00	0	0	1	CROSS PROFILE	

TABLE 6

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	06	00	00	00	00	00	0	0	1	CLIMATE IN THE BASIN	
01	06	01	00	00	00	00	0	0	1	SOLAR RADIATION	CAL/L**2
01	06	01	01	00	00	00	0	0	1	NET SOLAR RADIATION	CAL/L**2
01	06	01	01	01	00	00	0	0	1	INCIDENT SOLAR RADIATION	CAL/L**2
01	06	02	00	00	00	00	0	0	1	TEMPERATURE	
01	06	02	01	00	00	00	0	0	1	MAXIMUM	
01	06	02	02	00	00	00	0	0	1	MINIMUM	
01	06	02	02	01	00	00	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	
01	06	02	03	00	00	00	0	0	1	MEAN	
01	06	02	03	01	00	00	0	0	1	VARIATION IN TIME	
01	06	02	03	01	01	00	0	0	1	FREQUENCY DISTRIBUTION	
01	06	02	03	01	01	01	0	0	1	STATISTICAL PARAMETERS	
01	06	03	00	00	00	00	0	0	1	WINDS	
01	06	03	01	00	00	00	0	0	1	PREDOMINANT DIRECTION	DEGREES
01	06	03	02	00	00	00	0	0	1	INTENSITY	L/T
01	06	03	02	01	00	00	0	0	1	MAXIMUM	L/T
01	06	03	02	02	00	00	0	0	1	MINIMUM	L/T
01	06	03	02	03	00	00	0	0	1	MEAN	L/T
01	06	04	00	00	00	00	0	0	1	PRECIPITATION	L
01	06	04	01	00	00	00	0	0	1	SNOWFALL	L/T
01	06	04	01	01	00	00	0	0	1	AMOUNT	L
01	06	04	01	01	01	00	0	0	1	MAXIMUM	L
01	06	04	01	01	02	00	0	0	1	MINIMUM	L
01	06	04	01	01	02	01	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	L
01	06	04	01	01	03	00	0	0	1	AVERAGE	L
01	06	04	01	01	04	00	0	0	1	VARIATION IN TIME	
01	06	04	01	01	04	01	0	0	1	FREQUENCY DISTRIBUTION	
01	06	04	01	02	00	00	0	0	1	INTENSITY	L/T
01	06	04	01	02	01	00	0	0	1	MAXIMUM	L/T
01	06	04	01	02	02	00	0	0	1	MINIMUM	L/T
01	06	04	01	02	03	00	0	0	1	MEAN	L/T
01	06	04	01	02	04	00	0	0	1	VARIATION IN TIME	
01	06	04	01	02	04	01	0	0	1	FREQUENCY DISTRIBUTION	
01	06	04	02	00	00	00	0	0	1	RAINFALL	
01	06	04	02	01	00	00	0	0	1	AMOUNT	L
01	06	04	02	01	01	00	0	0	1	MAXIMUM	L
01	06	04	02	01	02	00	0	0	1	MINIMUM	L
01	06	04	02	01	02	01	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	L
01	06	04	02	01	04	00	0	0	1	VARIATION IN TIME	
01	06	04	02	01	04	01	0	0	1	FREQUENCY DISTRIBUTION	
01	06	04	02	01	04	01	1	0	1	STATISTICAL PARAMETERS	
01	06	04	02	02	00	00	0	0	1	INTENSITY	L/T
01	06	04	02	02	01	00	0	0	1	MAXIMUM	L/T
01	06	04	02	02	02	00	0	0	1	MINIMUM	L/T
01	06	04	02	02	02	01	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	L/T
01	06	04	02	02	03	00	0	0	1	AVERAGE	L/T
01	06	04	02	02	04	00	0	0	1	VARIATION IN TIME	
01	06	04	02	02	04	01	0	0	1	FREQUENCY DISTRIBUTION	
01	06	04	02	02	04	01	1	0	1	STATISTICAL PARAMETERS	
01	06	04	02	03	00	00	0	0	1	RAINFALL KINETIC ENERGY	ML**2/T**2
01	06	04	03	00	00	00	0	0	1	ANTECEDENT PRECIPITATION INDEX	
01	06	04	04	00	00	00	0	0	1	RATE OF PRECIPITATION	
01	06	05	00	00	00	00	0	0	1	EVAPOTRANSPIRATION	L**3
01	06	05	01	00	00	00	0	0	1	POTENTIAL	L**3
01	06	05	02	00	00	00	0	0	1	ACTUAL	L**3
01	06	05	02	01	00	00	0	0	1	MINIMUM	L**3
01	06	05	02	02	00	00	0	0	1	AVERAGE	L**3
01	06	05	02	03	00	00	0	0	1	VARIATION IN TIME	
01	06	05	03	00	00	00	0	0	1	WATER SURPLUS	L**3
01	06	05	03	01	00	00	0	0	1	MAXIMUM	L**3
01	06	05	03	02	00	00	0	0	1	MINIMUM	L**3
01	06	05	03	02	01	00	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	L**3
01	06	05	03	03	00	00	0	0	1	AVERAGE	L**3
01	06	05	03	04	00	00	0	0	1	VARIATION IN TIME	
01	06	05	04	00	00	00	0	0	1	WATER DEFICIENCY	L**3
01	06	05	04	01	00	00	0	0	1	MAXIMUM	L**3
01	06	05	04	02	00	00	0	0	1	MINIMUM	L**3
01	06	05	04	02	01	00	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	L**3
01	06	05	04	03	00	00	0	0	1	AVERAGE	L**3
01	06	05	04	04	00	00	0	0	1	VARIATION IN TIME	

TABLE 7

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	SUBJECT CLASSES FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	07	00	00	00	00	00	0	0	1	SUBSURFACE WATER IN BASIN	
01	07	01	00	00	00	00	0	0	1	CHEMICAL COMPOSITION	
01	07	01	01	00	00	00	0	0	1	VARIATION THROUGH TIME	
01	07	02	00	00	00	00	0	0	1	DIRECTION OF FLOW	DEGREES
01	07	03	00	00	00	00	0	0	1	VELOCITY	L/T
01	07	03	01	00	00	00	0	0	1	VARIATION IN TIME	
01	07	04	00	00	00	00	0	0	1	DISCHARGE	L**3/T
01	07	04	01	00	00	00	0	0	1	MAXIMUM	L**3/T
01	07	04	02	00	00	00	0	0	1	MINIMUM	L**3/T
01	07	04	03	00	00	00	0	0	1	AVERAGE	L**3/T
01	07	04	04	00	00	00	0	0	1	VARIATION IN TIME	
01	07	05	00	00	00	00	0	0	1	AQUIFERS	
01	07	05	01	00	00	00	0	0	1	CONFINED	
01	07	05	01	01	00	00	0	0	1	SHAPE	
01	07	05	01	02	00	00	0	0	1	THICKNESS	L
01	07	05	01	02	01	00	0	0	1	MAXIMUM	L
01	07	05	01	02	02	00	0	0	1	MINIMUM	L
01	07	05	01	02	03	00	0	0	1	AVERAGE	L
01	07	05	01	03	00	00	0	0	1	STORAGE COEFFICIENT	
01	07	05	02	00	00	00	0	0	1	UNCONFINED	
01	07	05	02	01	00	00	0	0	1	WATER TABLE	
01	07	05	02	01	01	00	0	0	1	DEPTH	L
01	07	05	02	01	01	01	0	0	1	MAXIMUM	L
01	07	05	02	01	01	02	0	0	1	MINIMUM	L
01	07	05	02	01	01	03	0	0	1	AVERAGE	L
01	07	05	02	01	01	04	0	0	1	VARIATION IN TIME	
01	07	05	02	01	01	04	1	0	1	FREQUENCY DISTRIBUTION	
01	07	05	02	01	01	04	1	1	1	STATISTICAL PARAMETERS	
01	07	05	02	01	01	04	2	0	1	INFLUENT STREAMS	
01	07	05	02	01	01	04	3	0	1	EFFLUENT STREAMS	
01	07	05	02	02	00	00	0	0	1	SPECIFIC YIELD	
01	07	05	02	02	01	00	0	0	1	SPECIFIC RETENTION	
01	07	06	00	00	00	00	0	0	1	SPRINGS	
01	07	06	01	00	00	00	0	0	1	TOTAL NUMBER	
01	07	06	02	00	00	00	0	0	1	SOURCES OF GROUND WATER	
01	07	06	02	01	00	00	0	0	1	WITHIN THE BASIN	
01	07	06	02	01	01	00	0	0	1	INTERMITTENT	
01	07	06	02	01	01	01	0	0	1	NUMBER	
01	07	06	02	01	01	01	1	0	1	PERCENT TO TOTAL NUMBER	
01	07	06	02	01	02	00	0	0	1	PERENNIAL	
01	07	06	02	01	02	01	0	0	1	NUMBER	
01	07	06	02	01	02	01	1	0	1	PERCENT TO TOTAL NUMBER	
01	07	06	02	01	03	00	0	0	1	DISCHARGE	L**3/T
01	07	06	02	01	03	01	0	0	1	MAXIMUM	L**3/T
01	07	06	02	01	03	02	0	0	1	MINIMUM	L**3/T
01	07	06	02	01	03	03	0	0	1	AVERAGE	L**3/T
01	07	06	02	01	03	04	0	0	1	VARIATION IN TIME	
01	07	06	02	01	03	04	1	0	1	FREQUENCY DISTRIBUTION	
01	07	06	02	01	03	04	1	1	1	STATISTICAL PARAMETERS	
01	07	06	02	02	00	00	0	0	1	FROM ADJOINING BASINS	
01	07	06	02	02	01	00	0	0	1	INTERMITTENT	
01	07	06	02	02	01	01	0	0	1	NUMBER	
01	07	06	02	02	01	01	1	0	1	PERCENT TO TOTAL NUMBER	
01	07	06	02	02	02	00	0	0	1	PERENNIAL	
01	07	06	02	02	02	01	0	0	1	NUMBER	
01	07	06	02	02	02	01	1	0	1	PERCENT TO TOTAL NUMBER	
01	07	06	02	02	03	00	0	0	1	DISCHARGE	L**3/T
01	07	06	02	02	03	01	0	0	1	MAXIMUM	L**3/T
01	07	06	02	02	03	02	0	0	1	MINIMUM	L**3/T
01	07	06	02	02	03	03	0	0	1	AVERAGE	L**3/T
01	07	06	02	02	03	04	0	0	1	VARIATION IN TIME	
01	07	06	02	02	03	04	1	0	1	FREQUENCY DISTRIBUTION	
01	07	06	02	02	03	04	1	1	1	STATISTICAL PARAMETERS	

The following paragraphs furnish comments on the contents and organization of Tables 2 through 7, which contain only the type 1 (subject matter) cards. The role and importance of the type 2 and type 3 cards are discussed in the following Section.

Table 2 covers drainage basin lithology, which is divided into two major variables, Soils and Bedrock. These characteristics are further divided into such soil attributes as profile, thickness, color, composition, texture, etc. For the bedrock, in addition to some characteristics of the soil, the bedding, fractures, etc., are included.

Table 3 covers the streams in the basin, and Tables 4 and 5 concern transportation and deposition by streams. Transportation and deposition could be arranged as variables of the first subject class under Streams in the Drainage basin. It was considered more appropriate to separate these topics, however. Thus, for the streams in the drainage basin there were recorded only the geometrical features of the streams (length, orientation, cross section, depth, slope, etc.); the characteristics of the flowing water (discharge, velocity, turbulence, and kinetic energy); the characteristics of the main stream valley; stream orders in the basin; and the works of man such as dams.

Stream transportation, listed in Table 4, was subdivided mainly into stream capacity, competence, sediment concentration, and attributes of the sedimentary load, including dissolved material. Stream deposits, in Table 5, were deliberately kept at a minimum as far as the characteristics of the deposited sediment are concerned. These characteristics (composition, texture, and sedimentary structures) are properly part of the subject of Sedimentology, which deserves its own main-subject heading. This is a major interest of the writer, who hopes to develop such a tabulation in considerable detail.

This problem of deciding which subjects properly belong under a given heading arises frequently in classification systems. In the long run it would be desirable (after additional main subjects are organized) to have appropriate cross-references in each table to indicate the code numbers of subjects closely related to the one under discussion.

Stream deposits in Table 5, considered as geomorphological entities, were also kept to a minimum, with emphasis only on features encountered within drainage basins, such as natural levees, alluvial fans, the floodplain, and associated terraces. The two latter were already included in Table 3, coded as 01 03 12 05 01 00 00 0 0, and as 01 03 12 05 02 00 00 0 0. Similarly, landforms outside the drainage basin, such as deltas, are not included, even though deltas may occur in drainage-basin lakes. It was thought that deltas form a main subject in their own right, because of the interplay of deposition and the work of shore agents in forming them.

The subject of climate in the drainage basin (Table 6) was included mainly because it is very important for the evolution of the features of a drainage basin. However, it belongs to other sciences more than to geology. For this reason only several of the most significant characteristics were recorded, such as solar radiation, temperature, winds, precipitation (snow and rain), evaporation from water masses, and transpiration through vegetation.

The last subject in this paper is the Subsurface Water in the Drainage basin, listed in Table 7. It was very difficult to decide which variables were most important in the context of the drainage basin. The literature on this subject is very rich, but only a few authors discuss the problem of subsurface water in respect to drainage basin characteristics as such. Most of the papers concern specific engineering problems. Very few papers deal with the characteristics of springs in relation to drainage basin characteristics.

On the basis of several decisions, the subject of Subsurface water in the Drainage basin was divided into six first level subjects: chemical composition, flow direction, velocity, discharge, aquifers (divided into confined and unconfined), and springs. Among lower level topics in Table 7, the water table depth, its variation through time and its influence on stream discharge are included. Springs were divided into two groups: springs draining the drainage basin under consideration, and springs which, although inside the basin, drain another drainage basin.

It is clear from Tables 1 through 7 that not all the subjects are treated in an equally detailed manner. Some subjects, as already mentioned, are not specific to geology. In summary of the tables, there was no difficulty in making some decisions about the contents of the tables. The geometrical features of the drainage basin and of its streams are certainly part of the main subject. First doubts arose about including detailed treatment (i.e., the mathematical aspects) of stream turbulence and other aspects of the flow. Similarly, in the treatment of subsurface water in the basin, subjects related directly to meteorology and engineering aspects of groundwater flow would be much improved by participation of a meteorologist and engineer in designing these parts of the system. The extent to which topics of this sort were included depended in part on the writer's own background of knowledge, and in part on whether or not the subjects were discussed in their geological context in typically geological papers.

As suggested above, it would be useful to enlarge the tables on climate and subsurface water by a meteorologist and an engineer respectively. Other subjects, such as vegetation and human influences (roads, towns, etc.) could be developed in terms of their importance for the variability of drainage basin characteristics. Vegetation was briefly considered with climate by noting its effects on evapotranspiration and the reduction of soil erosion by leaves which cover the soil with a protective shield, and thus reduce the impact force of rain drops. Roots also are important because they increase soil strength. Obviously the influence of vegetation is not restricted to these effects, and it would be useful to investigate different kinds of plants in relation to altitude, slope, arrangement, density of cover, etc. All the features lie mainly in botany, and they are not dealt with in this paper.

The subject of human influences on the natural characteristics of the basin is supported by only a limited literature. Some writers discuss towns along streams in terms of floods, but nothing has been found about the role of roads, tunnels, viaducts, etc., on drainage basin attributes. The effects of deforestation and crop patterns which change the characteristics of vegetation are mentioned; but these also may be more properly in the field of botany. It would be interesting to know how naturally developing drainage basin characteristics are controlled by the density of human populations and associated human activity.

Another problem always present because of time limitations was to place practical limits on the classification scheme, or this paper would never come to an end. Thus, although lakes were mentioned as natural reservoirs of water, nothing was said about lacustrine morphology. Stream deposits were reduced to a minimum to avoid overlap with sedimentology. For the same reason other particular morphologies that could be present inside the basin, but not produced by streams, such as volcanic morphology, glacial morphology, etc., were neglected. All of these could be main subjects in other papers, and only when these are available will it be possible to cross-reference them into stream-developed features in the basin.

Card code 2

Punched cards in all the systems with code number 2 in column 27 are purely bibliographic, and carry the accession numbers of the bibliography as listed in the Appendix Each topic is supported by one or more such cards. In this way it is possible to retrieve those publications in which the card 1 variable is described. This is achieved by having the same subject code numbers in columns 1 to 24 on both types of cards. Recording the subject code on these cards has also the purpose that if one knows the code for a variable, it is sufficient to call for the corresponding type 2 cards by machine, in order to have the references on that subject. Thus, for all references on drainage basin geometry (code 01 01), it is sufficient to call for the type 2 cards under this same subject code.

Items in the bibliography are listed by their accession numbers, and they are not strictly alphabetized, because such an arrangement would complicate the coding system when new references need to be added. The important thing is that the numerical order is preserved by assigning to each paper or book a unique accession number. Cards sorted from the bibliographic deck can in any event be alphabetized by machine.

The design of the bibliographic cards posed several problems. One was associated with the limited number of columns on a card, and another was the desire to confine each reference to a single card. The card format selected for present purposes is shown in Table C. This format leads to a much condensed reference, inasmuch as it does not contain the title of the paper. However, the essential information is included, and the bibliographic listing given in the Appendix is not unlike the minimal reference material given in some scientific journals. As with the card format in Table A, blank columns are included to facilitate easy reading when the cards are listed.

Punched card limitations do not apply to references on magnetic tape, and in an expanded system it would perhaps be desirable to include the title, as well as subsidiary codes referring back to the subject code.

TABLE C

FORMAT FOR BIBLIOGRAPHIC CARDS

Columns 1 - 4 inclusive	Reference accession number
Columns 5 - 40 inclusive	Author's name
Column 41	Blank
Columns 42 - 45 inclusive	Year of publication
Column 46	Blank
Columns 47 - 70 inclusive	Name of journal or book title
Column 71	Blank
Columns 72 - 75 inclusive	Journal Volume*
Column 76	Blank
Columns 77-80	Starting page in journal*

* Columns 72 - 80 carry the publisher's name for books. (The journal volume number is right-justified on column 74 unless the volume number is, say, 24A, in which case the A is in column 75.)

The present system was devised primarily as a framework adapted to an individual researcher rather than to a major research organization. There is at present an additional limitation in that the system does not provide for subject-matter retrieval from the bibliography. That is, there is no provision for finding out which particular subject topics are contained in any given bibliographic reference. Some comments on this, involving multiple cards, are made in the Concluding Remarks to this report.

As mentioned, there is a number 2 card with the same numerical subject code for each card number 1. Table 8, as an example, is a list of card types 1 and 2 for the first page of the drainage basin lithology (see Table 2). Only two references are recorded (372 and 775 in the bibliography), in which authors dealt with the effect of lithology on drainage basin characteristics in a general way. The number of papers increases for the first subject subdivision, soils (code 01 02 01), in which 43 references are recorded. These papers also are general in that they deal with the effect that soils have on drainage basin characteristics. As the more detailed and specific topics are reached, the number of papers decreases again, because only papers that deal with that one variable are listed. Thus there are only two papers listed (694 and 533) regarding the effect of mean elevation on soil properties. The soil profile shows an increase in listed references, which also decreases again as specific topics are reached.

By noting the amount of literature for each variable it is possible to see which variables were selected by various authors as the most useful to define a subject or to differentiate, for instance, among different kinds of streams, soils, basins, etc. Thus, for soils, the several authors attach most importance to the soil profile, composition, structure, texture, permeability, strength; they give less importance to

TABLE 8

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	02	00	00	00	00	00	0	0	1	BASIN LITHOLOGY	
01	02	00	00	00	00	00	0	0	2	372 775	
01	02	01	00	00	00	00	0	0	1	SOILS	
01	02	01	00	00	00	00	0	0	2	372 800 107 679 693 694 339 678 737 594	
01	02	01	00	00	00	00	0	0	2	799 31 499	
01	02	01	00	00	00	00	0	0	2	52 733 27 361 449 478 365 287 85 314	
01	02	01	00	00	00	00	0	0	2	256 22 169 311 373 374 588 708 734 732	
01	02	01	00	00	00	00	0	0	2	597 574 547 546 454 337 269 266 243 123	
01	02	01	01	00	00	00	0	0	1	MEAN ELEVATION	L
01	02	01	01	00	00	00	0	0	2	694 533	
01	02	01	02	00	00	00	0	0	1	MEAN SLOPE	DEGREES
01	02	01	02	00	00	00	0	0	2	694	
01	02	01	03	00	00	00	0	0	1	PROFILE	
01	02	01	03	00	00	00	0	0	2	694 800 693 678 533 413 596 736 216 598	
01	02	01	03	01	00	00	0	0	1	ORGANIC HORIZONS	
01	02	01	03	01	00	00	0	0	2	800 573	
01	02	01	03	01	01	00	0	0	1	HORIZON O	
01	02	01	03	01	01	00	0	0	2	800	
01	02	01	03	01	01	01	0	0	1	HORIZON O1	
01	02	01	03	01	01	01	0	0	2	800	
01	02	01	03	01	01	02	0	0	1	HORIZON O2	
01	02	01	03	01	01	02	0	0	2	800	
01	02	01	03	02	00	00	0	0	1	MINERAL HORIZONS	
01	02	01	03	02	00	00	0	0	2	800	
01	02	01	03	02	01	00	0	0	1	HORIZON A	
01	02	01	03	02	01	00	0	0	2	800	
01	02	01	03	02	01	01	0	0	1	HORIZON A1	
01	02	01	03	02	01	01	0	0	2	800	
01	02	01	03	02	01	02	0	0	1	HORIZON A2	
01	02	01	03	02	01	02	0	0	2	800	
01	02	01	03	02	01	03	0	0	1	HORIZON A3	
01	02	01	03	02	01	03	0	0	2	800	
01	02	01	03	02	01	04	0	0	1	HORIZON AB	
01	02	01	03	02	01	04	0	0	2	800	
01	02	01	03	02	01	05	0	0	1	HORIZON A+B	
01	02	01	03	02	01	05	0	0	2	800	
01	02	01	03	02	01	06	0	0	1	HORIZON AC	
01	02	01	03	02	01	06	0	0	2	800	
01	02	01	03	02	02	00	0	0	1	HORIZON B	
01	02	01	03	02	02	00	0	0	2	800	
01	02	01	03	02	02	01	0	0	1	HORIZON B1	
01	02	01	03	02	02	01	0	0	2	800	
01	02	01	03	02	02	02	0	0	1	HORIZON B2	
01	02	01	03	02	02	02	0	0	2	800	
01	02	01	03	02	02	03	0	0	1	HORIZON B3	
01	02	01	03	02	02	03	0	0	2	800	
01	02	01	03	02	02	04	0	0	1	HORIZON B+A	
01	02	01	03	02	02	04	0	0	2	800	
01	02	01	03	02	03	00	0	0	1	HORIZON C	
01	02	01	03	02	03	00	0	0	2	800	
01	02	01	03	02	04	00	0	0	1	HORIZON R	
01	02	01	03	02	04	00	0	0	2	800	
01	02	01	04	00	00	00	0	0	1	THICKNESS	L
01	02	01	04	00	00	00	0	0	2	694 800 138	
01	02	01	05	00	00	00	0	0	1	COLOR	
01	02	01	05	00	00	00	0	0	2	694 693 800 678	
01	02	01	06	00	00	00	0	0	1	COMPOSITION	
01	02	01	06	00	00	00	0	0	2	372 800 693 694 678 486	
01	02	01	06	01	00	00	0	0	1	MINERALOGICAL	
01	02	01	06	01	00	00	0	0	2	800 104 86 87 88 267	
01	02	01	06	01	01	00	0	0	1	SILT FRACTION	
01	02	01	06	01	01	00	0	0	2	800	
01	02	01	06	01	02	00	0	0	1	CLAY FRACTION	
01	02	01	06	01	02	00	0	0	2	800 268 62 571	
01	02	01	06	02	00	00	0	0	1	CHEMICAL	
01	02	01	06	02	00	00	0	0	2	800 16 40 86 87 88 335	
01	02	01	06	02	01	00	0	0	1	PH	
01	02	01	06	02	01	00	0	0	2	800 461	
01	02	01	06	02	02	00	0	0	1	CATION EXCHANGE CAPACITY	
01	02	01	06	02	02	00	0	0	2	800 247 49 126	

mean relief, mean slope, color, thickness, etc.

In some cases, at more detailed subject levels, no references were found, and this was recorded on the type 2 card as "no reference observed." This occurred, for instance, for the effect of bed thickness in bedrock on drainage basin characteristics (code 01 02 02 04 02 01 01 0 0 in Table 2) Obviously this lack may be due either to a lack of study of this feature, or papers about that subject were not found in the present literature search

The order of listing type 2 card references could be improved by recording first the accession number referring to the paper in which the term or concept was defined for the first time; in this way it would be possible to have the original definition, and then proceed to successive references.

<u>Card code 3</u>

Cards with this number are "comment cards" in which some remarks about the subject matter topics are recorded. For the most part, the function of type 3 cards is to point out interrelations among the various subjects or variables, with specific references where they are available.

For type 3 cards, as for the bibliographic cards, the card type code is preceded by the numerical subject code of the topic to which the number 3 card belongs Owing to the fact that each type 3 card contains a single remark (or refers to a single interrelation), some subject items may have more than one type 3 card. The recording of the numerical code has the same purpose as outlined for the reference cards: if one knows the code for a subject variable, he can call this code with card code 2 to have the bibliography, and with card code 3 to have remarks and specific references to the given variable in its relation to others.

Not all topics are accompanied by comment cards, and this indicates a lack of such remarks in the literature examined. Most remarks concern mainly correlations among different variables, about different techniques of sampling, different methods of measurement, etc.

Table 9 shows part of the table on Climate in the Drainage basin (refer to Table 6), with cards 1 and 3, omitting type 2 cards. As may be noted, the number 3 cards for topic 01 06 (Climate in the Drainage basin) are essentially about the relations between this variable and others, such as soil erodability, dissolved load in streams, soil profile, soil formation, dissolved load concentration, erosion ratio, and variability of spring discharge.

The motivation for remarks about correlations among variables is to induce other workers to measure the same variables and to make similar correlations in their own studies. In this way, by measuring the same variables in other places, it will be possible to compare basins located in regions geographically and climatically different. Moreover, by using the same correlation techniques it will be possible to observe if there is some general law linking, for instance, the climate of a basin with the erosional intensity, and this with rainfall intensity, stream energy, etc. When such linkages are known for a given region, it will be possible to compare similar linkages obtained for different regions, if the same variables, measured in the same way, are used. In this way, perhaps, it will be possible to make broader generalizations, and to transform what is largely a qualitative science into a quantitative one.

To support this aim more fully, it would be useful to enlarge the field of the comment cards. Thus, if card code number 3 is restricted to "correlations among variables," it will be useful to assign card code 4 to different sampling techniques; code 5 to different operational measurement methods; number 6 for sets of data in the literature;

TABLE 9

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	06	00	00	00	00	00	0	0	1	CLIMATE IN THE BASIN	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SOIL ERODIBILITY 217	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO DISSOLVED LOAD 443	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SOIL PROFILE 710 694	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SOIL FORMATION 694 372 735 401	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO STREAM DISSOLVD. LOAD CONC. 443	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SOIL EROSION RATIO 693	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SPRING DISCHARGE FLUCTUATION 185	
01	06	01	00	00	00	00	0	0	1	SOLAR RADIATION	CAL/L**2
01	06	01	01	00	00	00	0	0	1	NET SOLAR RADIATION	CAL/L**2
01	06	01	01	01	00	00	0	0	1	INCIDENT SOLAR RADIATION	CAL/L**2
01	06	02	00	00	00	00	0	0	1	TEMPERATURE	
01	06	02	00	00	00	00	0	0	3	FOR RELATION TO SOIL DEVELOPMENT 694 735	
01	06	02	00	00	00	00	0	0	3	FOR RELATION TO ANNUAL RUNOFF	
01	06	02	00	00	00	00	0	0	3	FOR VARIATION WITH ELEVATION	
01	06	02	00	00	00	00	0	0	3	FOR RELATION TO SOIL EROSION 693 694	
01	06	02	01	00	00	00	0	0	1	MAXIMUM	
01	06	02	02	00	00	00	0	0	1	MINIMUM	
01	06	02	02	01	00	00	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	
01	06	02	03	00	00	00	0	0	1	MEAN	
01	06	02	03	01	00	00	0	0	1	VARIATION IN TIME	
01	06	02	03	01	01	00	0	0	1	FREQUENCY DISTRIBUTION	
01	06	02	03	01	01	01	0	0	1	STATISTICAL PARAMETERS	
01	06	03	00	00	00	00	0	0	1	WINDS	
01	06	03	00	00	00	00	0	0	3	FOR RELATION TO SOIL DEVELOPMENT 694 735	
01	06	03	00	00	00	00	0	0	3	FOR INFLUENCE ON SOIL MOISTURE 54	
01	06	03	01	00	00	00	0	0	1	PREDOMINANT DIRECTION	DEGREES
01	06	03	01	00	00	00	0	0	3	FOR RELATION TO MAXIMUM RAINFALL INTENSITY 161	
01	06	03	02	00	00	00	0	0	1	INTENSITY	L/T
01	06	03	02	00	00	00	0	0	3	FOR RELATION TO EVAPORATION 350 794	
01	06	03	02	01	00	00	0	0	1	MAXIMUM	L/T
01	06	03	02	02	00	00	0	0	1	MINIMUM	L/T
01	06	03	02	03	00	00	0	0	1	MEAN	L/T
01	06	04	00	00	00	00	0	0	1	PRECIPITATION	L
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK 47	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO ACTUAL EVAPOTRANSPIRATION 664 694	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO TOPOGRAPHY 667	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO FLOOD FLOW 372	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO SIZE OF THE AREA 167	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO OVERLAND FLOW 372	
01	06	04	01	00	00	00	0	0	1	SNOWFALL	L/T
01	06	04	01	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK 47	
01	06	04	01	00	00	00	0	0	3	FOR RELATION TO ANNUAL RUNOFF 693 694	
01	06	04	01	00	00	00	0	0	3	FOR RELATION TO FLOW DURATION CURVE 632	
01	06	04	01	00	00	00	0	0	3	FOR RELATION TO MAXIMUM DISCHARGE NO REFERENCE	
01	06	04	01	01	00	00	0	0	1	AMOUNT	L
01	06	04	01	01	01	00	0	0	1	MAXIMUM	L
01	06	04	01	01	02	00	0	0	1	MINIMUM	L
01	06	04	01	01	02	01	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	L
01	06	04	01	01	03	00	0	0	1	AVERAGE	L
01	06	04	01	01	04	00	0	0	1	VARIATION IN TIME	
01	06	04	01	01	04	01	0	0	1	FREQUENCY DISTRIBUTION	
01	06	04	01	01	04	01	0	0	3	FOR RELATION TO FLOOD DISCHARGE 47	
01	06	04	01	02	00	00	0	0	1	INTENSITY	L/T
01	06	04	01	02	01	00	0	0	1	MAXIMUM	L/T
01	06	04	01	02	02	00	0	0	1	MINIMUM	L/T
01	06	04	01	02	03	00	0	0	1	MEAN	L/T
01	06	04	01	02	04	00	0	0	1	VARIATION IN TIME	
01	06	04	01	02	04	01	0	0	1	FREQUENCY DISTRIBUTION	

number 7 for statistical methods; number 8 for computer elaboration; and so on.

This kind of expansion lay beyond the time available, as stated; moreover, the material available was rather sparse. For example, only a few papers included complete data tables (very often they give only the mean value of the measures) and papers dealing with computer analysis of drainage basin characteristics are not very abundant. It is evident that within a given framework of organizing subject-matter topics, expansion of the kinds of remarks and relations brought out by the comment cards would have considerable importance. Their usefulness would be an increased unification of sampling methods, of operational definitions for making measurements, and a growing body of data in the literature on which to base generalizations. Moreover, with increased knowledge it would be possible to select those particular variables which are of primary importance in controlling the attributes or characteristics of drainage basins.

CONCLUDING REMARKS

Despite limitations of time, and the realization that a topic initially thought to be relatively self-contained was in fact quite complex, the writer believes that he has gained valuable experience in making this attempt to organize a subject within the framework of topics, references, and interrelations. This report is accordingly not to be considered as exhaustive and complete. Many fields in geology and physical geography are still somewhat diffuse in that their ramifications into other disciplines are numerous; there has been little organized effort to establish uniform operational definitions; and much observation and interpretation is dominantly qualitative.

If the system proposed has some merit in suggesting ways to improve communication, the purposes of the study will have been justified.

The writer hopes to expand the present approach in his continuing research in sedimentology and related fields. Ultimately, it is hoped, an underlying pattern of techniques for organizing the variables of a given field will be discerned, which should do much to make available to the newcomer the results of earlier studies, and to furnish some guidance on the selection of those underlying variables that most directly relate to the phenomenon under study.

One aspect of the present system that requires further consideration is the problem of retrieving subject material from the bibliography. This represents the other side of the coin, i.e., scanning a bibliographic reference for its substantive content instead of using subject matter as a path to the literature. In the present system it is relatively straightforward to proceed from a given topic to the reference material, either in general, as indicated by code 2 cards, or specific, as with code 3 cards. However, if one wishes to know which topics are included in reference No. 483, say, there is no provision by which this can be done at present. If multiple reference cards are developed (or if the system is put on magnetic tape), this problem can be handled by having a cross-reference between subject code numbers in the tabulations, and literature accession numbers in the bibliography. In this way retrieval can work in either direction.

This extension was not attempted in the present study, but it is included as an objective in Professor Krumbein's continuing research plans, as indicated in his Prefatory Remarks.

ACKNOWLEDGMENTS

I am indebted to many persons for encouragement and help in pursuing the present study, especially to Professor W. C. Krumbein for encouraging me to work directly at Northwestern University, and to Professor B. Accordi, Director of the Institute of Geology and Paleontology at the University of Rome, for granting me a leave of absence. The Geography Branch of the Office of Naval Research made it possible for me to come to the United States under Professor Krumbein's sponsorship.

Faculty members, graduate students, library personnel, and the secretarial staff at Northwestern University extended every courtesy in facilitating my work. Dr. J. Fehrenbacher, of the Department of Agronomy at the University of Illinois, who at that time was on leave at Northwestern University, gave me much help in developing the section on Soils in the Drainage Basin.

APPENDIX

1) Complete Tables of subject matter classification including card types 1, 2, and 3.

2) Complete bibliography arranged according to accession number.

SUBJECT MATTER TABLES

TABLE 1

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARD CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
										CARD CODE 1 = SUBJECT CARD CODE 2 = REFERENCES CARD CODE 3 = REMARKS	
										DRAINAGE BASIN (MAIN SUBJECT = 01)	
01	01	00	00	00	00	00	0	0	1	DRAINAGE BASIN GEOMETRY	
01	01	00	00	00	00	00	0	0	2	696 307 128 684 763 706 656 241 673 427	
01	01	00	00	00	00	00	0	0	2	622 431 428 148 253 330 551 113 393 659	
01	01	00	00	00	00	00	0	0	2	261 692 690 678 694 693 624 12 372 557	
01	01	00	00	00	00	00	0	0	2	570 470 194 191 471 91 662 635 522 512	
01	01	00	00	00	00	00	0	0	2	722 726 728 26 156 147 137 63 433 436	
01	01	00	00	00	00	00	0	0	2	587 595 623 640 671 681 682 689 691 896	
01	01	00	00	00	00	00	0	0	2	432 77 316 35 222 143 308	
01	01	00	00	00	00	00	0	0	3	FOR RELATION TO TECTONICS 423	
01	01	01	00	00	00	00	0	0	1	AREA	L--2
01	01	01	00	00	00	00	0	0	2	690 692 25 372 624 47 279 214 781	
01	01	01	00	00	00	00	0	0	3	FOR LENGTH TO CENTER OF AREA 261	
01	01	01	00	00	00	00	0	0	3	FOR RELTN BTWN DRAIN. DENSTY AND SED. YIELD 624	
01	01	01	00	00	00	00	0	0	3	FOR RELTN BTWN DRAIN. DENSIY AND SED. YIELD 690	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO MEAN ANNUAL FLOOD 186	
01	01	01	00	00	00	00	0	0	3	FOR CONSTANT OF CHANNEL MAINTENANCE 690	
01	01	01	00	00	00	00	0	0	3	FOR RELATN TO LENGTH OF STREAMS OF GIVEN ORDER 261	
01	01	01	00	00	00	00	0	0	3	FOR RELATN TO LENGTH OF STREAMS OF GIVEN ORDER 690	
01	01	01	00	00	00	00	0	0	3	FOR RELATN TO NUMBER OF STREAMS OF GIVEN ORDER 261	
01	01	01	00	00	00	00	0	0	3	FOR RELATN TO NUMBER OF STREAMS OF GIVEN ORDER 315	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO STREAM ORDER 690	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO MEANDER LENGTH 369	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO MEAN FLOOD PEAK 372 186	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO FLOOD DISCHARGE 366 47 279 372 357	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO FLOOD DISCHARGE 694 186 318	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL WIDTH 624 261 279	
01	01	01	00	00	00	00	0	0	3	FOR DRAINAGE DENSITY 315 624 690 692 25 176 130	
01	01	01	00	00	00	00	0	0	3	FOR DRAINAGE DENSITY 686	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL GRADIENT 258	
01	01	01	00	00	00	00	0	0	3	FOR LENGTH TO CENTER OF AREA 261	
01	01	01	00	00	00	00	0	0	3	FOR RELAT.TO SEDIM.CONC.STAT.PARAM. 624	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO BEDLOAD 258 624	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO AVERAGE STREAM DISCHARGE 279 372	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO PRECIPITATION	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO STREAM DISCHARGE 372	
01	01	01	00	00	00	00	0	0	3	FOR LENGTH TO CENTER OF AREA 261	
01	01	01	00	00	00	00	0	0	3	FOR RELATION TO STREAM TRANSPORATION 624 258	

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01 01 01 00 00 00 00 0 0 3   FOR RELATION TO PRECIPITATION
01 01 01 00 00 00 00 0 0 3   FOR RELATION TO STREAM DISCHARGE 372
01 01 01 00 00 00 00 0 0 3   FOR LENGTH TO CENTER OF AREA  261
01 01 01 00 00 00 00 0 0 3   FOR RELATION TO STREAM TRANSPORATION 624 258
01 01 01 00 00 00 00 0 0 3   FOR RELATION TO ALLUVIAL FANS X-SECTION
01 01 02 00 00 00 00 0 0 1   WIDTH                                          L
01 01 02 00 00 00 00 0 0 2            372 690 26
01 01 02 00 00 00 00 0 0 3   FOR RELATION TO STREAM ORDER 690
01 01 03 00 00 00 00 0 0 1   LENGTH                                         L
01 01 03 00 00 00 00 0 0 2            372 692 25 47 690 261 624 26
01 01 03 00 00 00 00 0 0 3   METHODS OF MEASUREMENT 47
01 01 03 00 00 00 00 0 0 3   FOR RELATION TO STREAM LENGTH 47 261
01 01 03 00 00 00 00 0 0 3   FOR RLTN.TO SEDIM.CONC.STAT.PARAM.
01 01 03 00 00 00 00 0 0 3   FOR RELATION TO STREAM ORDER 690
01 01 03 00 00 00 00 0 0 3   FOR RELATION TO STREAM GRADIENT 261 83
01 01 03 00 00 00 00 0 0 3   FOR LENGTH TO CENTER OF AREA 261
01 01 03 00 00 00 00 0 0 3   FOR RLTN. TO DRAINAGE AREA 279
01 01 03 00 00 00 00 0 0 3   METHODS OF MEASUREMENT
01 01 03 00 00 00 00 0 0 3   FOR RELATION TO STREAM TRANSPORTATION 624
01 01 03 00 00 00 00 0 0 3   FOR RELATION TO MAXIMUM DISCHARGE 47
01 01 03 01 00 00 00 0 0 2            372
01 01 04 00 00 00 00 0 0 1   PERIMETER LENGTH                               L
01 01 04 00 00 00 00 0 0 2            25 690 692 26
01 01 04 00 00 00 00 0 0 3   FOR RELATION TO BASIN TEXTURE 690
01 01 05 00 00 00 00 0 0 1   SHAPE
01 01 05 00 00 00 00 0 0 2            25 141 146 50 781
01 01 05 01 00 00 00 0 0 1     CIRCULARITY RATIO
01 01 05 01 00 00 00 0 0 2            261 692 25 26
01 01 05 02 00 00 00 0 0 1     ELONGATION RATIO
01 01 05 02 00 00 00 0 0 2            261 692 25 26
01 01 05 03 00 00 00 0 0 1     RATIO BTWN LENGTH AND WIDTH
01 01 06 00 00 00 00 0 0 1   RELIEF (ELEVATION)                             L
01 01 06 00 00 00 00 0 0 2            504 25 372 694 680 624 186 498 792 26
01 01 06 00 00 00 00 0 0 3   FOR RELATION TO MEAN FLOOD PEAK 186
01 01 06 00 00 00 00 0 0 3   FOR RELATION TO SOIL CHARACTERISTICS 694
01 01 06 00 00 00 00 0 0 3   FOR RELATION TO STREAM TRANSPORTATION 624
01 01 06 00 00 00 00 0 0 3   FOR RELATION TO RAINFALL 161
01 01 06 00 00 00 00 0 0 3   FOR RLTN. TO SEDIM.CONC.STAT.PARAM.
01 01 06 00 00 00 00 0 0 3   FOR RELATION TO RAINFALL INTENSITY 161
01 01 06 00 00 00 00 0 0 3   FOR RLTN. TO RAINFALL AMOUNT 161
01 01 06 00 00 00 00 0 0 3   FOR RELATION TO HYPSOMETRIC INTEGRAL 690 680
01 01 06 01 00 00 00 0 0 1     MAXIMUM                                      L
01 01 06 01 00 00 00 0 0 2            692
01 01 06 02 00 00 00 0 0 1     MINIMUM                                      L
01 01 06 02 00 00 00 0 0 2            692
01 01 06 03 00 00 00 0 0 1     TOTAL                                        L
01 01 06 03 00 00 00 0 0 2            25
01 01 06 03 01 00 00 0 0 1       RELIEF RATIO
01 01 06 03 01 00 00 0 0 2            690 258 692
01 01 06 03 01 00 00 0 0 3       FOR RELATION TO BEDLOAD 306
01 01 06 03 01 00 00 0 0 3       FOR RELATION TO STREAM TRANSPORTATION 306
01 01 06 03 01 00 00 0 0 3       FOR RELATION TO SOIL ERODIBILITY 690 613
01 01 06 03 01 00 00 0 0 3       FOR RELATION TO BASIN LENGTH 690
01 01 06 04 00 00 00 0 0 1     RELATIVE
01 01 06 04 00 00 00 0 0 2            692
01 01 06 05 00 00 00 0 0 1     HYPSOMETRY                                   L
01 01 06 05 00 00 00 0 0 2            690 680 692 300
01 01 06 05 01 00 00 0 0 1       HYPSOMETRIC CURVE
01 01 06 05 01 00 00 0 0 2            690 680 692 152
01 01 06 05 01 00 00 0 0 3       FOR RELATION TO BEDROCK STRUCTURE 690 694
01 01 06 05 01 00 00 0 0 3       FOR RELATION TO BEDROCK LITHOLOGY 690
01 01 06 05 01 00 00 0 0 3       FOR RELATION TO BEDROCK OF THE BASIN 690
```

B

A

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01 01 06 05 01 01 00 0 0 1      AREA BELOW THE CURVE                    L**2
01 01 06 05 01 01 00 0 0 2          690 692 25 680
01 01 06 05 01 01 00 0 0 3      FOR RELATION TO BASIN RELIEF 690 680
01 01 06 05 01 01 00 0 0 3      FOR RELATION TO SLOPE STEEPNESS 690 680
01 01 06 05 01 01 00 0 0 3      FOR RELATION TO STREAM GRADIENT 690
01 01 06 05 01 01 00 0 0 3      FOR RELATION TO STAGE OF DRAINAGE BASIN 690
01 01 06 05 01 01 00 0 0 3      FOR RELATION TO DRAINAGE DENSITY 690
01 01 06 05 01 02 00 0 0 1      SLOPE OF THE CURVE                   DEGREES
01 01 06 05 01 02 00 0 0 2          690
01 01 06 05 01 03 00 0 0 1      INFLECTION POINTS
01 01 06 05 01 03 00 0 0 2          690
01 01 07 00 00 00 00 0 0 1    SLOPE
                                                                     DEGREES
01 01 07 00 00 00 00 0 0 2          695 683 261 690 605 797 372 28 358 359
01 01 07 00 00 00 00 0 0 2          676 292 604 633 683 688 761 773 677 84
01 01 07 00 00 00 00 0 0 2          504 25 149 61 631 665 276 415 310 589
01 01 07 00 00 00 00 0 0 2          244 627 252 451 753 725 721 719 685
01 01 07 00 00 00 00 0 0 3    FOR RELATION TO SOIL ERODIBILITY 694 690 65 205
01 01 07 00 00 00 00 0 0 3    FOR RELATION TO SOIL ERODIBILITY 480
01 01 07 00 00 00 00 0 0 3    FOR RELATION TO TECTONICS 690 561
01 01 07 00 00 00 00 0 0 3    FOR RELATION TO BED ROCK 690 605 395 394 561
01 01 07 00 00 00 00 0 0 3    FOR RELATION TO ERODING FORCE 694
01 01 07 00 00 00 00 0 0 3    FOR RELATION TO RUNOFF RAINFALL RATIO 65 205 480
01 01 07 00 00 00 00 0 0 3    FOR RELATION TO HYPSOMETRIC INTEGRAL 690 680
01 01 07 01 00 00 00 0 0 1      GROUND SLOPE
01 01 07 01 00 00 00 0 0 2          138 604 692 694 80 463
01 01 07 01 00 00 00 0 0 3      FOR RELATION TO MEAN FLOOD PEAK 186 781
01 01 07 01 00 00 00 0 0 3      FOR RELATION TO SOIL THICKNESS 694 138
01 01 07 01 00 00 00 0 0 3      FOR REALTION TO SOIL PROFILE 138 694 533
01 01 07 01 00 00 00 0 0 3      FOR RELATION TO SOIL COLOR 138 694
01 01 07 01 00 00 00 0 0 3      FOR RELATION TO SOIL ORGANIC MATTER 694
01 01 07 01 00 00 00 0 0 3      FOR RELATION TO SOIL INFILTRATION CAPACITY 694
01 01 07 01 00 00 00 0 0 3      FOR RELATION TO CHANNEL SLOPE 261
01 01 07 01 00 00 00 0 0 3      FOR RELATION TO SLOPE OF FIRST ORDER STREAMS 261
01 01 07 01 00 00 00 0 0 3      FOR RELATION TO BEDROCK STRATA DIP 395
01 01 07 01 01 00 00 0 0 1        CURVATURE
01 01 07 01 01 00 00 0 0 2          692 797
01 01 07 01 01 01 00 0 0 1          CONCAVITY
01 01 07 01 01 01 00 0 0 2          692 797
01 01 07 01 01 02 00 0 0 1          CONVEXITY
01 01 07 01 01 02 00 0 0 2          692 797
01 01 07 01 02 00 00 0 0 1        MEAN SLOPE CURVE
01 01 07 01 02 00 00 0 0 2          690
01 01 07 01 02 00 00 0 0 3        FOR RELATION TO GEOLOGIC STRUCTURE 690
01 01 07 01 03 00 00 0 0 1        SLOPE FREQUENCY DISTRIBUTION
01 01 07 01 03 00 00 0 0 2          683 690 688
01 01 07 01 03 01 00 0 0 1          STATISTICAL PARAMETERS
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                             1    SLOPE FREQUENCY DISTRIBUTION
01 01 07 01 03 00 00 0 0 2              683 690 688
01 01 07 01 03 01 00 0 0 1            STATISTICAL PARAMETERS
01 01 07 01 03 01 00 0 0 2              683 690 688
01 01 08 00 00 00 00 0 0 1        ORDER OF BASIN
01 01 08 00 00 00 00 0 0 2              372 692 693 694 678 315 26
01 01 08 01 00 00 00 0 0 1          BASINS OF LOWER ORDER IN MAIN BASIN
01 01 08 01 00 00 00 0 0 2              372 692 315 26
01 01 08 01 01 00 00 0 0 1            NUMBER
01 01 08 01 01 00 00 0 0 2              372 692 315
01 01 08 01 02 00 00 0 0 1            AREA                                     L**2
01 01 08 01 02 00 00 0 0 2              372 692 315
01 01 08 01 02 00 00 0 0 3            FOR STREAM FREQUENCY
01 01 08 01 02 00 00 0 0 3            FOR RELATION TO STREAM LENGTH 257
01 01 08 01 02 01 00 0 0 1              RATIOS BTWN SUCCESSIVE AREAS
01 01 08 01 02 01 00 0 0 2              372 692 315
01 01 09 00 00 00 00 0 0 1        TEXTURE OF BASIN TOPOGRAPHY
01 01 09 00 00 00 00 0 0 2              690 692 693 694 678 657 25 429 26
01 01 09 00 00 00 00 0 0 3        FOR RELATION TO BASIN PERIMETER LENGTH
01 01 09 00 00 00 00 0 0 3        FOR RELATION TO DRAINAGE DENSITY
01 01 09 01 00 00 00 0 0 1          COARSE
01 01 09 01 00 00 00 0 0 2              NO REFERENCE OBSERVED
01 01 09 02 00 00 00 0 0 1          MEDIUM
01 01 09 02 00 00 00 0 0 2              NO REFERENCE OBSERVED
01 01 09 03 00 00 00 0 0 1          FINE
01 01 09 03 00 00 00 0 0 2              NO REFERENCE OBSERVED
01 01 09 04 00 00 00 0 0 1          ULTRA FINE
01 01 09 04 00 00 00 0 0 2              NO REFERENCE OBSERVED
01 01 10 00 00 00 00 0 0 1        BELT OF NO EROSION
01 01 10 00 00 00 00 0 0 2              315
01 01 10 01 00 00 00 0 0 1          WIDTH                                      L
01 01 10 01 00 00 00 0 0 2              315
01 01 10 02 00 00 00 0 0 1          AREA                                       L**2
01 01 10 02 00 00 00 0 0 2              315
01 01 11 00 00 00 00 0 0 1        DEPRESSION STORAGE ( LAKES, ETC. )
01 01 11 00 00 00 00 0 0 2              781 366
01 01 11 00 00 00 00 0 0 3        FOR RELATION TO MAXIMUM DISCHARGE 781
01 01 11 00 00 00 00 0 0 3        FOR RELATION TO RUNOFF RAINFALL RATIO
01 01 11 00 00 00 00 0 0 3        FOR RELATION TO FLOW-DURATION CURVE 632
01 01 11 00 00 00 00 0 0 3        FOR RELATION TO MEAN ANNUAL FLOOD 186
01 01 11 00 00 00 00 0 0 3        FOR RELATION TO REDUCTION OF FLOOD PEAK 318 107
01 01 11 00 00 00 00 0 0 3        FOR RELATION TO REDUCTION OF FLOOD PEAK 47 186 315
01 01 11 00 00 00 00 0 0 3        FOR RELATION TO STREAM DISCHARGE 47 781
01 01 11 01 00 00 00 0 0 1          AREA OF DEPRESSIONS                        L**2
01 01 11 01 00 00 00 0 0 2              781
01 01 11 01 01 00 00 0 0 1            PERCENTAGE TO BASIN AREA
01 01 11 01 01 00 00 0 0 2              781
01 01 11 02 00 00 00 0 0 1          VOLUME OF WATER                            L**3
01 01 11 02 00 00 00 0 0 2              NO REFERENCE OBSERVED
```

B

TABLE 2

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS (CARD CODE 1 = SUBJECT, CARD CODE 2 = REFERENCES, CARD CODE 3 = REMARKS)	DIMENSIONS
01	02	00	00	00	00	00	0	0	1	BASIN LITHOLOGY	
01	02	00	00	00	00	00	0	0	2	372 775	
01	02	01	00	00	00	00	0	0	1	SOILS	
01	02	01	00	00	00	00	0	0	2	372 800 107 679 693 694 339 678 737 594	
01	02	01	00	00	00	00	0	0	2	799 31 499	
01	02	01	00	00	00	00	0	0	2	52 733 27 361 449 478 365 287 85 314	
01	02	01	00	00	00	00	0	0	2	256 22 169 311 373 374 588 788 734 732	
01	02	01	00	00	00	00	0	0	2	597 574 547 546 454 337 269 266 243 123	
01	02	01	00	00	00	00	0	0	3	FOR SAMPLING TECHNIQUES 558	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO MEAN FLOOD PEAK 366	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO BEDROCK 694 372 642 596 39 150 531	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO LANDFORMS 694 372 118 731	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO CLIMATE 694 372 735 710 401	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO BIOLOGIC ACTIVITY 366 694 372	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO TEMPERATURE 694 735	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO MOISTURE 694 735	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO WINDS 694 735	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO SOIL INDEX OF ERODIBILITY	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO ELEVATION ASL 694	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO RAINFALL RUNOFF RATIO 47	
01	02	01	00	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK REDUCTION 366 186	
01	02	01	01	00	00	00	0	0	1	MEAN ELEVATION	L
01	02	01	01	00	00	00	0	0	2	694 533	
01	02	01	01	00	00	00	0	0	3	FOR RELATION TO SOIL THICKNESS NO REFERENCE OBS.	
01	02	01	01	00	00	00	0	0	3	FOR RELATION TO SOIL PROFILE	
01	02	01	01	00	00	00	0	0	3	FOR RELATION TO SOIL COLOR 694	
01	02	01	02	00	00	00	0	0	1	MEAN SLOPE	DEGREES
01	02	01	02	00	00	00	0	0	2	694	
01	02	01	02	00	00	00	0	0	3	FOR RELATION TO SOIL PROFILE 694	
01	02	01	03	00	00	00	0	0	1	PROFILE	
01	02	01	03	00	00	00	0	0	2	694 800 693 678 533 413 596 736 216 598	
01	02	01	03	00	00	00	0	0	3	FOR RELATION TO CLIMATE 694 710	
01	02	01	03	00	00	00	0	0	3	FOR RELATION TO SOIL MEAN ELEVATION 694 533	
01	02	01	03	00	00	00	0	0	3	FOR RELATION TO GROUND SLOPE 138 694 533	
01	02	01	03	00	00	00	0	0	3	FOR RELATION TO SOIL MEAN SLOPE 694	
01	02	01	03	02	04	00	0	0	3	FOR RELATION TO SOIL ERODIBILITY NO REFS.OBS	
01	02	01	03	01	00	00	0	0	1	ORGANIC HORIZONS	
01	02	01	03	01	00	00	0	0	2	800 573	
01	02	01	03	01	01	00	0	0	1	HORIZON O	
01	02	01	03	01	01	00	0	0	2	800	
01	02	01	03	01	01	01	0	0	1	HORIZON 01	
01	02	01	03	01	01	01	0	0	2	800	
01	02	01	03	01	01	02	0	0	1	HORIZON 02	
01	02	01	03	01	01	02	0	0	2	800	
01	02	01	03	02	00	00	0	0	1	MINERAL HORIZONS	
01	02	01	03	02	00	00	0	0	2	800	
01	02	01	03	02	01	00	0	0	1	HORIZON A	
01	02	01	03	02	01	00	0	0	2	800	
01	02	01	03	02	01	01	0	0	1	HORIZON A1	
01	02	01	03	02	01	01	0	0	2	800	
01	02	01	03	02	01	02	0	0	1	HORIZON A2	
01	02	01	03	02	01	02	0	0	2	800	
01	02	01	03	02	01	03	0	0	1	HORIZON A3	
01	02	01	03	02	01	03	0	0	2	800	
01	02	01	03	02	01	04	0	0	1	HORIZON AB	
01	02	01	03	02	01	04	0	0	2	800	
01	02	01	03	02	01	05	0	0	1	HORIZON A+B	
01	02	01	03	02	01	05	0	0	2	800	
01	02	01	03	02	01	06	0	0	1	HORIZON AC	
01	02	01	03	02	01	06	0	0	2	800	
01	02	01	03	02	02	00	0	0	1	HORIZON B	
01	02	01	03	02	02	00	0	0	2	800	
01	02	01	03	02	02	01	0	0	1	HORIZON B1	
01	02	01	03	02	02	01	0	0	2	800	
01	02	01	03	02	02	02	0	0	1	HORIZON B2	
01	02	01	03	02	02	02	0	0	2	800	
01	02	01	03	02	02	03	0	0	1	HORIZON B3	
01	02	01	03	02	02	03	0	0	2	800	
01	02	01	03	02	02	04	0	0	1	HORIZON B+A	
01	02	01	03	02	02	04	0	0	2	800	
01	02	01	03	02	03	00	0	0	1	HORIZON C	
01	02	01	03	02	03	00	0	0	2	800	
01	02	01	03	02	04	00	0	0	1	HORIZON R	
01	02	01	03	02	04	00	0	0	2	800	
01	02	01	04	00	00	00	0	0	1	THICKNESS	L
01	02	01	04	00	00	00	0	0	2	694 800 138	
01	02	01	04	00	00	00	0	0	3	THICKNESS FOR EACH HORIZON NO REFERENCE OBS.	
01	02	01	04	00	00	00	0	0	3	TOTAL THICKNESS OF THE SOIL NO REFERENCE OBS.	
01	02	01	04	00	00	00	0	0	3	FOR RELATION TO GROUND SLOPE 694 138	
01	02	01	04	00	00	00	0	0	3	FOR RELATION TO ELEVATION ASL 781	
01	02	01	05	00	00	00	0	0	1	COLOR	
01	02	01	05	00	00	00	0	0	2	694 693 800 678	
01	02	01	05	00	00	00	0	0	3	FOR EACH HORIZON NO REFERENCE	
01	02	01	05	00	00	00	0	0	3	FOR RELATION TO GROUND SLOPE 138 694	
01	02	01	05	00	00	00	0	0	3	FOR RELATION TO ELEVATION ASL 694	
01	02	01	06	00	00	00	0	0	1	COMPOSITION	
01	02	01	06	00	00	00	0	0	2	372 800 693 694 678 486	
01	02	01	06	00	00	00	0	0	3	FOR EACH HORIZON NO REFERENCE OBSERVED	
01	02	01	06	01	00	00	0	0	1	MINERALOGICAL	
01	02	01	06	01	00	00	0	0	2	800 104 86 87 88 267	
01	02	01	06	01	00	00	0	0	3	FOR EACH HORIZON NO REFERENCE	
01	02	01	06	01	01	00	0	0	1	SILT FRACTION	
01	02	01	06	01	01	00	0	0	2	800	
01	02	01	06	01	01	00	0	0	3	FOR EACH HORIZON NO REFERENCE [illegible]	

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01 02 01 04 00 00 00 0 0  3   FOR RELATION TO ELEVATION ASL 781
01 02 01 05 00 00 00 0 0  1   COLOR
01 02 01 05 00 00 00 0 0  2           694 693 800 678
01 02 01 05 00 00 00 0 0  3   FOR EACH HORIZON            NO REFERENCE
01 02 01 05 00 00 00 0 0  3   FOR RELATION TO GROUND SLOPE 138 694
01 02 01 05 00 00 00 0 0  3   FOR RELATION TO ELEVATION ASL 694
01 02 01 06 00 00 00 0 0  1   COMPOSITION
01 02 01 06 00 00 00 0 0  2           372 800 693 694 678 486
01 02 01 06 00 00 00 0 0  3   FOR EACH HORIZON            NO REFERENCE OBSERVED
01 02 01 06 01 00 00 0 0  1     MINERALOGICAL
01 02 01 06 01 00 00 0 0  2           800 104 86 87 88 267
01 02 01 06 01 00 00 0 0  3     FOR EACH HORIZON          NO REFERENCE
01 02 01 06 01 01 00 0 0  1       SILT FRACTION
01 02 01 06 01 01 00 0 0  2           800
01 02 01 06 01 01 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 06 01 02 00 0 0  1       CLAY FRACTION
01 02 01 06 01 02 00 0 0  2           800 268 62 571
01 02 01 06 01 02 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 06 02 00 00 0 0  1     CHEMICAL
01 02 01 06 02 00 00 0 0  2           800 16 40 86 87 88 335
01 02 01 06 02 00 00 0 0  3     FOR EACH HORIZON          NO REFERENCE OBSERVED
01 02 01 06 02 01 00 0 0  1       PH
01 02 01 06 02 01 00 0 0  2           800 461
01 02 01 06 02 01 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 06 02 02 00 0 0  1       CATION EXCHANGE CAPACITY
01 02 01 06 02 02 00 0 0  2           800 247 49 126
01 02 01 06 02 02 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 06 02 03 00 0 0  1       EXTRACTABLE CATIONS
01 02 01 06 02 03 00 0 0  2           800
01 02 01 06 02 03 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 06 02 04 00 0 0  1       BASE SATURATION
01 02 01 06 02 04 00 0 0  2           800
01 02 01 06 02 04 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 06 03 00 00 0 0  1     BIOLOGICAL
01 02 01 06 03 00 00 0 0  2           800 372
01 02 01 06 03 00 00 0 0  3     FOR EACH HORIZON          NO REFERENCE OBSERVED
01 02 01 06 03 01 00 0 0  1       AMOUNT OF ORGANIC MATTER
01 02 01 06 03 01 00 0 0  2           372
01 02 01 06 03 01 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 06 03 01 00 0 0  3       FOR RELATION TO SOIL PERMEABILITY 366
01 02 01 06 03 01 00 0 0  3       FOR RELATN TO WATER INFILTRATION 366
01 02 01 06 03 01 00 0 0  3       FOR RELATION TO GROUND SLOPE 694
01 02 01 07 00 00 00 0 0  1   TEXTURE
01 02 01 07 00 00 00 0 0  2           694 372 693 678 626
01 02 01 07 00 00 00 0 0  3   FOR EACH HORIZON            NO REFERENCE OBSERVED
01 02 01 07 00 00 00 0 0  3   FOR RELATION TO ANNUAL RUNOFF 476
01 02 01 07 00 00 00 0 0  3   FOR RELATION TO INFILTRATN CAPACITY 694
01 02 01 07 00 00 00 0 0  3   FOR RELATION TO WATER RETENTION 694
01 02 01 07 00 00 00 0 0  3   FOR RELATION TO WATER TRANSMISSION 694
01 02 01 07 01 00 00 0 0  1     PARTICLE SIZE COMPOSITION
01 02 01 07 01 00 00 0 0  2           398 693 694 678 122
01 02 01 07 01 00 00 0 0  3     FOR EACH HORIZON          NO REFERENCE OBSERVED
01 02 01 07 01 00 00 0 0  3     FOR RELATION TO WILTING POINT 694
01 02 01 07 01 00 00 0 0  3     FOR RELATION TO SOIL CAPILLARITY 619
01 02 01 07 01 00 00 0 0  3     FOR RELATION TO PERMEABILITY 398
01 02 01 07 01 00 00 0 0  3     FOR RELTN TO SOIL INDX OF RESISTANCE 142
01 02 01 07 01 01 00 0 0  1       GRAVEL
01 02 01 07 01 01 00 0 0  2           694
01 02 01 07 01 01 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 07 01 02 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 07 01 02 00 0 0  3       FOR RELATN TO INFILTRTN CAPACITY 694
01 02 01 07 01 02 00 0 0  1       SAND
01 02 01 07 01 02 00 0 0  2           694
01 02 01 07 01 03 00 0 0  1       SILT
01 02 01 07 01 03 00 0 0  2           694
01 02 01 07 01 03 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 07 01 03 00 0 0  3       FOR BOUNDARY BTWN SILT AND CLAY 619
01 02 01 07 01 04 00 0 0  1       CLAY
01 02 01 07 01 04 00 0 0  2           694 571 199 336
01 02 01 07 01 04 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 07 01 04 00 0 0  3       FOR RELATN TO INFILTRATION CAPACITY 694
01 02 01 07 01 04 01 0 0  1         DISPERSION RATIO
01 02 01 07 01 04 01 0 0  2           16 17
01 02 01 07 01 04 01 0 0  3         FOR RELATION TO ERODIBILITY 16 17
01 02 01 07 01 04 01 0 0  3         FOR EACH HORIZON      NO REFERENCE OBSERVED
01 02 01 07 01 04 02 0 0  1         SURFACE AGGREGATION RATIO
01 02 01 07 01 04 02 0 0  2           16 17
01 02 01 07 01 04 02 0 0  3         FOR EACH HORIZON      NO REFERENCE OBSERVED
01 02 01 07 01 04 02 0 0  3         FOR RELATION TO ERODIBILITY 16 17
01 02 01 07 01 05 00 0 0  1       GRAIN SIZE FREQ. DISTRIBUTION
01 02 01 07 01 05 00 0 0  2           142 398
01 02 01 07 01 05 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 07 01 05 00 0 0  3       FOR RELATION TO SOIL INDX.OF RESISTANCE 142
01 02 01 07 01 05 00 0 0  3       FOR RELATION TO SOIL PERMEABILITY 398 694
01 02 01 07 01 05 01 0 0  1         STATISTICAL PARAMETERS
01 02 01 07 01 05 01 0 0  2           398
01 02 01 07 01 05 01 0 0  3         FOR EACH HORIZON      NO REFERENCE OBSERVED
01 02 01 07 01 05 01 0 0  3         FOR RELATION TO PERMEABILITY 398
01 02 01 07 01 06 00 0 0  1       COLLOIDS
01 02 01 07 01 06 00 0 0  2           694
01 02 01 07 01 06 00 0 0  3       FOR EACH HORIZON        NO REFERENCE OBSERVED
01 02 01 07 01 06 01 0 0  1         HUMUS COLLOIDS
01 02 01 07 01 06 01 0 0  2           366
01 02 01 07 01 06 01 0 0  3         FOR EACH HORIZON      NO REFERENCE OBSERVED
01 02 01 07 01 06 01 0 0  3         FOR RELATION TO SOIL STRUCTURE 366
01 02 01 07 01 06 02 0 0  1         INORGANIC COLLOIDS
01 02 01 07 01 06 02 0 0  2           NO REFERENCE OBSERVED
01 02 01 07 01 06 02 0 0  3         FOR EACH HORIZON      NO REFERENCE OBSERVED
01 02 01 07 01 06 03 0 0  1         COLLOIDS TO MOISTURE EQUIV RATIO
01 02 01 07 01 06 03 0 0  2           NO REFERENCE OBSERVED
01 02 01 07 01 06 03 0 0  3         FOR EACH HORIZON      NO REFERENCE OBSERVED
01 02 01 08 00 00 00 0 0  1   STRUCTURE
01 02 01 08 00 00 00 0 0  2           694 372 693 678 408 317
01 02 01 08 00 00 00 0 0  3   FOR EACH HORIZON            NO REFERENCE OBSERVED
01 02 01 08 00 00 00 0 0  3   FOR RELATION TO HUMIC MATERIAL 694 366
01 02 01 08 00 00 00 0 0  3   FOR RELATION TO PERMEABILITY 693 694 678
01 02 01 08 01 00 00 0 0  1     BLOCKY
01 02 01 08 01 00 00 0 0  2           678 693 694
01 02 01 08 02 00 00 0 0  1     GRANULAR
01 02 01 08 02 00 00 0 0  2           678 693 694
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A

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01 02 01 08 03 00 00 0 0 1      COLUMNAR
01 02 01 08 03 00 00 0 0 2            678 693 694
01 02 01 08 04 00 00 0 0 1      PRISMATIC
01 02 01 08 04 00 00 0 0 2            678 693 694
01 02 01 08 05 00 00 0 0 1      PLATY
01 02 01 08 05 00 00 0 0 2            678 693 694
01 02 01 09 00 00 00 0 0 1    POROSITY
01 02 01 09 00 00 00 0 0 2            678 693 694 749
01 02 01 09 00 00 00 0 0 3    FOR EACH HORIZON            NO REFERENCE OBSERVED
01 02 01 10 00 00 00 0 0 1    PERMEABILITY                                   L/T
01 02 01 10 00 00 00 0 0 2            350 398 42 372 611 693 694 678 230 353
01 02 01 10 00 00 00 0 0 2            69 581 121 228
01 02 01 10 00 00 00 0 0 3    FOR EACH HORIZON            NO REFERENCE OBSERVED
01 02 01 10 00 00 00 0 0 3    FOR RELATION TO HUMIC MATERIALS 366
01 02 01 10 00 00 00 0 0 3    FOR RELATION TO SOIL INDX.OF RESISTANCE 142
01 02 01 10 00 00 00 0 0 3    FOR RLTN.TO SOIL PARTICLE SIZE DIST. 398
01 02 01 10 00 00 00 0 0 3    FOR RELATION TO GRAINSIZE DISTRIB. 398 694 121
01 02 01 10 00 00 00 0 0 3    FOR RELATION TO SOIL STRUCTURE 693 694 678
01 02 01 10 00 00 00 0 0 3    FOR RELATION TO ERODIBILITY 16
01 02 01 10 00 00 00 0 0 3    FOR RELATION TO SOIL PARTICLE SIZE COMP. 694 398
01 02 01 10 01 00 00 0 0 1      COEFFICIENT OF PERMEABILITY              L/T
01 02 01 10 01 00 00 0 0 2            350 42 142
01 02 01 10 01 00 00 0 0 3      FOR EACH HORIZON          NO REFERENCE OBSERVED
01 02 01 10 01 00 00 0 0 3      FOR RLTN TO SOIL INDX OF RESISTNCE 142
01 02 01 10 01 00 00 0 0 3      FOR RELATN. TO SOIL INDEX OF ERDBLTY.
01 02 01 11 01 00 00 6 0 3      FOR RELATION TO SOIL INDX.OF RESISTANCE 142
01 02 01 10 01 01 00 0 0 2            694 350 42 331
01 02 01 10 02 00 00 0 0 1      COEFFICIENT OF TRANSMISSIBILITY       L**2/T
01 02 01 11 00 00 00 0 0 1    STRENGTH
01 02 01 11 00 00 00 0 0 2            695 507
01 02 01 11 01 00 00 0 0 1      SOIL BULK DENSITY                         M/L**3
01 02 01 11 01 00 00 0 0 2            142
01 02 01 11 02 00 00 0 0 1      PLASTICITY
01 02 01 11 02 00 00 0 0 2            679 529 695
01 02 01 11 02 00 00 0 0 3      FOR EACH HORIZON          NO REFERENCE OBSERVED
01 02 01 11 03 00 00 0 0 1      DEGREE OF CONSISTENCY
01 02 01 11 03 00 00 0 0 2            800
01 02 01 11 04 00 00 0 0 1      SHEAR STRENGTH                            M/L**2
01 02 01 11 04 00 00 0 0 2            142 679 692 690 145 410 742 744
01 02 01 11 04 01 00 0 0 1        INDEX OF RESISTANCE
01 02 01 11 04 01 00 0 0 3        FOR RELATION TO VEGETATION COVER 694
01 02 01 11 04 01 00 0 0 3        FOR RELATION TO SOIL MOISTURE 142
01 02 01 11 04 01 00 0 0 3        FOR RELATION TO SOIL DENSITY 142
01 02 01 11 04 01 00 0 0 3        FOR RELTN TO SOIL GRAINSIZE DIST 142
01 02 01 11 04 01 00 0 0 3        FOR RLTN TO SOIL INDX OF ERDBLTY 142
01 02 01 11 04 01 00 0 0 3        FOR RELATION TO PERMEABILITY 142
01 02 01 11 05 00 00 0 0 1      ERODABILITY
01 02 01 11 05 00 00 0 0 3      FOR RLTN TO SURF AGGREGATN RATIO 16 17
01 02 01 11 05 00 00 0 0 3      FOR RELATION TO DISPERSION RATIO 16 17
01 02 01 11 05 00 00 0 0 3      FOR RELATION TO VEGETATION 366 16 76
01 02 01 11 05 00 00 0 0 3      FOR RELATION TO PERMEABILITY 16
01 02 01 11 05 00 00 0 0 3      FOR RELATION TO SOIL PARENT ROCK 16 177
01 02 01 11 05 00 00 0 0 3      FOR RELTN TO RNFAL KINETIC ENRGY 780
01 02 01 11 05 00 00 0 0 3      FOR RELTN TO ANTECDNT PRECIP INDX 239
01 02 01 11 05 00 00 0 0 3      FOR RELATN TO RAINFALL INTENSITY 780 16 217
01 02 01 11 05 00 00 0 0 3      FOR RELATN TO RAINFALL INTENSITY 505 340 480
01 02 01 11 05 00 00 0 0 3      FOR RELATN TO RAINFALL INTENSITY 258
01 02 01 11 05 00 00 0 0 3      FOR RELTN TO GROUND SLOPE 694 366 690 65 205
01 02 01 11 05 00 00 0 0 3      FOR RELTN TO GROUND SLOPE 480
01 02 01 11 05 00 00 0 0 3      FOR RELATN TO BASIN RELIEF RATIO 690 6 )
01 02 01 11 05 01 00 0 0 1        EROSION RATIO
01 02 01 11 05 01 00 0 0 2            315 16 217 372 17 255 475 383 239 614
01 02 01 11 05 01 00 0 0 2            16 261 658 177 155
01 02 01 11 05 01 00 0 0 2            333 687
01 02 01 11 05 01 00 0 0 3      FOR RELATION TO CLIMATE 217 767
01 02 01 11 05 01 00 0 0 3      FOR RELATION TO TEMPERATURE 693 694
01 02 01 11 05 01 00 0 0 3      FOR RLTN.TO RAINFALL FREQ.DISTRBTN. 258
01 02 01 11 05 01 00 0 0 3      FOR RLTN.TO RAINFALL FREQ.DISTRBTN. 16 480 239
01 02 01 11 05 01 00 0 0 3      FOR RLTN.TO RAINFALL KINETIC ENERGY 239
01 02 01 11 05 01 00 0 0 3      FOR RLTN.TO RAINFALL MAX.INTENSITY 780 217
01 02 01 11 05 01 00 0 0 3      FOR RLTN.TO LAND USE 16 275
01 02 01 11 05 01 00 0 0 3      FOR RLTN.TO RAINFALL INTENS.VAR. IN TIME 340
01 02 01 11 05 01 00 0 0 3      FOR RLTN.TO RAINFALL INTENS.VAR. IN TIME 258
01 02 01 11 05 01 00 0 0 3        FOR RELATION TO CLIMATE 16 261
01 02 01 11 05 02 00 0 0 1        FACTOR OF EROSION                     T/L
01 02 01 11 05 02 00 0 0 2            692
01 02 01 11 05 02 00 0 0 3        FOR RELATION TO ERODING FORCE 692
01 02 01 11 05 03 00 0 0 3        FOR RELATION TO SOIL INDX.OF RESISTANCE 142
01 02 01 11 05 03 00 0 0 3        FOR RELATION TO COEFF.OF PERMEABILITY 142
01 02 01 11 05 03 00 0 0 1        INDEX OF ERODABILITY
01 02 01 11 05 03 00 0 0 2            142
01 02 01 12 00 00 00 0 0 1    SOIL MOISTURE
01 02 01 12 00 00 00 0 0 2            142 694 119 289 291 611 693 760 678 322
01 02 01 12 00 00 00 0 0 2            106 643 251
01 02 01 12 00 00 00 0 0 3    FOR RLTN.TO SOIL INDEX OF RESISTANCE 142
01 02 01 12 00 00 00 0 0 3    FOR INFLUENCE OF WIND 56
01 02 01 12 01 00 00 0 0 1      INFILTRATION                             L/T
01 02 01 12 01 00 00 0 0 2            366 578 611 694 715 678 601
01 02 01 12 01 00 00 0 0 3      FOR RLTN.TO RAINFALL INTENSITY 780 329 340
01 02 01 12 01 00 00 0 0 3      FOR RELATION TO GROUND SLOPE 694 106
01 02 01 12 01 00 00 0 0 3      FOR RELATION TO ORGANIC MATERIAL 366
01 02 01 12 01 01 00 0 0 1        RATE OF INFILTRATION                   L/T
01 02 01 12 01 01 00 0 0 2            315 694 692 715
01 02 01 12 01 01 00 0 0 3        FOR RLTN.TO RAINFALL MAX.INTENSITY 47
01 02 01 12 01 01 00 0 0 3        FOR RELATION TO VEGETATION COVER 366 611 694
01 02 01 12 01 01 00 0 0 3        FOR RELATION TO SOIL TEXTURE 694
01 02 01 12 01 01 00 0 0 3        FOR RELATION TO AMOUNT OF SAND IN SOIL 694
01 02 01 12 01 01 00 0 0 3        FOR RELATION TO AMOUNT OF CLAY IN SOIL 694
01 02 01 12 02 00 00 0 0 1      WILTING POINT                              L
01 02 01 12 02 00 00 0 0 2            694 693 678
01 02 01 12 02 00 00 0 0 3      FOR RELATION TO PARTICLE SIZE COMPOSITION 694
01 02 01 12 02 01 00 0 0 1        AVAILABLE WATER STORAGE CAPACITY L**3
01 02 01 12 02 01 00 0 0 2              NO REFERENCE OBSERVED
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01 02 01 12 02 01 00 0 0 2          NO REFERENCE OBSERVED
01 02 02 00 00 00 00 0 0 1   BEDROCK
01 02 02 00 00 00 00 0 0 2          372 43 679 693 694 678 563 250 346 592
01 02 02 00 00 00 00 0 0 3   FOR RELATION TO ALLUVIAL FANS X-SECTION NO REF.OBS
01 02 02 00 00 00 00 0 0 3   FOR RELATION TO MEAN FLOOD PEAK 186
01 02 02 00 00 00 00 0 0 3   FOR RELATION TO HYPSOMETRIC CURVE 690 694
01 02 02 00 00 00 00 0 0 3   FOR RELATION TO SLOPE ANGLE 690 605 395 394
01 02 02 00 00 00 00 0 0 3   FOR RLTN.TO SUBSURF.WATER CHEM.COMPOS. 350 450
01 02 02 00 00 00 00 0 0 3   FOR CONTROL ON TOPOGRAPHY 694
01 02 02 01 00 00 00 0 0 1     COMPOSITION
01 02 02 01 00 00 00 0 0 2          NO REFERENCE OBSERVED
01 02 02 01 01 00 00 0 0 1       PETROGRAPHICAL
01 02 02 01 01 00 00 0 0 2          594
01 02 02 01 02 00 00 0 0 1       MINERALOGICAL
01 02 02 01 02 00 00 0 0 2          NO REFERENCE OBSERVED
01 02 02 01 03 00 00 0 0 1       CHEMICAL
01 02 02 01 03 00 00 0 0 2          NO REFERENCE OBSERVED
01 02 02 02 00 00 00 0 0 1     LITHOLOGY
01 02 02 02 00 00 00 0 0 2          372 83
01 02 02 02 00 00 00 0 0 3     FOR RELATN TO GROUND WATER MOVEMENT 350
01 02 02 02 00 00 00 0 0 3     FOR RELATN TO RAINFALL RUNOFF RATIO 47
01 02 02 02 00 00 00 0 0 3     FOR RELTN TO GRND WATER CHEM COMPOS. 94 350 450
01 02 02 02 00 00 00 0 0 3     FOR RELATION TO HYPSOMETRIC CURVE 690
01 02 02 02 00 00 00 0 0 3     FOR RELATION TO DRAINAGE DENSITY 692
01 02 02 02 00 00 00 0 0 3     FOR RELATION TO FLOW DURATION CURVE 632
01 02 02 02 00 00 00 0 0 3     FOR RELATION TO MINIMUM DISCHARGE 632 612
01 02 02 02 00 00 00 0 0 3     FOR RELATION TO SOILS 594 39 380 150
01 02 02 02 01 00 00 0 0 1       IGNEOUS ROCKS
01 02 02 02 01 00 00 0 0 2          594
01 02 02 02 01 01 00 0 0 1         INTRUSIVE
01 02 02 02 01 01 00 0 0 2          594
01 02 02 02 01 02 00 0 0 1         EXTRUSIVE
01 02 02 02 01 02 00 0 0 2          NO REFERENCE OBSERVED
01 02 02 02 02 00 00 0 0 1       METAMORPHIC ROCKS
01 02 02 02 02 00 00 0 0 2          380
01 32 02 02 03 00 09 0 0 1       PYROCLASTIC ROCKS
01 02 02 02 03 00 00 0 0 2          NO REFERENCE OBSERVED
01 02 02 02 04 00 00 0 0 1       SEDIMENTARY ROCKS
01 02 02 02 04 00 00 0 0 2          272 563 250 162 43 264
01 02 02 02 04 00 00 0 0 3       FOR RELATION TO GROUND SLOPE ANGLE 395
01 02 02 02 04 01 00 0 0 1         CLASTIC ROCKS
01 02 02 02 04 01 00 0 0 2          563 250 264
01 02 02 02 04 01 01 0 0 1           GRAINSIZE FREQ. DISTRIBUTION
01 02 02 02 04 01 01 0 0 2          83 250 264
01 02 02 02 04 01 01 1 0 1             STATISTICAL PARAMETERS
01 02 02 02 04 01 01 1 0 2          83
01 32 02 02 04 01 01 1 0 3             FOR RELATION TO PERMEABILITY 563 250
01 02 02 02 04 02 00 0 0 1         NON CLASTIC ROCKS
01 02 02 02 04 02 00 0 0 2          162 272 43
01 02 02 02 04 02 01 0 0 1           CARBONATE
01 02 02 02 04 02 01 0 0 2          272 162 43
01 02 02 02 04 02 01 1 0 1             LIMESTONE
01 02 02 02 04 02 01 1 0 2          272 162 43
01 02 02 02 04 02 01 2 0 1             DOLOMITIC
01 02 02 02 04 02 01 2 0 2          NO REFERENCE OBSERVED
01 02 02 02 04 02 02 0 0 1           EVAPORITES
01 02 02 02 04 02 02 0 0 2          NO REFERENCE OBSERVED
01 02 02 03 00 00 00 0 0 1   MASS PROPERTIES
01 02 02 03 00 00 00 0 0 2          372
01 02 02 03 01 00 00 0 0 1     POROSITY
01 02 02 03 01 00 00 0 0 2          194 749 250 563 136
01 02 02 03 01 00 00 0 0 3     FOR RLTN.TO SPECIFIC RETENTION 194
01 02 02 03 02 00 00 0 0 1     PERMEABILITY                                  L/T
01 02 02 03 02 00 00 0 0 2          350 42 230 564 228 264 399 136
01 02 02 04 00 00 00 0 0 1   STRUCTURE
01 02 02 04 00 00 00 0 0 2          372 399
01 02 02 04 00 00 00 0 0 3   FOR RELATION TO STREAM ORDER  NO REFERENCE OBS.
01 02 02 04 00 00 00 0 0 3   FOR RELATION TO FLOW DURATION CURVE 632
01 02 02 04 00 00 00 0 0 3   FOR RELATN TO LAW OF STREAM NUMBERS 690
01 02 02 04 00 00 00 0 0 3   FOR RELATION TO HYPSOMETRIC CURVE 690
01 02 02 04 00 00 00 0 0 3   FOR RLTN.TO SUBSURF.WATER DIRECT.OF FLOW NO REF.
01 02 02 04 00 00 00 0 0 3   FOR RELATION TO MINIMUM DISCHARGE 632
01 02 02 04 00 00 00 0 0 3   FOR RELATION TO MEAN SLOPE CURVE 690
01 02 02 04 01 00 00 0 0 1     MASSIVE
01 02 02 04 01 00 00 0 0 2          NO REFERENCE OBSERVED
01 02 02 04 02 00 00 0 0 1     BEDDED
01 02 02 04 02 00 00 0 0 2          395
01 02 02 04 02 01 00 0 0 1       BEDS
01 02 02 04 02 01 00 0 0 2          395
01 02 02 04 02 01 01 0 0 1         THICKNESS                               L
01 02 02 04 02 01 01 0 0 2          NO REFERENCE OBSERVED
01 02 02 04 02 01 01 1 0 1           MAXIMUM                               L
01 02 02 04 02 01 01 1 0 2          NO REFERENCE OBSERVED
01 02 02 04 02 01 01 2 0 1           MINIMUM                               L
01 02 02 04 02 01 01 2 0 2          NO REFERENCE OBSERVED
01 32 02 04 02 01 01 3 0 1           FREQUENCY DISTRIBUTION
01 02 02 04 02 01 01 3 0 2          NO REFERENCE OBSERVED
01 02 02 04 02 01 01 4 0 1           MEAN THICKNESS                        L
01 02 02 04 02 01 01 4 0 2          NO REFERENCE OBSERVED
01 02 02 04 02 01 02 0 0 1         STRIKE                                  DEGREES
01 02 02 04 02 01 02 0 0 2          NO REFERENCE OBSERVED
01 02 02 04 02 01 03 0 0 1         DIP                                     DEGREES
01 02 02 04 02 01 03 0 0 2          395
01 02 02 04 02 02 00 0 0 1       FRACTURES
01 02 02 04 02 02 00 0 0 2          272 563 560
01 02 02 04 02 02 00 0 0 3       FOR RELATION TO GROUND WATER 390 445
01 02 02 05 00 00 00 0 0 1   TECTONICS (REGIONAL STRUCTURE)
01 02 02 05 00 00 00 0 0 2          423 641 346 48 771 508
01 02 02 05 00 00 00 0 0 3   FOR RELATION TO GROUND SLOPE 690 561 48
01 02 02 05 00 00 00 0 0 3   FOR CONTROL OF MAIN STREAM VALLEY 672
01 02 02 05 00 00 00 0 0 3   FOR RELATN TO LAW OF STREAM NUMBERS 690
01 02 02 05 00 00 00 0 0 3   FOR RELATION TO DRAINAGE BASIN GEOMETRY 423
01 02 02 05 00 00 00 0 0 3   FOR RELATION TO STREAM ORDER 690
01 02 02 05 00 00 00 0 0 3   FOR RELATION TO GROUND WATER 699 767 4
01 02 02 05 01 00 00 0 0 1     STRIKE                                      DEGREES
01 02 02 05 01 00 00 0 0 2          NO REFERENCE OBSERVED
01 02 02 05 02 00 00 0 0 1     DIP                                         DEGREES
01 02 02 05 02 00 00 0 0 2          NO REFERENCE OBSERVED
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TABLE 3

MAIN SUBJECT	PRIMARY CODE	SUBJECT CLASSES: FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARD CODE	SUBJECT, REFERENCES, REMARKS (CARD CODE 1 = SUBJECT; CARD CODE 2 = REFERENCES; CARD CODE 3 = REMARKS)	DIMENSIONS
01	03	00	00	00	00	00	0	0	1	STREAMS IN DRAINAGE BASIN	
01	03	00	00	00	00	00	0	0	2	372 341 553 485 99 323 752 100 140 242	
01	03	00	00	00	00	00	0	0	2	75 77 79 182 278 299 704 803 783 727	
01	03	00	00	00	00	00	0	0	2	33 597 466 184 544 746 95 34 564 29 71	
01	03	00	00	00	00	00	0	0	2	720 675 524 455 432 31739	
01	03	00	00	00	00	00	0	0	3	FOR RELATION TO AQUIFERS 669	
01	03	00	00	00	00	00	0	0	3	FOR RELATION TO GROUND WATER LEVEL 579 336	
01	03	01	00	00	00	00	0	0	1	ORIENTATION	DEGREES
01	03	01	00	00	00	00	0	0	2	692	
01	03	02	00	00	00	00	0	0	1	LENGTH	L
01	03	02	00	00	00	00	0	0	2	319 372 279 692 693 694 789 678 25 26	
01	03	02	00	00	00	00	0	0	3	FOR RLTN.TO STREAM ORDER 690	
01	03	02	00	00	00	00	0	0	3	FOR RELATION TO RUNOFF PEAK 47	
01	03	02	00	00	00	00	0	0	3	FOR RELATION TO BASIN LENGTH 47 261	
01	03	02	00	00	00	00	0	0	3	METHODS OF MEASUREMENT	
01	03	02	00	00	00	00	0	0	3	FOR RLTN.TO DRAINAGE BASIN AREA 261	
01	03	02	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL STORAGE 47	
01	03	02	00	00	00	00	0	0	3	FOR MEASUREMENT ON MAPS 465	
01	03	02	00	00	00	00	0	0	3	FOR RELATION TO AREA OF BASINS OF LOWER ORDER 257	
01	03	02	00	00	00	00	0	0	3	FOR RELATION TO STREAM SLOPE 261	
01	03	02	00	00	00	00	0	0	3	FOR RELATION TO STREAM PROFILE 372	
01	03	03	00	00	00	00	0	0	1	CROSS SECTION	
01	03	03	00	00	00	00	0	0	2	372 693 694 789 678 379	
01	03	03	00	00	00	00	0	0	3	FOR RELATION TO STREAM ORDER 690	
01	03	03	00	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK 47	
01	03	03	01	00	00	00	0	0	1	WIDTH	L
01	03	03	01	00	00	00	0	0	2	372 279 789	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO TRANSPORT CAPACITY 254	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO SUSPENDED LOAD 372	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO DRAINAGE BASIN AREA 624 261 279	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO MEANDER LENGTH 370 369 372	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO DISCHARGE 254 528	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO ALLUVIAL SEDIMENTS 789	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO BANK ALLUVIUM 784 619	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO MEANDER AMPLITUDE 370 369 372	
01	03	03	01	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK 47	
01	03	03	02	00	00	00	0	0	1	DEPTH	L
01	03	03	02	00	00	00	0	0	2	279 501	
01	03	03	02	00	00	00	0	0	3	FOR RELTN.TO DISCHARGE 254 523 528	
01	03	03	02	00	00	00	0	0	3	FOR RELATION TO BED LOAD 158	
01	03	03	02	00	00	00	0	0	3	FOR RELATION TO ALLUVIAL SEDIMENT 619	
01	03	03	02	00	00	00	0	0	3	FOR WIDTH DEPTH RATIO 619	
01	03	03	02	00	00	00	0	0	3	FOR RELATION TO TRANSPORT CAPACITY 254	
01	03	03	02	00	00	00	0	0	3	FOR RELATION TO CHANNEL STABILITY 619	
01	03	03	02	01	00	00	0	0	1	AVERAGE	L
01	03	03	02	01	00	00	0	0	2	528 523	
01	03	03	02	01	00	00	0	0	3	FOR RELATION TO DISCHARGE 528 523	
01	03	03	02	01	00	00	0	0	3	FOR RELATION TO SUSPENDED LOAD 372	
01	03	03	02	01	00	00	0	0	3	FOR RELATN. TO RELATIVE SMOOTHNESS 369	
01	03	03	02	01	00	00	0	0	3	ALSO SEE HYDRAULIC RADIUS 357 372	
01	03	03	03	00	00	00	0	0	1	AREA	L**2
01	03	03	03	00	00	00	0	0	2	372	
01	03	03	03	00	00	00	0	0	3	FOR RELATION TO DISCHARGE 357 528 254	
01	03	03	03	00	00	00	0	0	3	FOR RELATN. TO STREAM WATER VELOCITY 523 693	
01	03	03	04	00	00	00	0	0	1	WETTED PERIMETER	L
01	03	03	04	00	00	00	0	0	2	357 372 528	
01	03	03	04	01	00	00	0	0	1	HYDRAULIC RADIUS	L
01	03	03	04	01	00	00	0	0	2	357 372 528	
01	03	03	04	01	00	00	0	0	3	FOR RELATION TO STREAM WATER VELOCITY 357 693	
01	03	03	04	01	00	00	0	0	3	FOR RELATION TO STREAM WATER VELOCITY 528	
01	03	03	04	01	00	00	0	0	3	FOR RELATION TO AVERAGE DEPTH 372 357	
01	03	04	00	00	00	00	0	0	1	PROFILE ALONG STREAM	
01	03	04	00	00	00	00	0	0	2	781 819 316 [illegible] 693 699 678 76 [illegible]	
01	03	04	00	00	00	00	0	0	3	FOR RELATION TO STREAM DISCHARGE 357	
01	03	04	00	00	00	00	0	0	3	FOR RELATION TO WATER VELOCITY 372	
01	03	04	00	00	00	00	0	0	3	FOR RELATION TO STREAM LENGTH372	
01	03	04	01	00	00	00	0	0	1	CURVATURE	
01	03	04	01	00	00	00	0	0	2	781	
01	03	04	01	00	00	00	0	0	3	TWO DIFFERENT INDICES	
01	03	05	00	00	00	00	0	0	1	GRADIENT	L
01	03	05	00	00	00	00	0	0	2	372 83 692 781	
01	03	05	00	00	00	00	0	0	3	FOR COMPETENT SLOPE 254	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO STREAM TRANSPORTATION 254 630	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO DISCHARGE 254 528 357 372	
01	03	05	00	00	00	00	0	0	3	FOR RLTN.TO SEDIM.CONC.STAT.PARAM. 372	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO STREAM CAPACITY 254	
01	03	05	00	00	00	00	0	0	3	FOR RLTN.TO BEDLOAD STAT.PARAM. 254 279	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK 186	
01	03	05	00	00	00	00	0	0	3	METHODS OF MEASUREMENT	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO WATER KINETIC ENERGY 254	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO BASIN LENGTH 261 83	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO HYPSOMETRIC INTEGRAL 690	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO ENERGY OF THE STREAM 254	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO SIZE OF BED MATERIAL 254 279	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO DRAINAGE AREA 261	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO STREAM LENGTH 261 83	
01	03	05	00	00	00	00	0	0	3	FOR RELATION TO STREAM WATER VELOCITY 83 693 528	

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01 03 05 00 00 00 00 0 0 3   FOR RELATION TO WATER KINETIC ENERGY 254
01 03 05 00 00 00 00 0 0 3   FOR RELATION TO BASIN LENGTH 261 83
01 03 05 00 00 00 00 0 0 3   FOR RELATION TO HYPSOMETRIC INTEGRAL 690
01 03 05 00 00 00 00 0 0 3   FOR RELATION TO ENERGY OF THE STREAM 254
01 03 05 00 00 00 00 0 0 3   FOR RELATION TO SIZE OF BED MATERIAL 254 279
01 03 05 00 00 00 00 0 0 3   FOR RELATION TO DRAINAGE AREA 261
01 03 05 00 00 00 00 0 0 3   FOR RELATION TO STREAM LENGTH 261 83
01 03 05 00 00 00 00 0 0 3   FOR RELATION TO STREAM WATER VELOCITY 83 693 528
01 03 05 00 00 00 00 0 0 3   FOR RELATION TO STREAM WATER MEAN VELOCITY 528
01 03 05 01 00 00 00 0 0 1     SLOPE OF WATER SURFACE                     DEGREES
01 03 05 01 00 00 00 0 0 3     FOR RLTN.TO BANK LITHOLOGY 357
01 03 05 01 00 00 00 0 0 3     FOR RELATN. TO STRM. WATER VELOCITY 528 523
01 03 06 00 00 00 00 0 0 1   DEPTH OF WATER                               L
01 03 06 00 00 00 00 0 0 2             372
01 03 06 00 00 00 00 0 0 3   FOR RELATION TO STREAM WATER MEAN VELOCITY 523 158
01 03 06 00 00 00 00 0 0 3   AT DIFFERENT POINTS THRU CROSS SEC.    NO REF.OBS.
01 03 06 00 00 00 00 0 0 3   FOR RELATION TO STREAM WATER VELOCITY 523
01 03 06 00 00 00 00 0 0 3   AT DIFFERENT POINTS ALONG THE STREAM   NO REF.OBS.
01 03 06 00 00 00 00 0 0 3   FOR RELATION TO WATER TURBULENCE 366 523 190
01 03 06 00 00 00 00 0 0 3   FOR RELATION TO DISCHARGE 366 523 190 650 528 693
01 03 06 00 00 00 00 0 0 3   FOR RATING CURVE 693 190 528
01 03 06 01 00 00 00 0 0 1     MAXIMUM
01 03 06 01 00 00 00 0 0 2             372
01 03 06 02 00 00 00 0 0 2             372
01 03 06 02 00 00 00 0 0 3     FOR RELATION TO BEDLOAD 372
01 03 06 02 00 00 00 0 0 1     MINIMUM                                    L
01 03 06 02 01 00 00 0 0 1       DIFFERENCE BTWN MAX. AND MIN.            L
01 03 06 02 01 00 00 0 0 2             NO REFERENCE OBSERVED
01 03 06 03 00 00 00 0 0 1     AVERAGE                                    L
01 03 06 03 00 00 00 0 0 2             528
01 03 06 03 00 00 00 0 0 3     FOR RELATION TO X-SECTION HYDRAULIC RADIUS 372
01 03 06 03 00 00 00 0 0 3     FOR RELATION TO X-SECTION HYDRAULIC RADIUS 357
01 03 06 03 01 00 00 0 0 1       VARIATION IN TIME
01 03 06 03 01 00 00 0 0 2             372
01 03 07 00 00 00 00 0 0 1   DISCHARGE                                    L**3/T
01 03 07 00 00 00 00 0 0 2             372 528 633 693 694 678 351 716
01 03 07 00 00 00 00 0 0 2             366 694
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO STREAM ENERGY254
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO SUSP.LOAD MIN.COMPOS. 528 693
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO SUSPENDED LOAD 528 693
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO TRACTIVE CAPACITY254
01 03 07 00 00 00 00 0 0 3   FOR RATING CURVE 357 693
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO GROUND WATER TABLE 694 580
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO RESERVOIRS
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO STREAM PROFILE 357
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO STREAM WATER VELOCITY 523 357 528
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO STREAM WATER VELOCITY 693
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO SEDIMENT CONCENTRATION 64
01 03 07 00 00 00 00 0 0 3   FOR CONCORDANT FLOW 366
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO CHANNEL AVERAGE DEPTH 528 523
01 03 07 00 00 00 00 0 0 3   FOR VOL. AT DIF. PTS. ALONG THE STREAM 366
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO STREAM ORDER 690
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO WATER DEPTH 523 366 190 650 528
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO WATER DEPTH 690
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO DISSOLVED LOAD (GRADIENT) 350
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO STREAM SLOPE 254 528 357
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO STREAM BRAIDING 372
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO DRAINAGE AREA 366 47 279 372 357
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO DRAINAGE AREA 694
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO CHANNEL DEPTH 254 523 528
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO STREAM CROSS SECTION 357 528 254
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO CHANNEL WIDTH 254 528
01 03 07 00 00 00 00 0 0 3   FOR COMPETENT DISCHARGE 254
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO BED ROUGHNESS 523 650
01 03 07 00 00 00 00 0 0 3   FOR RELATION TO RAINFALL 238 32 289 694
01 03 07 01 00 00 00 0 0 1     MAXIMUM                                    L**3/T
01 03 07 01 00 00 00 0 0 3     FOR RELATION TO MEANDER LENGTH 369 131
01 03 07 01 00 00 00 0 0 3     FOR RELATION TO BASIN LENGTH 47
01 03 07 01 00 00 00 0 0 3     FOR RELATION TO SNOW FALL 781
01 03 07 01 00 00 00 0 0 3     FOR RELATION TO STORAGE AREAS 781
01 03 07 01 00 00 00 0 0 3     FOR RELATION TO URBANIZATION 476 781
01 03 07 02 00 00 00 0 0 1     MINIMUM                                    L**3/T
01 03 07 02 00 00 00 0 0 2             694 612 64
01 03 07 02 00 00 00 0 0 3     FOR RELATION TO BED ROCK LITHOLOGY 632 612
01 03 07 02 00 00 00 0 0 3     FOR RELATION TO BEDROCK STRUCTURE 632
01 03 07 02 00 00 00 0 0 3     FOR BASE FLOW L9
01 03 07 02 00 00 00 0 0 3     FOR BASE FLOW 694
01 03 07 02 01 00 00 0 0 1       DIFFERENCE BTWN. MAX. AND MIN.       L**3/T
01 03 07 02 01 00 00 0 0 2             NO REFERENCE OBSERVED
01 03 07 03 00 00 00 0 0 1     AVERAGE                                    L**3/T
01 03 07 03 00 00 00 0 0 2             279
01 03 07 03 00 00 00 0 0 3     FOR RELATION TO DRAINAGE AREA 279
01 03 07 03 00 00 00 0 0 3     FOR RELATION TO DRAINAGE DENSITY 624
01 03 07 03 00 00 00 0 0 3     FOR RELATION TO WATER VELOCITY 372
01 03 07 03 00 00 00 0 0 3     FOR RELATION TO MEAN WATER VELOCITY 372
01 03 07 04 00 00 00 0 0 1     RELATIVE
01 03 07 04 00 00 00 0 0 2             17
01 03 07 05 00 00 00 0 0 1     VARIATION IN TIME
01 03 07 05 00 00 00 0 0 2             372
01 03 07 06 00 00 00 0 0 1     FLOW DURATION CURVE
01 03 07 06 00 00 00 0 0 2             523 632 528
01 03 07 06 00 00 00 0 0 3     FOR RELATION TO SUBSURF.WATER
01 03 07 06 00 00 00 0 0 3     FOR RELATION TO SNOW FALL 632
01 03 07 06 00 00 00 0 0 3     FOR RELATION TO BEDROCK STRUCTURE 632
01 03 07 06 00 00 00 0 0 3     FOR RELATION TO DEPRESSION STORAGE 632
01 03 07 06 00 00 00 0 0 3     FOR RELATION TO GEOLOGIC CHARACTERISTICS 632 648
01 03 07 06 00 00 00 0 0 3     FOR RELATION TO BED ROCK LITHOLOGY 632
01 03 07 07 00 00 00 0 0 1     FLOW DISTRIBUTION GRAPH
01 03 07 07 00 00 00 0 0 2             632
01 03 07 08 00 00 00 0 0 1     BASE DISCHARGE                             L**3/T
01 03 07 08 00 00 00 0 0 2             694 612
01 03 07 09 00 00 00 0 0 1     FLOOD DISCHARGE                            L**3/T
01 03 07 09 00 00 00 0 0 2             372 693 694 768 678 548 703 472 787 354
01 03 07 09 00 00 00 0 0 2             89 277
01 03 07 09 00 00 00 0 0 3     FOR RELATION TO DRAINAGE AREA 366 47 372 186 279
01 03 07 09 00 00 00 0 0 3     FOR THE MEANING OF FREQ. DISTRIBTN. 366 690 46
01 03 07 09 00 00 00 0 0 3     FOR RELATION TO WATER STAGE  366 318
01 03 07 09 00 00 00 0 0 3     FOR REGULATION BY DAMS 366 318
01 03 07 09 00 00 00 0 0 3     FOR RELATION TO SEDIMENT TRANSPORT 694
01 03 07 09 00 00 00 0 0 3     FOR RELATION TO SED.CONC.STAT.PARAM. 372
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01 03 07 09 00 00 00 0 0 3   FOR CONCORDANT FLC. 366
01 03 07 09 00 00 00 0 0 3   FOR RELATION TO ANTECEDENT PRECIP.INDEX 366 318
01 03 07 09 00 00 00 0 0 3   FOR RELATION TO RATE OF PRECIPITATION 366 318
01 03 07 09 00 00 00 0 0 3   FOR RELATION TO SNOWFALL FREQ.DISTRIBTN. 47
01 03 07 09 00 00 00 0 0 3   FOR RELATION TO STORM PRECIPITATION 366 47 318
01 03 07 09 01 00 00 0 0 1     FLOODED CHANNEL WIDTH                        L
01 03 07 09 01 00 00 0 0 2           369
01 03 07 09 02 00 00 0 0 1     WATER HEIGHT IN FLOOD                        L
01 03 07 09 02 00 00 0 0 2           366 318
01 03 07 09 02 00 00 0 0 3     FOR RELATION TO FLOOD PLAIN DIMENS. 366 318
01 03 07 09 03 00 00 0 0 1     FLOOD WAVE
01 03 07 09 03 00 00 0 0 2           694
01 03 07 09 03 01 00 0 0 1       FLOOD ROUTING
01 03 07 09 03 01 00 0 0 2           366 318 127
01 03 07 09 04 00 00 0 0 1     FLOOD PEAK                                   L**3/T
01 03 07 09 04 00 00 0 0 2           366 318
01 03 07 09 04 00 00 0 0 3     FOR REDUCTION BY DEPRESSION STORAGE 315 318
01 03 07 09 04 00 00 0 0 3     FOR REDUCTION BY DEPRESSION STORAGE 107 781
01 03 07 09 04 00 00 0 0 3     FOR REDUCTION BY RESERVOIRS 366 186 318 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO STREAM GRADIENT 186 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO CHANNEL SLOPE 47 186 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO RAINFALL VARIATION IN TIME 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO SOILS 366 781
01 03 07 09 04 00 00 0 0 3     FOR RELATN. TO CHAN. CROSS SECTION 47 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO SNOWMELT 781
01 03 07 09 04 00 00 0 0 3     FOR RELATN. TO RAINFALL AND RUNOFF 567 318 366
01 03 07 09 04 00 00 0 0 3     FOR RELATN. TO RAINFALL AND RUNOFF 366 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO DRAINAGE AREA 372 47 186 567
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO DRAINAGE AREA 318 366 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO CHANNEL WIDTH 47 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO RNFALL INTENSITY 47 366 567
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO RNFALL INTENSITY 318 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO SNOWFALL 47 781
01 03 07 09 04 00 00 0 0 3     FOR RELATION TO STREAM STORAGE 366 47 318 781
01 03 07 09 04 00 00 0 0 3     FOR REDUCTION BY DEPRESSION STORAGE 366 47 186
01 03 07 09 04 01 00 0 0 1       MAXIMUM                                    L**3/T
01 03 07 09 04 01 00 0 0 2           503 396
01 03 07 09 04 01 00 0 0 3       FOR ANNUAL FLOOD 366 503 396
01 03 07 09 04 01 01 0 0 1         MAXIMUM PROBABLE                         L**3/T
01 03 07 09 04 01 01 0 0 2           366 318
01 03 07 09 04 01 01 0 0 3   ERODIBILITY
01 03 07 09 04 02 00 0 0 1       MEAN                                       L**3/T
01 03 07 09 04 02 00 0 0 2           366 372
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO CULTIVATION 366 186
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO DRAINAGE AREA 372 186
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO CHANNEL STORAGE 186
01 03 07 09 04 02 00 0 0 3       FOR RELATN. TO DEPRESSN. STORAGE 366 186
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO STREAMS DENSITY86
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO ASPECT 186
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO BASIN BEDROCK 186
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO GROUND SLOPE 186 506
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO RELIEF 186
01 03 07 09 04 02 00 0 0 3       FOR RELATION TO SOILS IN BASIN 366 186
01 03 07 09 04 03 00 0 0 1       VARIATION THROUGH TIME
01 03 07 09 04 03 00 0 0 2           186
01 03 07 09 04 04 00 0 0 1       PARTIAL DURATION SERIES
01 03 07 09 04 04 00 0 0 2           186 503 318 366
01 03 07 09 05 00 00 0 0 1     RECURRENCE INTERVAL                          T
01 03 07 09 05 00 00 0 0 2           186 503 396 318 366 781
01 03 07 09 05 00 00 0 0 3     METHODS OF MEASUREMENT
01 03 07 09 05 00 00 0 0 3     FOR MEAN ANNUAL FLOOD 396 318
01 03 07 09 05 01 00 0 0 1       PROBABILITY OF RECURRENCE
01 03 07 09 05 01 00 0 0 2           186 503
01 03 07 09 05 02 00 0 0 1       FLOOD FREQUENCY
01 03 07 09 05 02 00 0 0 2           366 186 318 46
01 03 07 09 06 00 00 0 0 1     BANKFULL STAGE                               L
01 03 07 09 06 00 00 0 0 2           784 357 318 366 801
01 03 08 00 00 00 00 0 0 1   VELOCITY                                       L/T
01 03 08 00 00 00 00 0 0 2           693 372 83 523 694 678
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO DISCHARGE 523 357 528 693
01 03 08 00 00 00 00 0 0 3   FOR RELATN. TO SEDIMENT TRANSPORTATION 694 105 592
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO SEDIM.CONC.STAT.PARAM. 105
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO STREAM GRADIENT 83 693 528
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO STREAM PROFILE 372
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO AVERAGE DISCHARGE 372
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO SLOPE OF STRM.WATER SURF 523 528
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO SUSPENDED LOAD 105 254 17 46 669
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO SUSPENDED LOAD 232
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO BED LOAD 254 212 297
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO TRACTIVE COMPETENCE 693
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO BED LOAD STAT.PARAM. 297
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO BED LOAD GRAINSIZE 64
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO TRACTIVE CAPACITY 693
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO WATER TURBULENCE 372
01 03 08 00 00 00 00 0 0 3   FOR RELATN. TO STRM. BED ROUGHNESS 523 693 528
01 03 08 00 00 00 00 0 0 3   FOR VARIATION DURING FLOODS 694
01 03 08 00 00 00 00 0 0 3   FOR MANNING EQUATION 57 528 372
01 03 08 00 00 00 00 0 0 3   FOR RELATN. TO CROSS SEC. AREA 523 693
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO DEPTH OF WATER 523
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO SHEAR STRESS 372
01 03 08 00 00 00 00 0 0 3   FOR RELATION TO MEANDER 372
01 03 08 00 00 00 00 0 0 3   FOR RELATN. TO CHN. SEC. HYDRAULIC RAD. 357 693 528
01 03 08 01 00 00 00 0 0 1     MAXIMUM                                      L/T
01 03 08 01 00 00 00 0 0 2           372
01 03 08 02 00 00 00 0 0 1     MINIMUM                                      L/T
01 03 08 02 00 00 00 0 0 2           372
01 03 08 02 00 00 00 0 0 3     FOR RELATION TO BED LOAD 254
01 03 08 02 01 00 00 0 0 1       DIFFERENCE BTWN. MAX. AND MIN.             L/T
01 03 08 02 01 00 00 0 0 2           NO REFERENCE OBSERVED
01 03 08 03 00 00 00 0 0 1     MEAN                                         L/T
01 03 08 03 00 00 00 0 0 2           523 357 157 158
01 03 08 03 00 00 00 0 0 3     FOR VARIATION ABOVE THE CHANNEL BED   NO REF.OBS.
01 03 08 03 00 00 00 0 0 3     FOR RELATION TO BED LOAD 523 158 157
01 03 08 03 00 00 00 0 0 3     FOR RELATION TO DISSOLVED LOAD 157
01 03 08 03 00 00 00 0 0 3     FOR VARIATION ALONG STREAM CHANNEL 372
01 03 08 03 00 00 00 0 0 3     FOR RELATN TO MEAN ANNUAL DISCHARGE 528
01 03 08 03 00 00 00 0 0 3     FOR RELATION TO WATER DEPTH 523 158
01 03 08 03 00 00 00 0 0 3     FOR RELATION TO SEDIMENT CONCENTRATION 64 105
01 03 08 03 00 00 00 0 0 3     FOR RELATION TO SEDIMENT CONCENTRATION [illegible]
```

```
01 03 08 02 00 00 00 0 0 2            372
01 03 08 02 00 00 00 0 0 3      FOR RELATION TO BED LOAD 254
01 03 08 02 01 00 00 0 0 1        DIFFERENCE BTWN. MAX. AND MIN.      L/T
01 03 08 02 01 00 00 0 0 2              NO REFERENCE OBSERVED
01 03 08 03 00 00 00 0 0 1      MEAN                                  L/T
01 03 08 03 00 00 00 0 0 2            523 357 157 158
01 03 08 03 00 00 00 0 0 3      FOR VARIATION ABOVE THE CHANNEL BED  NO REF.OBS.
01 03 08 03 00 00 00 0 0 3      FOR RELATION TO BED LOAD 523 158 157
01 [illegible] [illegible] 03 00 00 00 0 0 3      FOR RELATION TO DISSOLVED LOAD 157
01 03 08 03 00 00 00 0 0 3      FOR VARIATION ALONG STREAM CHANNEL 372
01 03 08 03 00 00 00 0 0 3      FOR RELATN TO MEAN ANNUAL DISCHARGE 528
01 03 08 03 00 00 00 0 0 3      FOR RELATION TO WATER DEPTH 523 158
01 03 08 03 00 00 00 0 0 3      FOR RELATION TO SEDIMENT CONCENTRATION 64 105
01 03 08 03 00 00 00 0 0 3      FOR RELATION TO SEDIMENT CONCENTRATION 809
01 03 08 03 00 00 00 0 0 3      FOR RELATN TO CHANNEL BED ROUGHNESS 523
01 03 08 03 00 00 00 0 0 3      FOR RELATION TO CHANNEL SLOPE 528
01 03 08 03 00 00 00 0 0 3      FOR CHEZY COEFFICIENT 357 372
01 03 08 03 00 00 00 0 0 3      FOR VARIATION AT FLOOD PASSAGE 694
01 03 09 00 00 00 00 0 0 1    TURBULENCE
01 03 09 00 00 00 00 0 0 2            372 72
01 03 07 09 00 00 00 0 0 3      FOR RELATION TO DRAINAGE AREA 318 694
01 03 09 00 00 00 00 0 0 3    FOR RELATION TO WATER VELOCITY 372
01 03 09 00 00 00 00 0 0 3    FOR RELATION TO WATER DEPTH 366 523 190 650
01 03 09 00 00 00 00 0 0 3    FOR RELATION TO KINEMATIC VISCOSITY 692
01 03 09 01 00 00 00 0 0 1      REYNOLDS NUMBER
01 03 09 01 00 00 00 0 0 2            372 692 338
01 03 09 02 00 00 00 0 0 1      SHEAR STRESS                          M/L**2T**2
01 03 09 02 00 00 00 0 0 2            372
01 03 09 02 00 00 00 0 0 3      FOR RELATION TO STREAM WATER VELOCITY 372
01 03 09 02 00 00 00 0 0 3      FOR CRITICAL SHEAR STRESS 372
01 03 09 02 00 00 00 0 0 3      FOR RELATION TO TRANSPORT RATE 372
01 03 09 02 01 00 00 0 0 1        RESISTANCE                          M/L**4
01 03 09 02 01 00 00 0 0 2            372
01 03 10 00 00 [illegible] 1    KINETIC ENERGY                        ML**2/T**2
01 03 10 00 [illegible]            372
01 03 10 00 [illegible]    FOR RELATION TO CHANNEL SLOPE 254
01 03 11 00 [illegible]    BED
01 03 11 00 [illegible]            372 523 693 528 102 332 37 652 606 309
01 03 11 01 [illegible] 1      PHYSICAL NATURE OF BED
01 03 11 01 [illegible] 2            693 696 678 332 708 265 79
01 03 11 01 [illegible]      FOR RELATION TO STREAM TRANSPORTATION  652
01 03 11 01 01 [illegible] 0 0 1        CHANNEL BED ROUGHNESS
01 03 11 01 01 00 00 0 0 2            57 648 357 66 650 692 694 73 183 532
01 03 11 01 01 00 00 0 0 2            651 810
01 03 11 01 01 00 00 0 0 3        FOR RELATION TO WATER VELOCITY 523 693 528
01 03 11 01 01 00 00 0 0 3        FOR RELATION TO STREAM DISCHARGE 523 650
01 03 11 01 01 00 00 0 0 3        FOR RELATION TO MEAN WATER VELOCITY 523
01 03 11 01 01 00 00 0 0 3        FOR RELATION TO BEDLOAD 57 648 342
01 03 11 01 01 00 00 0 0 3        FOR RELATION TO REGIME OF FLOW 648 650 92
01 03 11 01 01 00 00 0 0 3        FOR RELATION TO RESISTANCE TO FLOW 332 652 92
01 03 11 01 01 00 00 0 0 3        FOR RELATIVE ROUGHNESS 215
01 03 12 00 00 00 00 0 0 1    VALLEY OF MAIN STREAM
01 03 12 00 00 00 00 0 0 2            372 690 693 694 678 348 672 539 645 790
01 03 12 00 00 00 00 0 0 2            545
01 03 12 00 00 00 00 0 0 3    FOR CONTROL BY TECTONICS 672
01 03 12 01 00 00 00 0 0 1      LENGTH                                L
01 03 12 01 00 00 00 0 0 2            790
01 03 12 02 00 00 00 0 0 1      WIDTH                                 L
01 03 12 02 00 00 00 0 0 2            372 638 729
01 03 12 02 00 00 00 0 0 3      FOR RELATION TO MEANDER LENGTH 372
01 03 12 02 01 00 00 0 0 1        MAXIMUM                             L
01 03 12 02 01 00 00 0 0 2            372
01 03 12 02 02 00 00 0 0 1        MINIMUM                             L
01 03 12 02 02 00 00 0 0 2            372
01 03 12 03 00 00 00 0 0 1      DEPTH                                 L
01 03 12 03 00 00 00 0 0 2            638
01 03 12 03 01 00 00 0 0 1        VARIATION DOWNSTREAM
01 03 12 03 01 00 00 0 0 2            NO REFERENCE OBSERVED
01 03 12 04 00 00 00 0 0 1      ELEVATION OF VALLEY DIVIDE            L
01 03 12 04 00 00 00 0 0 2            372 26
01 03 12 05 00 00 00 0 0 1      FLOOD PLAIN
01 03 12 05 00 00 00 0 0 2            785
01 03 12 05 01 00 00 0 0 1        PRESENT DAY FLOOD PLAIN
01 03 12 05 01 00 00 0 0 2            555
01 03 12 05 01 01 00 0 0 1          DIMENSIONS                        L
01 03 12 05 01 01 00 0 0 2            NO REFERENCE OBSERVED
01 03 12 05 01 01 00 0 0 3          FOR RELATION TO WATER STAGE 366 318
01 03 12 05 01 02 00 0 0 1          HEIGHT OF LOW TERRACES            L
01 03 12 05 01 02 00 0 0 2            166 271 654 103 70 602 748 407 462 519
01 03 12 05 01 02 00 0 0 2            698 324 317 577 779 198 387 245 270 5
01 03 12 05 01 02 00 0 0 2            453
01 03 12 05 02 00 00 0 0 1        FLOOD PLAIN OF A PREVIOUS AGE
01 03 12 05 02 00 00 0 0 2            166 271 654 103 70 602 748 407 462 519
01 03 12 05 02 00 00 0 0 2            698 324 317 577 779 198 387 245 270 373
01 03 12 05 02 00 00 0 0 2            5 453
01 03 12 05 02 01 00 0 0 1          DIMENSIONS                        L
01 03 12 05 02 01 00 0 0 2            NO REFERENCE OBSERVED
01 03 12 05 02 02 00 0 0 1          HEIGHT OF HIGH TERRACES           L
01 03 12 05 02 02 00 0 0 2            NO REFERENCE OBSERVED
01 03 12 06 00 00 00 0 0 1      VALLEY ASYMMETRY
01 03 12 06 00 00 00 0 0 2            372 319 576
01 03 12 06 00 00 00 0 0 3      FOR RELATION TO WATER VELOCITY 372
01 03 12 07 00 00 00 0 0 1      VALLEY WALL SLOPES                    DEGREES
01 03 12 07 00 00 00 0 0 2            369 692
01 03 12 07 00 00 00 0 0 3      FOR RELATION TO SED.CONC.STAT.PARAM. 372
01 03 12 07 00 00 00 0 0 3      FOR RELATION TO SEDIMENT CONCENTRATION 690
01 03 12 07 00 00 00 0 0 3      FOR RELATION TO STREAM TRANSPORTATION 690
01 03 12 07 00 00 00 0 0 3      FOR RELATION TO DISSOLVED LOAD 690
01 03 13 00 00 00 00 0 0 1    BRAIDING (ANASTOMOSIS)
01 03 13 00 00 00 00 0 0 2            372 369 203 793
01 03 13 00 00 00 00 0 0 3    FOR RELATION TO SEDIMENTATION 372
01 03 13 00 00 00 00 0 0 3    FOR RELATION TO DISCHARGE 372
01 03 14 00 00 00 00 0 0 1    MEANDERS
01 03 14 00 00 00 00 0 0 2            372 369 357 218 517 377 197 210 717 793
01 03 14 00 00 00 00 0 0 2            328 208 636 90 281 786
01 03 14 00 00 00 00 0 0 3    FOR RELATION TO BEDROCK
01 03 14 00 00 00 00 0 0 3    FOR RELATION TO STREAM WATER VELOCITY 372
01 03 14 01 00 00 00 0 0 1      AMPLITUDE                             L
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B

A

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01 03 14 01 00 00 00 0 0  2            370 369 372
01 03 14 01 00 00 00 0 0  3     FOR RELATION TO CHANNEL WIDTH 370 369 372
01 03 14 02 00 00 00 0 0  1     LENGTH                                        L
01 03 14 02 00 00 00 0 0  2            372
01 03 14 02 00 00 00 0 0  3     FOR RELATION TO CHANNEL WIDTH 370 369 372
01 03 14 02 00 00 00 0 0  3     FOR RELATION TO MAXIMUM DISCHARGE 369 131
01 03 14 02 00 00 00 0 0  3     FOR RELATION TO VALLEY WIDTH 372
01 03 14 02 00 00 00 0 0  3     FOR RELATN TO MN RADIUS OF CURVATURE 370 372
01 03 14 02 00 00 00 0 0  3     FOR RELATN TO DRNAGE BASIN AREA 369
01 03 14 03 00 00 00 0 0  1     BELT WIDTH                                    L
01 03 14 03 00 00 00 0 0  2            372
01 03 14 04 00 00 00 0 0  1     RADIUS OF CURVATURE                           L
01 03 14 04 00 00 00 0 0  2            370 372
01 03 14 04 01 00 00 0 0  1       MEAN                                        L
01 03 14 04 01 00 00 0 0  2            370 372
01 03 14 04 01 00 00 0 0  3       FOR RELATION TO MEANDER LENGTH 370 372
01 03 15 00 00 00 00 0 0  1   BANKS
01 03 15 00 00 00 00 0 0  2            784 757 421
01 03 15 01 00 00 00 0 0  1     LITHOLOGICAL COMPOSITION
01 03 15 01 00 00 00 0 0  2            619
01 03 15 01 00 00 00 0 0  3     FOR RELATION TO CHANNEL WIDTH 784 619
01 03 15 01 00 00 00 0 0  3     FOR RELATION TO SLOPE OF WATER SURFACE 357
01 03 15 01 00 00 00 0 0  3     FOR RELATION TO STORAGE 619
01 03 15 02 00 00 00 0 0  1     HEIGHT                                        L
01 03 15 02 00 00 00 0 0  2            NO REFERENCE OBSERVED
01 03 16 00 00 00 00 0 0  1   STREAM ORDER
01 03 16 00 00 00 00 0 0  2            372 690 692 693 607 781
01 03 16 00 00 00 00 0 0  3   FOR RELATION TO DRAINAGE BASIN AREA 690
01 03 16 00 00 00 00 0 0  3   FOR RELATION TO BEDROCK TECTONICS 690
01 03 16 00 00 00 00 0 0  3   FOR RELATION TO DRAINAGE BASIN LENGTH 690
01 03 16 00 00 00 00 0 0  3   FOR RELATION TO BEDROCK STRUCTURE 690
01 03 16 00 00 00 00 0 0  3   FOR RELATION TO STREAM LENGTH 690
01 03 16 00 00 00 00 0 0  3   FOR RELATION TO CHANNEL SIZE 690
01 03 16 00 00 00 00 0 0  3   FOR RELATION TO DISCHARGE 690
01 03 16 01 00 00 00 0 0  1     CHANNELS OF ORDER LOWER THAN THE MAIN STREAM
01 03 16 01 00 00 00 0 0  2            372 690 692 693 607
01 03 16 01 01 00 00 0 0  1       NUMBER
01 03 16 01 01 00 00 0 0  2            315 372 690 666 541
01 03 16 01 01 00 00 0 0  3       FOR RELATION TO DRAINAGE AREA 261 315
01 03 16 01 01 01 00 0 0  1         BIFURCATION RATIO
01 03 16 01 01 01 00 0 0  2            403 615 690 315 692
01 03 16 01 01 01 01 0 0  1           AVERAGE FOR ALL THE BASIN
01 03 16 01 01 01 01 0 0  2            315
01 03 16 01 02 00 00 0 0  1       LENGTH                                      L
01 03 16 01 02 00 00 0 0  2            315 692
01 03 16 01 02 00 00 0 0  3       FOR RELATION TO STREAM ORDER 690
01 03 16 01 02 00 00 0 0  3       FOR MEANING OF FREQ. DISTRIBUTION 690
01 03 16 01 02 00 00 0 0  3       FOR RELATION TO DRAINAGE AREA 261 690
01 03 16 01 02 00 00 0 0  3       FOR DRAINAGE DENSITY 690 692 25 315 120
01 03 16 01 02 00 00 0 0  3       FOR CONSTANT OF CHANL MAINTENANCE 690 615 692
01 03 16 01 02 01 00 0 0  1         MEAN                                      L
01 03 16 01 02 01 00 0 0  2            315 261 692
01 03 16 01 02 01 01 0 0  1           RATIO BTWN SUCCESSIVE ORDERS
01 03 16 01 02 01 01 0 0  2            315
01 03 16 01 03 00 00 0 0  1       SLOPE                                       DEGREES
01 03 16 01 03 00 00 0 0  2            692
01 03 16 01 03 01 00 0 0  1         MEAN                                      DEGREES
01 03 16 01 03 01 00 0 0  2            692
01 03 16 01 03 01 01 0 0  1           RATIO BTWN SUCCESSIVE ORDERS
01 03 16 01 03 01 01 0 0  2            692
01 03 16 01 04 00 00 0 0  1       ENTRANCE ANGLE OF TRIBUTARIES               DEGREES
01 03 16 01 04 00 00 0 0  2            315 692
01 03 16 01 04 01 00 0 0  1         MEAN                                      DEGREES
01 03 16 01 04 01 00 0 0  2            315 692
01 03 17 00 00 00 00 0 0  1   STORAGE                                         L**3
01 03 17 00 00 00 00 0 0  2            315 694 151 404 781
01 03 17 00 00 00 00 0 0  3   FOR RELATION TO FLOOD PEAK 366 47 316
01 03 17 01 00 00 00 0 0  1     CHANNEL STORAGE                               L**3
01 03 17 01 00 00 00 0 0  2            315 694 151
01 03 17 01 00 00 00 0 0  3     FOR RELATION TO CHANNEL LENGTH 47
01 03 17 01 00 00 00 0 0  3     FOR RELATION TO MEAN FLOOD PEAK 186 366 315
01 03 17 01 00 00 00 0 0  3     FOR RELATION TO CHANGE OF RIVER STORAGE 47
01 03 17 02 00 00 00 0 0  1     BANK STORAGE                                  L**3
01 03 17 02 00 00 00 0 0  2            619 151
01 03 17 02 00 00 00 0 0  3     FOR RELATION TO BANKS LITHOL.COMPOS. 619
01 03 18 00 00 00 00 0 0  1   WORKS OF MAN
01 03 18 00 00 00 00 0 0  2            304 366 318 694
01 03 18 01 00 00 00 0 0  1     DAMS
01 03 18 01 00 00 00 0 0  2            304 366 318 459
01 03 18 01 00 00 00 0 0  3     FOR RELATION TO SEDIM.CONC.STAT.PARAM. 372
01 03 18 01 00 00 00 0 0  3     FOR RELATION TO STREAM TRANSPORTATION 694 304
01 03 18 01 00 00 00 0 0  3     FOR RELATION TO STREAM EROSION 459
01 03 18 01 00 00 00 0 0  3     FOR RELATION TO FLOOD DISCHARGE 459
01 03 18 01 01 00 00 0 0  1       DIMENSIONS                                  L
01 03 18 01 01 00 00 0 0  2
01 03 18 01 02 00 00 0 0  1       RESERVOIR
01 03 18 01 02 00 00 0 0  2            284 31
01 03 18 01 02 00 00 0 0  3       FOR REDUCTION OF FLOOD PEAK 366 318
01 03 18 01 02 00 00 0 0  3       FOR RELATION TO STREAM DISCHARGE
01 03 18 01 02 00 00 0 0  3       FOR RELATION TO STREAM SEDIMENTATION 694 282
01 03 18 01 02 00 00 0 0  3       FOR RESERVOIR SEDIMENTATION 694 282
01 03 18 01 02 01 00 0 0  1         LENGTH                                    L
01 03 18 01 02 01 00 0 0  2            NO REFERENCE OBSERVED
01 03 18 01 02 02 00 0 0  1         WIDTH                                     L
01 03 18 01 02 02 00 0 0  2            NO REFERENCE OBSERVED
01 03 18 01 02 03 00 0 0  1         AVERAGE DEPTH                             L
01 03 18 01 02 03 00 0 0  2
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01 03 16 00 00 00 00 0 0 3   FOR RELATION TO BEDROCK STRUCTURE 690
01 03 16 00 00 00 00 0 0 3   FOR RELATION TO STREAM LENGTH 690
01 03 16 00 00 00 00 0 0 3   FOR RELATION TO CHANNEL SIZE 690
01 03 16 00 00 00 00 0 0 3   FOR RELATION TO DISCHARGE 690
01 03 16 01 00 00 00 0 0 1     CHANNELS OF ORDER LOWER THAN THE MAIN STREAM
01 03 16 01 00 00 00 0 0 2             372 690 692 693 607
01 03 16 01 01 00 00 0 0 1       NUMBER
01 03 16 01 01 00 00 0 0 2             315 372 690 646 541
01 03 16 01 01 00 00 0 0 3       FOR RELATION TO DRAINAGE AREA 261 315
01 03 16 01 01 01 00 0 0 1         BIFURCATION RATIO
01 03 16 01 01 01 00 0 0 2             403 615 690 315 692
01 03 16 01 01 01 01 0 0 1           AVERAGE FOR ALL THE BASIN
01 03 16 01 01 01 01 0 0 2             315
01 03 16 01 02 00 00 0 0 1       LENGTH                                        L
01 03 16 01 02 00 00 0 0 2             315 692
01 03 16 01 02 00 00 0 0 3       FOR RELATION TO STREAM ORDER 690
01 03 16 01 02 00 00 0 0 3       FOR MEANING OF FREQ. DISTRIBUTION 690
01 33 16 01 02 00 00 0 0 3       FOR RELATION TO DRAINAGE AREA 261 690
01 03 16 01 02 00 00 0 0 3       FOR DRAINAGE DENSITY 690 692 25 315 120
01 03 16 01 02 00 00 0 0 3       FOR CONSTANT OF CHANL MAINTENANCE 690 615 692
01 03 16 01 02 01 00 0 0 1         MEAN                                        L
01 03 16 01 02 01 00 0 0 2             315 261 692
01 03 16 01 02 01 01 0 0 1           RATIO BTWN SUCCESSIVE ORDERS
01 03 16 01 02 01 01 0 0 2             315
01 03 16 01 03 00 00 0 0 1       SLOPE                                         DEGREES
01 03 16 01 03 00 00 0 0 2             692
01 03 16 01 03 01 00 0 0 1         MEAN                                        DEGREES
01 03 16 01 03 01 00 0 0 2             692
01 03 16 01 03 01 01 0 0 1           RATIO BTWN SUCCESSIVE ORDERS
01 03 16 01 03 01 01 0 0 2             692
01 03 16 01 04 00 00 0 0 1       ENTRANCE ANGLE OF TRIBUTARIES                 DEGREES
01 03 16 01 04 00 00 0 0 2             315 692
01 03 16 01 04 01 00 0 0 1         MEAN                                        DEGREES
01 03 16 01 04 01 00 0 0 2             315 692
01 03 17 00 00 00 00 0 0 1   STORAGE                                           L**3
01 03 17 00 00 00 00 0 0 2             315 694 151 404 781
01 03 17 00 00 00 00 0 0 3   FOR RELATION TO FLOOD PEAK 366 47 318
01 03 17 01 00 00 00 0 0 1     CHANNEL STORAGE                                 L**3
01 03 17 01 00 00 00 0 0 2             315 694 151
01 03 17 01 00 00 00 0 0 3     FOR RELATION TO CHANNEL LENGTH 47
01 03 17 01 00 00 00 0 0 3     FOR RELATION TO MEAN FLOOD PEAK 186 366 315
01 03 17 01 00 00 00 0 0 3     FOR RELATION TO CHANGE OF RIVER STORAGE 47
01 03 17 02 00 00 00 0 0 1     BANK STORAGE                                    L**3
01 03 17 02 00 00 00 0 0 2             619 151
01 03 17 02 00 00 00 0 0 3     FOR RELATION TO BANKS LITHOL.COMPOS. 619
01 03 18 00 00 00 00 0 0 1   WORKS OF MAN
01 03 18 00 00 00 00 0 0 2             304 366 318 694
01 03 18 01 00 00 00 0 0 1     DAMS
01 03 18 01 00 00 00 0 0 2             304 366 318 459
01 03 18 01 00 00 00 0 0 3     FOR RELATION TO SEDIM.CONC.STAT.PARAM. 372
01 33 18 01 00 00 00 0 0 3     FOR RELATION TO STREAM TRANSPORTATION 694 304
01 03 18 01 00 00 00 0 0 3     FOR RELATION TO STREAM EROSION 459
01 03 18 01 00 00 00 0 0 3     FOR RELATION TO FLOOD DISCHARGE 459
01 03 18 01 01 00 00 0 0 1       DIMENSIONS                                    L
01 03 18 01 01 00 00 0 0 2
01 03 18 01 02 00 00 0 0 1       RESERVOIR
01 03 18 01 02 00 00 0 0 2             284 31
01 03 18 01 02 00 00 0 0 3       FOR REDUCTION OF FLOOD PEAK 366 318
01 03 18 01 02 00 00 0 0 3       FOR RELATION TO STREAM DISCHARGE
01 03 18 01 02 00 00 0 0 3       FOR RELATION TO STREAM SEDIMENTATION 694 282
01 03 18 01 02 00 00 0 0 3       FOR RESERVOIR SEDIMENTATION 694 282
01 03 18 01 02 01 00 0 0 1         LENGTH                                      L
01 03 18 01 02 01 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 01 02 02 00 0 0 1         WIDTH                                       L
01 03 18 01 02 02 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 01 02 03 00 0 0 1         AVERAGE DEPTH                               L
01 03 18 01 02 03 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 01 02 04 00 0 0 1         AREA                                        L**2
01 03 18 01 02 04 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 01 02 05 00 0 0 1         VOLUME OF WATER                             L**3
01 03 18 01 02 05 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 01 02 05 01 0 0 1           EVAPORATION RATE                          L**3
01 03 18 01 02 05 01 0 0 2               NO REFERENCE OBSERVED
01 03 18 01 02 05 01 1 0 2               NO REFERENCE OBSERVED
01 03 18 01 02 05 01 1 0 1             VARIATION THROUGH TIME
01 03 18 01 02 05 02 0 0 1           STAGE CAPACITY CURVE
01 03 18 01 02 05 02 0 0 2               NO REFERENCE OBSERVED
01 03 18 01 02 05 02 1 0 1             DEAD STORAGE                            L**3
01 03 18 01 02 05 02 1 0 2               NO REFERENCE OBSERVED
01 03 18 02 00 00 00 0 0 1   DIVERSION CHANNELS
01 03 18 02 00 00 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 02 01 00 00 0 0 1     DISCHARGE                                       L**3/T
01 03 18 02 01 00 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 02 01 01 00 0 0 1       MAXIMUM                                       L**3/T
01 03 18 02 01 01 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 02 01 02 00 0 0 1       MINIMUM                                       L**3/T
01 03 18 02 01 02 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 02 01 03 00 0 0 1       AVERAGE                                       L**3/T
01 03 18 02 01 03 00 0 0 2               NO REFERENCE OBSERVED
01 03 18 02 01 03 01 0 0 1         VARIATION IN TIME
01 03 18 02 01 03 01 0 0 2               NO REFERENCE OBSERVED
```

B

TABLE 4

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARD CODE	SUBJECT, REFERENCES, REMARKS (CARD CODE 1 = SUBJECT, CARD CODE 2 = REFERENCES, CARD CODE 3 = REMARKS)	DIMENSIONS
01	04	00	00	00	00	00	0	0	1	STREAM TRANSPORTATION	
01	04	00	00	00	00	00	0	0	2	64 372 254 802 693 592 174 36 364 537	
01	04	00	00	00	00	00	0	0	2	642 96 67 93 441 130 173 290 614 636	
01	04	00	00	00	00	00	0	0	2	778 411 276 52 98 406 53 38 249 262 634	
01	04	00	00	00	00	00	0	0	2	437 777 441	
01	04	00	00	00	00	00	0	0	3	FOR SEDIMENT TRANSPORTATION MECHANICS 653 15 234 67	
01	04	00	00	00	00	00	0	0	3	FOR SEDIMENT TRANSPORTATION MECHANICS 72	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL DEPTH	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO DRAINAGE AREA SIZE 624 258	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO WATER SHEAR STRESS 372	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO PARTICLE SHAPE 249 98 707	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO FLOW RESISTANCE 653	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO FORM OF STREAM BED 652	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO DEGREE OF CHANNELIZATION 258	
01	04	00	00	00	00	00	0	0	3	FOR TRANSPORT RATE 372	
01	04	00	00	00	00	00	0	0	3	FOR TRANSPORT CAPACITY 372 592	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO STREAM VELOCITY 694 105 592	
01	04	00	00	00	00	00	0	0	3	FOR SEDIMENT YIELD 18 174 525	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO RELIEF RATIO 258	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO DRAINAGE DENSITY 624	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO DAMS 694 304	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO VALLEY SLOPES 696	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL SLOPE 254 610	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL WIDTH	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO FLOOD DISCHARGE	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL COMPETENT SLOPE 372	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO MEAN STREAM VELOCITY IN X-SECT. 372	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO BASIN RELIEF 624	
01	04	00	00	00	00	00	0	0	3	FOR RELATION TO BASIN LENGTH 624	
01	04	01	00	00	00	00	0	0	1	TRACTIVE CAPACITY	
01	04	01	00	00	00	00	0	0	2	693 592	ML/T
01	04	01	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL DEPTH	
01	04	01	00	00	00	00	0	0	3	FOR MAXIMUM CAPACITY 372	
01	04	01	00	00	00	00	0	0	3	FOR RELATION TO COMPETENT DISCHARGE 254	
01	04	01	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL WIDTH 254	
01	04	01	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL COMPETENT SLOPE 254	
01	04	01	00	00	00	00	0	0	3	FOR RELATION TO STREAM VELOCITY 693	
01	04	01	01	00	00	00	0	0	1	MAXIMUM	
01	04	01	01	00	00	00	0	0	2	372 693	ML/T
01	04	01	02	00	00	00	0	0	1	MINIMUM	
01	04	01	02	00	00	00	0	0	2	372 693	ML/T
01	04	01	02	01	00	00	0	0	1	DIFFERENCE BTWN. MAX. AND MIN.	
01	04	01	02	01	00	00	0	0	2	NO REFERENCE OBSERVED	ML/T
01	04	01	03	00	00	00	0	0	1	MEAN	
01	04	01	03	00	00	00	0	0	2	372 693	ML/T
01	04	01	04	00	00	00	0	0	1	VARIATION IN TIME	
01	04	01	04	00	00	00	0	0	2	NO REFERENCE OBSERVED	
01	04	01	04	01	00	00	0	0	1	FREQUENCY DISTRIBUTION	
01	04	01	04	01	00	00	0	0	2	NO REFERENCE OBSERVED	
01	04	01	04	01	01	00	0	0	1	STATISTICAL PARAMETERS	
01	04	01	04	01	01	00	0	0	2	NO REFERENCE OBSERVED	
01	04	02	00	00	00	00	0	0	1	TRACTIVE COMPETENCE	
01	04	02	00	00	00	00	0	0	2	693 592 220	L**3
01	04	02	00	00	00	00	0	0	3	FOR RELATION TO STREAM VELOCITY 693	
01	04	02	01	00	00	00	0	0	1	MAXIMUM	
01	04	02	01	00	00	00	0	0	2	693	L**3
01	04	02	02	00	00	00	0	0	1	MINIMUM	
01	04	02	02	00	00	00	0	0	2	693	L**3
01	04	02	02	01	00	00	0	0	1	DIFFERENCE BTWN. MAX. AN MIN.	
01	04	02	02	01	00	00	0	0	2	NO REFERENCE OBSERVED	L**3
01	04	02	03	00	00	00	0	0	1	MEAN	
01	04	02	03	00	00	00	0	0	2	NO REFERENCE OBSERVED	L**3
01	04	02	04	00	00	00	0	0	1	VARIATION IN TIME	
01	04	02	04	00	00	00	0	0	2	NO REFERENCE OBSERVED	
01	04	02	04	01	00	00	0	0	1	FREQUENCY DISTRIBUTION	
01	04	02	04	01	00	00	0	0	2	NO REFERENCE OBSERVED	
01	04	02	04	01	01	00	0	0	1	STATISTICAL PARAMETERS	
01	04	02	04	01	01	00	0	0	2	NO REFERENCE OBSERVED	
01	04	03	00	00	00	00	0	0	1	SEDIMENT CONCENTRATION	
01	04	03	00	00	00	00	0	0	2	396 64 805	M/L**3
01	04	03	00	00	00	00	0	0	3	FOR RELATION TO STREAM DISCHARGE 64	
01	04	03	00	00	00	00	0	0	3	FOR RELATION TO VALLEY WALL SLOPES 693	
01	04	03	00	00	00	00	0	0	3	FOR RELATION TO MEAN STREAM VELOCITY 105 64 805	
01	04	03	00	00	00	00	0	0	3	FOR VARIATION ALONG THE STREAM CHANNEL 372	
01	04	03	01	00	00	00	0	0	1	MAXIMUM	
01	04	03	01	00	00	00	0	0	2	372	M/L**3
01	04	03	02	00	00	00	0	0	1	MINIMUM	
01	04	03	02	00	00	00	0	0	2	372	M/L**3
01	04	03	02	01	00	00	0	0	1	DIFFERENCE BTWN. MAX. AND MIN.	
01	04	03	02	01	00	00	0	0	2	NO REFERENCE OBSERVED	M/L**3
01	04	03	03	00	00	00	0	0	1	MEAN	
01	04	03	03	00	00	00	0	0	2	372	M/L**3
01	04	03	04	00	00	00	0	0	1	VARIATION IN TIME	
01	04	03	04	00	00	00	0	0	2	NO REFERENCE OBSERVED	
01	04	03	04	01	00	00	0	0	1	FREQUENCY DISTRIBUTION	
01	04	03	04	01	00	00	0	0	2	372 624 258	
01	04	03	04	01	01	00	0	0	1	STATISTICAL PARAMETERS	
01	04	03	04	01	01	00	0	0	2	372 624 258	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3	FOR RELATION TO [illegible]	

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01 04 03 03 00 00 00 0 0  1   MEAN                                                    M/L**3
01 04 03 03 00 00 00 0 0  2              372
01 04 03 04 00 00 00 0 0  1     VARIATION IN TIME
01 04 03 04 00 00 00 0 0  2              NO REFERENCE OBSERVED
01 04 03 04 01 00 00 0 0  1       FREQUENCY DISTRIBUTION
01 04 03 04 01 00 00 0 0  2              372 624 258
01 04 03 04 01 01 00 0 0  1         STATISTICAL PARAMETERS
01 04 03 04 01 01 00 0 0  2              372 624 258
01 04 03 04 01 01 00 0 0  3         FOR RELATION TO DRAINAGE AREA 624
01 04 03 04 01 01 00 0 0  3         FOR RELATION TO DAMS
01 04 03 04 01 01 00 0 0  3         FOR RELATION TO CHANNEL SLOPE 372
01 04 03 04 01 01 00 0 0  3         FOR RELATION TO STREAM VELOCITY 372
01 04 03 04 01 01 00 0 0  3         FOR RELATION TO FLOOD DISCHARGE 372
01 04 03 04 01 01 00 0 0  3         FOR RELATION TO VALLEY WALL SLOPES 372
01 04 03 04 01 01 00 0 0  3         FOR RELATION TO BASIN LENGTH 372
01 04 03 04 01 01 00 0 0  3         FOR RELATION TO BASIN RELIEF 372
01 04 03 04 01 01 00 0 0  3         FOR SEDIMENT YIELD 258
01 04 04 00 00 00 00 0 0  1   SEDIMENT LOAD                                           M
01 04 04 00 00 00 00 0 0  2              258 396 44 45 402 212 911 7
01 04 04 01 00 00 00 0 0  1     BED LOAD                                              M
01 34 04 01 00 00 00 0 0  2              693 258 443 44 802 806 134 325 349 402
01 04 04 01 00 00 00 0 0  2              782 592 214 776 751 572 530
01 04 04 01 00 00 00 0 0  3     FOR RELATION TO CHANNEL EROSION 372
01 04 04 01 00 00 00 0 0  3     FOR TECHNIQUE OF MEASUREMENT 325 782
01 04 04 01 00 00 00 0 0  3     FOR DISCHARGE CONTROL 372
01 04 04 01 00 00 00 0 0  3     FOR BEDLOAD VELOCITY 649
01 04 04 01 00 00 00 0 0  3     FOR RELATION TO SIZE OF DRAINAGE AREA 258 624
01 04 04 01 00 00 00 0 0  3     FOR RELATION TO MIN. STREAM VELOCITY 254
01 04 04 01 00 00 00 0 0  3     FOR RELATION TO STREAM VELOCITY 254 212
01 04 04 01 00 00 00 0 0  3     FOR RELATION TO CHANNEL DEPTH 158
01 04 04 01 00 00 00 0 0  3     FOR RELATION TO MIN. WATER DEPTH 372
 1 04 04 01 00 00 00 0 0  3     FOR RELATION TO BED ROUGHNESS 57 648 342
 1 04 04 01 00 00 00 0 0  3     FOR RELATION TO DEGREE OF CHANNELIZATION 258
 1 04 04 01 00 00 00 0 0  3     FOR RELATION TO RELIEF RATIO 258
 1 04 04 01 00 00 00 0 0  3     FOR RELATION TO SUSPENDED LOAD 443
 1 04 04 01 00 00 00 0 0  3     FOR RELATION TO DISSOLVED LOAD 443
01 04 04 01 00 00 00 0 0  3     FOR RELATION TO DRAINAGE DENSITY 372
 1 04 04 01 00 00 00 0 0  3     FOR RELATION TO STREAM FLOOD VELOCITY 694
 1 04 04 01 00 00 00 0 0  3     FOR RELATION TO MEAN STREAM VELOCITY 523 158 157
 1 04 04 01 00 00 00 0 0  3     FOR RELATION TO MEAN STREAM VELOCITY 297
01 04 04 01 01 00 00 0 0  1       PEBBLES
01 04 04 01 01 00 00 0 0  2              372
01 04 04 01 01 00 00 0 0  3       FOR RELATION TO MANNING FACTOR 372
01 04 04 01 01 01 00 0 0  1         LITHOLOGICAL COMPOSITION
01 04 04 01 01 01 00 0 0  2              NO REFERENCE OBSERVED
01 04 04 01 01 01 01 0 0  1           DOWNSTREAM VARIATION
01 04 04 01 01 01 01 0 0  2              NO REFERENCE OBSERVED
01 04 04 01 02 00 00 0 0  1       FINEGRAINED SEDIMENTS
01 04 04 01 02 00 00 0 0  2              56 776
01 04 04 01 02 00 00 0 0  3       FOR RELATION TO CHAN. BED REL.SMOOTHNESS 372
01 04 04 01 02 00 00 0 0  3       FOR RELATION TO STREAM VELOCITY 372
01 04 04 01 02 00 00 0 0  3       FOR RELATN TO CHAN. COMPETENT SLOPE 254 279
01 04 04 01 02 00 00 0 0  3       FOR RELATION TO COMPETENT DISCHARGE 372
01 04 04 01 02 00 00 0 0  3       FOR RLTN TO CHANNEL SLOPE 254 279
01 04 04 01 02 01 00 0 0  1         MINERALOGICAL COMPOSITION
01 04 04 01 02 01 00 0 0  2              NO REFERENCE OBSERVED
01 04 04 01 02 01 01 0 0  1           DOWNSTREAM VARIATION
01 04 04 01 02 01 01 0 0  2              NO REFERENCE OBSERVED
01 04 04 01 03 00 00 0 0  1       GRAINSIZE FREQUENCY DISTRIBUTION
01 34 04 01 03 00 00 0 0  2              279 44 56
01 04 04 01 03 00 00 0 0  3       FOR RELATION TO STREAM WATER VELOCITY 44
01 04 04 01 03 00 00 0 0  3       FOR RELATION TO STREAM GRADIENT 254 279
01 04 04 01 03 01 00 0 0  1         DOWNSTREAM VARIATION
01 04 04 01 03 01 00 0 0  2              NO REFERENCE OBSERVED
01 04 04 01 03 02 00 0 0  1         STATISTICAL PARAMETERS
01 04 04 01 03 02 00 0 0  2              56 254 297
01 04 04 01 03 02 00 0 0  3         FOR RELATION TO CHANNEL SLOPE 254 279
01 04 04 01 03 02 00 0 0  3         FOR RELATION TO STREAM VELOCITY 297
01 04 04 01 03 02 01 0 0  1           DOWNSTREAM VARIATION
01 04 04 01 03 02 01 0 0  2              NO REFERENCE OBSERVED
01 04 04 02 00 00 00 0 0  1     SUSPENDED LOAD                                        M
01 04 04 02 00 00 00 0 0  2              693 443 44 17 402 474 592 481 762 233
01 04 04 02 00 00 00 0 0  2              188
01 04 04 02 00 00 00 0 0  3     FOR RELATION TO STREAM VELOCITY 105 254 17 44
01 04 04 02 00 00 00 0 0  3     FOR RELATION TO STREAM VELOCITY 649 212
01 04 04 02 00 00 00 0 0  3     FOR RELATION TO STREAM DISCHARGE 693 528
01 04 04 02 00 00 00 0 0  3     FOR RELATION TO DISSOLVED LOAD 443
01 04 04 02 00 00 00 0 0  3     FOR RELATION TO CHANNEL MEAN DEPTH  372
01 04 04 02 00 00 00 0 0  3     FOR RELATION TO CHANNEL WIDTH 372
01 04 04 02 00 00 00 0 0  3     FOR RELATION TO BED LOAD 443
01 04 04 02 01 00 00 0 0  1       CONCENTRATION                                       M/L**3
01 04 04 02 01 00 00 0 0  2              474 709
01 04 04 02 01 01 00 0 0  1         DOWNSTREAM VARIATION
01 04 04 02 01 01 00 0 0  2              NO REFERENCE OBSERVED
01 04 04 02 02 00 00 0 0  1       MINERALOGICAL COMPOSITION
01 04 04 02 02 00 00 0 0  2              528 693
01 04 04 02 02 00 00 0 0  3       FOR RELATION TO STREAM DISCHARGE
01 04 04 02 02 01 00 0 0  1         DOWNSTREAM VARIATION
01 04 04 02 02 01 00 0 0  2              NO REFERENCE OBSERVED
01 04 04 02 03 00 00 0 0  1       GRAINSIZE FREQ. DISTRIBUTION
01 04 04 02 03 00 00 0 0  2              NO REFERENCE OBSERVED
01 34 04 02 03 01 00 0 0  1         DOWNSTREAM VARIATION
01 04 04 02 03 01 00 0 0  2              NO REFERENCE OBSERVED
01 04 04 02 03 02 00 0 0  1         STATISTICAL PARAMETERS
01 04 04 02 03 02 00 0 0  2              NO REFERENCE OBSERVED
01 04 04 02 03 02 01 0 0  1           DOWNSTREAM VARIATION
01 04 04 02 03 02 01 0 0  2              NO REFERENCE OBSERVED
01 04 04 03 00 00 00 0 0  1     DISSOLVED LOAD                                        M
01 04 04 03 00 00 00 0 0  2              693 44 386 207 257 764 355 192 388
01 04 04 03 00 00 00 0 0  3     FOR RELATION TO STREAM DISCHARGE 355
01 04 04 03 00 00 00 0 0  3     FOR RELATION TO MEAN STREAM VELOCITY 257 388 788
01 04 04 03 00 00 00 0 0  3     FOR VARIATION ALONG THE STREAM CHANNEL
01 04 04 03 00 00 00 0 0  3     FOR RELATION TO BED LOAD 443
01 04 04 03 00 00 00 0 0  3     FOR RELATION TO SUSPENDED LOAD 443
01 04 04 03 00 00 00 0 0  3     FOR RELATION TO VALLEY WALL SLOPES 690
01 04 04 03 00 00 00 0 0  3     FOR RELATION TO CLIMATE 443
01 04 04 03 01 00 00 0 0  1       CONCENTRATION                                       M/L**3
01 04 04 03 01 00 00 0 0  2              443 372
01 04 04 03 01 00 00 0 0  3       FOR RELATION TO CLIMATE 443
01 04 04 03 01 01 00 0 0  1         DOWNSTREAM VARIATION
01 04 04 03 01 01 00 0 0  2              NO REFERENCE OBSERVED
01 04 04 03 02 00 00 0 0  1       CHEMICAL COMPOSTION
01 04 04 03 02 00 00 0 0  2              192 64 764 355
01 04 04 03 02 01 00 0 0  1         DOWNSTREAM VARIATION
01 04 04 03 02 01 00 0 0  2              NO REFERENCE OBSERVED
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B

TABLE 5

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS (CARD CODE 1 = SUBJECT; CARD CODE 2 = REFERENCES; CARD CODE 3 = REMARKS)	DIMENSIONS
01	05	00	00	00	00	00	0	0	1	STREAM DEPOSITS	
01	05	00	00	00	00	00	0	0	2	620 288 750 235 483 542 55 647 23 59	
01	05	00	00	00	00	00	0	0	2	286 600 756 364 201 556 2 180 193 200	
01	05	00	00	00	00	00	0	0	2	246 270 294 352 448 419 755 741 697 674	
01	05	00	00	00	00	00	0	0	2	618 554 527 502 500 389 388 280 125 24	
01	05	00	00	00	00	00	0	0	2	20 19 1 625 621 469 438 81 82 93 170	
01	05	00	00	00	00	00	0	0	2	172 263 385 438 774	
01	05	00	00	00	00	00	0	0	3	FOR RELATION TO STREAM BRAIDING	
01	05	00	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL DEPTH 619	
01	05	00	00	00	00	00	0	0	3	FOR RELATION TO CHANNEL WIDTH 789	
01	05	00	00	00	00	00	0	0	3	FOR RELATION TO RESERVOIRS 694 282	
01	05	01	00	00	00	00	0	0	1	COMPOSITION	
01	05	01	00	00	00	00	0	0	2	533	
01	05	01	01	00	00	00	0	0	1	PETROGRAPHICAL	
01	05	01	01	00	00	00	0	0	2	NO REFERENCE OBSERVED	
01	05	01	02	00	00	00	0	0	1	MINERALOGICAL	
01	05	01	02	00	00	00	0	0	2	NO REFERENCE OBSERVED	
01	05	02	00	00	00	00	0	0	1	TEXTURE	
01	05	02	00	00	00	00	0	0	2	637 538 10 58 562 798 724	
01	05	02	01	00	00	00	0	0	1	VARIATION DOWNSTREAM	
01	05	02	01	00	00	00	0	0	2	798 724	
01	05	03	00	00	00	00	0	0	1	STRUCTURE	
01	05	03	00	00	00	00	0	0	2	362 345 418	
01	05	03	01	00	00	00	0	0	1	CROSS BEDDING	
01	05	03	01	00	00	00	0	0	2	145 81 416 293 129 701 82 718	
01	05	04	00	00	00	00	0	0	1	ALLUVIAL FANS	
01	05	04	00	00	00	00	0	0	2	392 320 235 422 117 473 583 189 58 555	
01	05	04	00	00	00	00	0	0	2	111 109 112 584 107 108 296	
01	05	04	01	00	00	00	0	0	1	DIMENSIONS	
01	05	04	01	00	00	00	0	0	2	NO REFERENCE OBSERVED	
01	05	04	02	00	00	00	0	0	1	SHAPE	
01	05	04	02	00	00	00	0	0	2	110	
01	05	04	02	01	00	00	0	0	1	CROSS PROFILE	
01	05	04	02	01	00	00	0	0	2	110	
01	05	04	02	01	00	00	0	0	3	FOR RELATION TO BEDROCK NO REFERENCE	
01	05	04	02	01	00	00	0	0	3	FOR RELATION TO DRAINAGE AREA NO REFERENCE	

TABLE 6

CARD CODE 1 = SUBJECT
CARD CODE 2 = REFERENCES
CARD CODE 3 = REMARKS

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARD CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
01	06	00	00	00	00	00	0	0	1	CLIMATE IN THE BASIN	
01	06	00	00	00	00	00	0	0	2	811 468 520 616 617	
01	06	00	00	00	00	00	0	0	2	693 694 678 430 559 175 321 132 183 21	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SOIL ERODIBILITY 217	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO DISSOLVED LOAD 443	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SOIL PROFILE 710 694	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SOIL FORMATION 694 372 735 481	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO STREAM DISSOLVED LOAD CONC. 443	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SOIL EROSION RATIO 693	
01	06	00	00	00	00	00	0	0	3	FOR RELATION TO SPRING DISCHARGE FLUCTUATION 185	
01	06	01	00	00	00	00	0	0	1	SOLAR RADIATION	CAL/L**2
01	06	01	00	00	00	00	0	0	2	664 694 693 678 540	
01	06	01	01	00	00	00	0	0	1	NET SOLAR RADIATION	CAL/L**2
01	06	01	01	00	00	00	0	0	2	694 693 678	
01	06	01	01	01	00	00	0	0	1	INCIDENT SOLAR RADIATION	CAL/L**2
01	06	01	01	01	00	00	0	0	2	694 693 678	
01	06	02	00	00	00	00	0	0	1	TEMPERATURE	
01	06	02	00	00	00	00	0	0	2	694 735 693 678 639	
01	06	02	00	00	00	00	0	0	3	FOR RELATION TO SOIL DEVELOPMENT 694 735	
01	06	02	00	00	00	00	0	0	3	FOR RELATION TO ANNUAL RUNOFF	
01	06	02	00	00	00	00	0	0	3	FOR VARIATION WITH ELEVATION	
01	06	02	00	00	00	00	0	0	3	FOR RELATION TO SOIL EROSION 693 694	
01	06	02	01	00	00	00	0	0	1	MAXIMUM	
01	06	02	01	00	00	00	0	0	2	693 694 678	
01	06	02	02	00	00	00	0	0	1	MINIMUM	
01	06	02	02	00	00	00	0	0	2	693 694 678	
01	06	02	02	01	00	00	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	
01	06	02	02	01	00	00	0	0	2	693 694 678	
01	06	02	03	00	00	00	0	0	1	MEAN	
01	06	02	03	00	00	00	0	0	2	693 694 678	
01	06	02	03	01	00	00	0	0	1	VARIATION IN TIME	
01	06	02	03	01	00	00	0	0	2	NO REFERENCE OBSERVED	
01	06	02	03	01	01	00	0	0	1	FREQUENCY DISTRIBUTION	
01	06	02	03	01	01	00	0	0	2	NO REFERENCE OBSERVED	
01	06	02	03	01	01	01	0	0	1	STATISTICAL PARAMETERS	
01	06	02	03	01	01	01	0	0	2	NO REFERENCE OBSERVED	
01	06	03	00	00	00	00	0	0	1	WINDS	
01	06	03	00	00	00	00	0	0	2	694 735 693 678 747 161 617	
01	06	03	00	00	00	00	0	0	3	FOR RELATION TO SOIL DEVELOPMENT 694 735	
01	06	03	00	00	00	00	0	0	3	FOR INFLUENCE ON SOIL MOISTURE 54	
01	06	03	01	00	00	00	0	0	1	PREDOMINANT DIRECTION	DEGREES
01	06	03	01	00	00	00	0	0	2	161	
01	06	03	01	00	00	00	0	0	3	FOR RELATION TO MAXIMUM RAINFALL INTENSITY 161	
01	06	03	02	00	00	00	0	0	1	INTENSITY	L/T
01	06	03	02	00	00	00	0	0	2	350 796	
01	06	03	02	00	00	00	0	0	3	FOR RELATION TO EVAPORATION 350 796	
01	06	03	02	01	00	00	0	0	1	MAXIMUM	L/T
01	06	03	02	01	00	00	0	0	2	350 796	
01	06	03	02	02	00	00	0	0	1	MINIMUM	L/T
01	06	03	02	02	00	00	0	0	2	350 796	
01	06	03	03	00	00	00	0	0	1	MEAN	L/T
01	06	03	03	00	00	00	0	0	2	350 796	
01	06	04	00	00	00	00	0	0	1	PRECIPITATION	L
01	06	04	00	00	00	00	0	0	2	161 167 693 694 678 231	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK 47	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO ACTUAL EVAPOTRANSPIRATION 664 694	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO TOPOGRAPHY 667	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO FLOOD FLOW 372	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO SIZE OF THE AREA 167	
01	06	04	00	00	00	00	0	0	3	FOR RELATION TO OVERLAND FLOW 372	
01	06	04	01	00	00	00	0	0	1	SNOWFALL	L/T
01	06	04	01	00	00	00	0	0	2	678 693 694 425 781	
01	06	04	01	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK 47	
01	06	04	01	00	00	00	0	0	3	FOR RELATION TO ANNUAL RUNOFF 693 694	
01	06	04	01	00	00	00	0	0	3	FOR RELATION TO FLOW DURATION CURVE 632	
01	06	04	01	00	00	00	0	0	3	FOR RELATION TO MAXIMUM DISCHARGE NO REFERENCE	
01	06	04	01	01	00	00	0	0	1	AMOUNT	L
01	06	04	01	01	00	00	0	0	2	693 694 47	
01	06	04	01	01	01	00	0	0	1	MAXIMUM	L
01	06	04	01	01	01	00	0	0	2	693 694	
01	06	04	01	01	02	00	0	0	1	MINIMUM	L
01	06	04	01	01	02	00	0	0	2	693 694	
01	06	04	01	01	02	01	0	0	1	DIFFERENCE BTWN MAX. AND MIN.	L
01	06	04	01	01	02	01	0	0	2	NO REFERENCE OBSERVED	
01	06	04	01	01	03	00	0	0	1	AVERAGE	L
01	06	04	01	01	03	00	0	0	2	NO REFERENCE OBSERVED	
01	06	04	01	01	04	00	0	0	1	VARIATION IN TIME	
01	06	04	01	01	04	00	0	0	2	NO REFERENCE OBSERVED	
01	06	04	01	01	04	01	0	0	1	FREQUENCY DISTRIBUTION	
01	06	04	01	01	04	01	0	0	2	47	
01	06	04	01	01	04	01	0	0	3	FOR RELATION TO FLOOD DISCHARGE 47	
01	06	04	01	02	00	00	0	0	1	INTENSITY	L/T
01	06	04	01	02	00	00	0	0	2	NO REFERENCE OBSERVED	
01	06	04	01	02	01	00	0	0	1	MAXIMUM	L/T
01	06	04	01	02	01	00	0	0	2	NO REFERENCE OBSERVED	
01	06	04	01	02	02	00	0	0	1	MINIMUM	L/T
01	06	04	01	02	02	00	0	0	2	NO REFERENCE OBSERVED	
01	06	04	01	02	03	00	0	0	1	MEAN	L/T
01	06	04	01	02	03	00	0	0	2	NO REFERENCE OBSERVED	
01	06	04	01	02	04	00	0	0	1	VARIATION IN TIME	
01	06	04	01	02	04	00	0	0	2	NO REFERENCE OBSERVED	
01	06	04	01	02	04	01	0	0	1	FREQUENCY DISTRIBUTION	
01	06	04	01	02	04	01	0	0	2	NO REFERENCE OBSERVED	
01	06	04	02	00	00	00	0	0	1	RAINFALL	
01	06	04	02	00	00	00	0	0	2	161 179 240 347 678 693 694 372 616	
01	06	04	02	00	00	00	0	0	3	FOR RELATION TO FLOOD PEAK 318 567 366 566	
01	06	04	02	00	00	00	0	0	3	FOR RELATION TO BASIN RELIEF	
01	06	04	02	01	00	00	0	0	1	AMOUNT	L
01	06	04	02	01	00	00	0	0	2	161 566 363 664 452	
01	06	04	02	01	00	00	0	0	3	FOR RAINFALL RUNOFF RATIO 566 664 363 452	
01	06	04	02	01	00	00	0	0	3	FOR AREA DEPTH CURVE 566 664 363 452	
01	06	04	02	01	00	00	0	0	3	FOR RELATION TO DISTANCE FROM STORM CENTER 167	
01	06	04	02	01	00	00	0	0	3	FOR RELATION TO ANNUAL RUNOFF 452 566 664	
01	06	04	02	01	00	00	0	0	3	FOR RELATION TO DRAINAGE DENSITY 315	
01	06	04	02	01	00	00	0	0	3	FOR RELATION TO RAINFALL INTENSITY 161 452	
1	06	04	02	01	00	00	0	0	3	FOR RELATION TO RESULT OF LAND TREATMENT	
01	06	04	02	01	01	00	0	0	1	MAXIMUM	L
01	06	04	02	01	01	00	0	0	2	161	
01	06	04	02	01	01	00	0	0	3	FOR RELATION TO BASIN RELIEF 161	
01	06	04	02	01	02	00	0	0	1	MINIMUM	L
01	06	04	02	01	02	00	0	0	2	167	

```
        161 179 240 327 678 693 694 372 616
FOR RELATION TO FLOOD PEAK 318 567 366 566
FOR RELATION TO BASIN RELIEF
  AMOUNT                                          L
        161 566 363 664 452
  FOR RAINFALL RUNOFF RATIO 566 664 363 452
  FOR AREA DEPTH CURVE 566 664 363 452
  FOR RELATION TO DISTANCE FROM STORM CENTER 167
  FOR RELATION TO ANNUAL RUNOFF 452 566 664
  FOR RELATION TO DRAINAGE DENSITY 315
  FOR RELATION TO RAINFALL INTENSITY 161 452
  FOR RELATION TO RESULT OF LAND TREATMENT
    MAXIMUM                                       L
        161
    FOR RELATION TO BASIN RELIEF 161
    MINIMUM                                       L
        167
    FOR MINIMUM RAINFALL CURVE 167
      DIFFERENCE BTWN MAX. AND MIN.               L
          NO REFERENCE OBSERVED
      VARIATION IN TIME
          NO REFERENCE OBSERVED
      FOR RELATION TO FLOOD PEAK NO REFERENCE
        FREQUENCY DISTRIBUTION
          16 480
        FOR RELATION TO EROSION 16 480
        FOR RELATION TO RAINFALL INTENSITY 350
        FOR RELATION TO RAINFALL INTENSITY 796
          STATISTICAL PARAMETERS
        NO REFERENCE OBSERVED
  INTENSITY                                       L/T
        289 693 780 664 452 796 349 329
  FOR RELATION TO SOIL INFILTRATION CAPACITY 780
  FOR RELATION TO SOIL INFILTRATION CAPACITY 329
  FOR RELATION TO SOIL INFILTRATION CAPACITY 349
  FOR RELATION TO RAINFALL AMOUNT 161 452
  FOR RELATION TO FLOOD DISCHARGE 366 47 318
  FOR RELATION TO FLOOD PEAK 47 366 567 318
  FOR RELATION TO BASIN RELIEF 161
  FOR RELATION TO KINETIC ENERGY 780
  FOR RELATION TO SOIL ERODIBILITY 780 16 217
  FOR RELATION TO SOIL ERODIBILITY 505 340 480
  FOR RELATION TO RAINFALL FREQUENCY 350 796
  FOR RELATION TO EROSION 780 480
    MAXIMUM                                       L/T
        161 780 217
    FOR RELATION TO WIND DIRECTION 161
    FOR RELATION TO SOIL LOSS 780 217
    FOR RELATION TO DECREASING INFILTRATION RATE
    MINIMUM                                       L/T
        NO REFERENCE OBSERVED
      DIFFERENCE BTWN MAX. AND MIN.               L/T
        NO REFERENCE OBSERVED
    AVERAGE                                       L/T
        NO REFERENCE OBSERVED
    VARIATION IN TIME
        363 340
    FOR RELATION TO RUNOFF PEAK 363
    FOR RELATION TO SOIL ERODIBILITY 340
  FOR RELATION TO VEGETATION 366 694
  FOR RELATION TO SOIL ERODIBILITY 780
  FOR RELATION TO RAINFALL INTENSITY 780
  FOR RELATION TO SOIL LOSS 239
 FOR RELATION TO FLOOD DISCHARGE 366 318
 FOR RELATION TO SOIL ERODIBILITY 239
 FOR RELATION TO SOIL LOSS 239
 FOR RELATION TO FLOOD DISCHARGE 366 318
FOR RELATION TO VEGETATION COVER 366 404 295
FOR VARIATION WITH ELEVATION 204
FOR RELATION TO WIND VELOCITY 350 796
      FREQUENCY DISTRIBUTION
        521 161
        STATISTICAL PARAMETERS
        NO REFERENCE OBSERVED
  RAINFALL KINETIC ENERGY                          ML**2/T**2
        780 366 694
 ANTECEDENT PRECIPITATION INDEX
        452 318 366
 RATE OF PRECIPITATION
        NO REFERENCE OBSERVED
EVAPOTRANSPIRATION                                 L**3
        366 204 712 796 795
 POTENTIAL                                         L**3
        664 694
  FOR RELATION TO PLANT COVER 694
  FOR RELATION TO ACTUAL EVAPOTRANSPIRATION 664
  FOR RELATION TO ANNUAL RUNOFF 664
 ACTUAL                                            L**3
        664 694
  FOR RELATION TO PRECIPITATION 664
  FOR RELTN.TO POTENTIAL EVAPOTRANSPIRATION 664
  FOR RELATION TO RUNOFF 664
  MINIMUM                                          L**3
        NO REFERENCE OBSERVED
  AVERAGE                                          L**3
        NO REFERENCE OBSERVED
  VARIATION IN TIME
        350
 WATER SURPLUS                                     L**3
        694
  MAXIMUM                                          L**3
        NO REFERENCE OBSERVED
  MINIMUM                                          L**3
        NO REFERENCE OBSERVED
   DIFFERENCE BTWN MAX. AND MIN.                   L**3
        NO REFERENCE OBSERVED
  AVERAGE                                          L**3
        NO REFERENCE OBSERVED
  VARIATION IN TIME
        NO REFERENCE OBSERVED
WATER DEFICIENCY                                   L**3
        694
  MAXIMUM                                          L**3
        NO REFERENCE OBSERVED
  MINIMUM                                          L**3
        NO REFERENCE OBSERVED
   DIFFERENCE BTWN MAX. AND MIN.                   L**3
        NO REFERENCE OBSERVED
  AVERAGE                                          L**3
        NO REFERENCE OBSERVED
  VARIATION IN TIME
        694
  FOR RELATION TO BASE FLOW 694
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TABLE 7

MAIN SUBJECT	PRIMARY CODE	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	SEVENTH	CARDS CODE	SUBJECT, REFERENCES, REMARKS	DIMENSIONS
										CARD CODE 1 = SUBJECT	
										CARD CODE 2 = REFERENCES	
										CARD CODE 3 = REMARKS	
01	07	00	00	00	00	00	0	0	1	SUBSURFACE WATER IN BASIN	
01	07	00	00	00	00	00	0	0	2	42 382 426 444 693 350 678 160 738 55	
01	07	00	00	00	00	00	0	0	2	583 273 699 227 230 298 420 479 8 9 187	
01	07	00	00	00	00	00	0	0	2	226 236 237 518 781 813 336	
01	07	00	00	00	00	00	0	0	3	FOR RELATION TO FLOW DURATION CURVE 632	
01	07	00	00	00	00	00	0	0	3	FOR RELATION TO BEDROCK FRACTURES 350 444	
01	07	00	00	00	00	00	0	0	3	FOR RELATION TO FAULT LINES 699 767 4	
01	07	01	00	00	00	00	0	0	1	CHEMICAL COMPOSITION	
01	07	01	00	00	00	00	0	0	2	516 350 450 195 486 209 97	
01	07	01	00	00	00	00	0	0	3	FOR RELATION TO BEDROCK 350 450 94	
01	07	01	01	00	00	00	0	0	1	VARIATION THROUGH TIME	
01	07	01	01	00	00	00	0	0	2	NO REFERENCE OBSERVED	
01	07	02	00	00	00	00	0	0	1	DIRECTION OF FLOW	DEGREES
01	07	02	00	00	00	00	0	0	2	350 739 223 758 251	
01	07	02	00	00	00	00	0	0	3	FOR RELATION TO BEDROCK STRUCTURE 350	
01	07	03	00	00	00	00	0	0	1	VELOCITY	L/T
01	07	03	00	00	00	00	0	0	2	714 711	
01	07	03	00	00	00	00	0	0	3	FOR METHODS OF MEASUREMENT 714	
01	07	03	00	00	00	00	0	0	3	FOR RELATION TO BED ROCK LITHOLOGY 350	
01	07	03	01	00	00	00	0	0	1	VARIATION IN TIME	
01	07	03	01	00	00	00	0	0	2	426 740 55 497	
01	07	04	00	00	00	00	0	0	1	DISCHARGE	L**3/T
01	07	04	00	00	00	00	0	0	2	740	
01	07	04	01	00	00	00	0	0	1	MAXIMUM	L**3/T
01	07	04	01	00	00	00	0	0	2	740	
01	07	04	02	00	00	00	0	0	1	MINIMUM	L**3/T
01	07	04	02	00	00	00	0	0	2	740	
01	07	04	03	00	00	00	0	0	1	AVERAGE	L**3/T
01	07	04	03	00	00	00	0	0	2	740	
01	07	04	04	00	00	00	0	0	1	VARIATION IN TIME	
01	07	04	04	00	00	00	0	0	2	740	
01	07	05	00	00	00	00	0	0	1	AQUIFERS	
01	07	05	00	00	00	00	0	0	2	770 593 629 582 494 409 24 225 189 758	
01	07	05	00	00	00	00	0	0	2	813 331	
01	07	05	00	00	00	00	0	0	3	FOR RELATION TO STREAMS 669 629 668	
01	07	05	01	00	00	00	0	0	1	CONFINED	
01	07	05	01	00	00	00	0	0	2	285 494	
01	07	05	01	01	00	00	0	0	1	SHAPE	
01	07	05	01	01	00	00	0	0	2	285 494	
01	07	05	01	01	00	00	0	0	3	FOR RELATION TO WATER FLOW 285	
01	07	05	01	02	00	00	0	0	1	THICKNESS	L
01	07	05	01	02	00	00	0	0	2	NO REFERENCE OBSERVED	
01	07	05	01	02	01	00	0	0	1	MAXIMUM	L
01	07	05	01	02	01	00	0	0	2	NO REFERENCE OBSERVED	
01	07	05	01	02	02	00	0	0	1	MINIMUM	L
01	07	05	01	02	02	00	0	0	2	NO REFERENCE OBSERVED	
01	07	05	01	02	03	00	0	0	1	AVERAGE	L
01	07	05	01	02	03	00	0	0	2	NO REFERENCE OBSERVED	
01	07	05	01	03	00	00	0	0	1	STORAGE COEFFICIENT	
01	07	05	01	03	00	00	0	0	2	NO REFERENCE OBSERVED	
01	07	05	02	00	00	00	0	0	1	UNCONFINED	
01	07	05	02	00	00	00	0	0	2	494	
01	07	05	02	01	00	00	0	0	1	WATER TABLE	
01	07	05	02	01	00	00	0	0	2	426 694 693 580	
01	07	05	02	01	00	00	0	0	3	FOR RELATION TO STREAM DISCHARGE 694 580 579	
01	07	05	02	01	00	00	0	0	3	FOR RELATION TO BASE FLOW 694	
01	07	05	02	01	01	00	0	0	1	DEPTH	L
01	07	05	02	01	01	00	0	0	3	FOR RELATION TO BASE FLOW 694	
01	07	05	02	01	01	01	0	0	1	MAXIMUM	L
01	07	05	02	01	01	01	0	0	2	694 426	
01	07	05	02	01	01	02	0	0	1	MINIMUM	L
01	07	05	02	01	01	02	0	0	2	694 426	
01	07	05	02	01	01	03	0	0	1	AVERAGE	L
01	07	05	02	01	01	03	0	0	2	694 426	
01	07	05	02	01	01	04	0	0	1	VARIATION IN TIME	
01	07	05	02	01	01	04	0	0	2	426	
01	07	05	02	01	01	04	1	0	1	FREQUENCY DISTRIBUTION	
01	07	05	02	01	01	04	1	0	2	NO REFERENCE OBSERVED	
01	07	05	02	01	01	04	1	1	1	STATISTICAL PARAMETERS	
01	07	05	02	01	01	04	1	1	2	NO REFERENCE OBSERVED	

```
01 07 05 02 01 00 00 0 0 3   FOR RELATION TO STREAM DISCHARGE 694 580 599
01 07 05 02 01 01 00 0 0 1     FOR RELATION TO BASE FLOW 694
01 07 05 02 01 01 00 0 0 3       DEPTH                                          L
01 07 05 02 01 01 01 0 0 1       FOR RELATION TO BASE FLOW 694
01 07 05 02 01 01 01 0 0 2         MAXIMUM                                      L
01 07 05 02 01 01 02 0 0 1           694 426
01 07 05 02 01 01 02 0 0 2         MINIMUM                                      L
01 07 05 02 01 01 03 0 0 1           694 426
01 07 05 02 01 01 03 0 0 2         AVERAGE                                      L
01 07 05 02 01 01 04 0 0 1           694 426
01 07 05 02 01 01 04 0 0 2         VARIATION IN TIME
01 07 05 02 01 01 04 1 0 1           426
01 07 05 02 01 01 04 1 0 2           FREQUENCY DISTRIBUTION
01 07 05 02 01 01 04 1 1 1            NO REFERENCE OBSERVED
01 07 05 02 01 01 04 1 1 2             STATISTICAL PARAMETERS
01 07 05 02 01 01 04 2 0 1            NO REFERENCE OBSERVED
01 07 05 02 01 01 04 2 0 2           INFLUENT STREAMS
01 07 05 02 01 01 04 3 0 1            693 694 426
01 07 05 02 01 01 04 3 0 2           EFFLUENT STREAMS
01 07 05 02 02 00 00 0 0 1            694 693
01 07 05 02 02 00 00 0 0 2     SPECIFIC YIELD
01 07 05 02 02 00 00 0 0 3           494
01 07 05 02 02 00 00 0 0 3     FOR RELATION TO SPECIFIC RETENTION 350
01 07 05 02 02 01 00 0 0 1     FOR RELATION TO SAMPLE GRAINSIZE 398 154
01 07 05 02 02 01 00 0 0 2       SPECIFIC RETENTION
01 07 05 02 02 01 00 0 0 3           154
01 07 05 02 02 01 00 0 0 3       FOR RELATION TO ROCK POROSITY 154
01 07 06 00 00 00 00 0 0 1       FOR RELATION TO SPECIFIC YIELD 154
01 07 06 00 00 00 00 0 0 2   SPRINGS
01 07 06 01 00 00 00 0 0 1           693 639 229 771
01 07 06 01 00 00 00 0 0 2     TOTAL NUMBER
01 07 06 02 00 00 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 00 00 00 0 0 2     SOURCES OF GROUND WATER
01 07 06 02 01 00 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 01 00 00 0 0 2       WITHIN THE BASIN
01 07 06 02 01 01 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 01 01 00 0 0 2         INTERMITTENT
01 07 06 02 01 01 01 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 01 01 01 0 0 2           NUMBER
01 07 06 02 01 01 01 1 0 1           NO REFERENCE OBSERVED
01 07 06 02 01 01 01 1 0 2             PERCENT TO TOTAL NUMBER
01 07 06 02 01 02 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 01 02 00 0 0 2         PERENNIAL
01 07 06 02 01 02 01 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 01 02 01 0 0 2           NUMBER
01 07 06 02 01 02 01 1 0 1           NO REFERENCE OBSERVED
01 07 06 02 01 02 01 1 0 2             PERCENT TO TOTAL NUMBER
01 07 06 02 01 03 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 01 03 00 0 0 2         DISCHARGE                                    L**3/T
01 07 06 02 01 03 01 0 0 1           213
01 07 06 02 01 03 01 0 0 2         MAXIMUM                                      L**3/T
01 07 06 02 01 03 02 0 0 1           185
01 07 06 02 01 03 02 0 0 2         MINIMUM                                      L**3/T
01 07 06 02 01 03 03 0 0 1           185
01 07 06 02 01 03 03 0 0 2         AVERAGE                                      L**3/T
01 07 06 02 01 03 04 0 0 1           185
01 07 06 02 01 03 04 0 0 2         VARIATION IN TIME
01 07 06 02 01 03 04 0 0 3           185
01 07 06 02 01 03 04 1 0 1         FOR RELATION TO CLIMATE
01 07 06 02 01 03 04 1 0 2           FREQUENCY DISTRIBUTION
01 07 06 02 01 03 04 1 1 1           NO REFERENCE OBSERVED
01 07 06 02 01 03 04 1 1 2             STATISTICAL PARAMETERS
01 07 06 02 02 00 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 00 00 0 0 2       FROM ADJOINING BASINS
01 07 06 02 02 01 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 01 00 0 0 2         INTERMITTENT
01 07 06 02 02 01 01 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 01 01 0 0 2           NUMBER
01 07 06 02 02 01 01 1 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 01 01 1 0 2             PERCENT TO TOTAL NUMBER
01 07 06 02 02 02 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 02 00 0 0 2         PERENNIAL
01 07 06 02 02 02 01 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 02 01 0 0 2           NUMBER
01 07 06 02 02 02 01 1 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 02 01 1 0 2             PERCENT TO TOTAL NUMBER
01 07 06 02 02 03 00 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 03 00 0 0 2         DISCHARGE                                    L**3/T
01 07 06 02 02 03 01 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 03 01 0 0 2           MAXIMUM                                    L**3/T
01 07 06 02 02 03 02 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 03 02 0 0 2           MINIMUM                                    L**3/T
01 07 06 02 02 03 03 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 03 03 0 0 2           AVERAGE                                    L**3/T
01 07 06 02 02 03 04 0 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 03 04 0 0 2           VARIATION IN TIME
01 07 06 02 02 03 04 1 0 1           NO REFERENCE OBSERVED
01 07 06 02 02 03 04 1 0 2             FREQUENCY DISTRIBUTION
01 07 06 02 02 03 04 1 1 1           NO REFERENCE OBSERVED
01 07 06 02 02 03 04 1 1 2               STATISTICAL PARAMETERS
                                       NO REFERENCE OBSERVED
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COMPLETE LIST OF REFERENCES

No.	Author	Year	Source	Vol.	Page
1	ADAMS G.	1966	IND.ACAD.SCI.PROC.	63	201
2	ADLER A.A.-LATTMAN L.H.	1961	PA.ST.U.MIN.IND.EXP.STA.BULL.77		
3	AJMANI M.J.	1961	J.GEOPHYS.RES.	66	1996
4	AKERS J.P.	1962	U.S.G.S.PROF.PAPER 450D		97
5	ALEXANDER C.S.	1953	CAL.UNIV.PUBS.GEOGRAPHY	10	
6	AL SHARIF S.M.	1966	DISSERTATION ABSTRACTS	26	5020
7	ALLEN R.M.JR.	1950	VA.JOUR.SCI.	1	301
8	ALLEN R.R. ET AL.	1959	R.I.NAT.RES.COORD.BRD.GRD.WAT.MAP3		
9	ALLEN R.R.-GORMAN L.M.	1959	R.I.NAT.RES.COORD.BRD.GRD.WAT.MAP4		
10	ALLEN J.R.L.	1965	SEDIMENTOLOGY	2	99
11	AMEIN M.	1966	WATER RESOUR.RES.	2	123
12	AMERMAN C.R.	1965	WATER RESOUR.RES.	1	499
13	ANDREWS J.-HART W.E.	1964	TR.AM.GEOPHYS.UNION	45	307
14	AM.GEOPHYS.UNION	1964	FED.INTR.R.BASIN COMM.HYDRO.BULL.5		
15	AM.SOC.CIVIL ENGINEERING	1966	J.HYDRAUL.DIV.	2	291
16	ANDRE J.E.-ANDERSON H.W.	1961	J.GEOPHYS.RES.	66	3351
17	ANDERSON H.W.	1954	TR.AM.GEOPHYS.UNION	35	268
18	ANDERSON H.W.	1957	TR.AM.GEOPHYS.UNION	38	921
19	ANTEVS E.V.	1948	UTAH UNIV.ANTHRO.PAPER 11		
20	ANTEVS E.V.	1952	J.GEOL.	60	375
21	ANDERSON R.V.	1961	N.Y.ACAD.SCI.ANNALS	95	426
22	ANDERSON D.M.-BIRNIE R.M.	1961	SOIL SCI.SOC.AM.PROC.	25	499
23	ARAMAKI M.	1959	J.AM.CERAMIC SOC.	42	644
24	ARCHAMBAULT J.	1963	TERRES ET EAUX PARIS	15	2
25	AUTOMETRIC CORPORATION	1963	ONR TASK 387-030 NONR 4346(00)		
26	AUTOMETRIC FACILITY	1964	ONR TASK 387-030 NONR 4929(00)		
27	AVENARD J.M.-TRICART J.	1960	REV.GEOMORPH.DYNAMIQUE	11	146
28	BAKKER J.P.-STRAHLER A.N.	1956	UN.GEOGR.INT.RIO DE JAN.		30
29	BALDWIN E.M.	1957	NORTHWEST SCIENCE	31	109
30	BALEK J.-KOLAR V.	1959	SLOV.AKD.VIED.-BRADISLAVA	7	237
31	BAPTIST O.C.	1955	NATL.RES.COUNCIL PUB.395		
32	BARTELL M.J.	1949	TR.AM.GEOPHYS.UNION	30	89
33	BARTON R.H.-BROSCOE A.J.	1961	ALBERTA SOC.PETROL.GEOL.J.	9	240
34	BATES R.L.	1961	OHIO J.SCI.	61	113
35	BATTELLE MEMORIAL INSTITUTE	1961	U.S.CONG.87TH HS.DOC.176	2	
36	BARR D.I.H.	1965	ASCE-J.HYDRAUL.DIV.	3	323
37	BARR D.I.H.	1966	ASCE-J.HYDRAUL.DIV.	6	226
38	BAGNOLD R.A.	1960	U.S.G.S.PROF.PAPER 282E		
39	BAYLISS P.	1964	NATURE	203	327
40	BEAR F.E.	1955	AM.CHEM.SOC.MON.	126	
41	BEAUMONT R.T.	1957	TR.AM.GEOPHYS.UNION	38	190
42	BEDINGER M.S. ET AL.	1963	U.S.G.S.WATER SUP.P.1460L		
43	BELCHER D.J.	1951	NAT.RES.COUNC.HWY.R.B.BULL.	40	19
44	BENEDICT P.C.	1957	TR.AM.GEOPHYS.UNION	38	897
45	BENEDICT P.C. ET AL.	1955	TR.AM.SOC.CIV.ENG.	120	457
46	BENSON M.A.	1962	U.S.G.S.WATER SUP.P.1580A		
47	BENSON M.A.	1964	U.S.G.S.WATER SUP.P.1580D		
48	BEATY C.B.	1961	ASSOC.AM.GEOG.ANNALS	51	236
49	BEETEM W.A. ET AL.	1962	U.S.G.S.BULLETIN 1140D		
50	BEATY C.B.	1962	J.GEOL.	70	347
51	BENSON M.A.-THOMAS D.M.	1967	INT.ASSOC.SCI.HYDROL.BULL.11		76
52	BERTOUILLE H.	1964	SOC.GEOL.FR.BULL.	5	419
53	BERTHOIS L.-MORIZE J.	1960	ACAD.SCI.PARIS.C.R.	250	2239
54	BIDAL F.-HSIEH J.	1966	SOIL SCI.	102	143
55	BINDEMAN N.N.	1960	INT.GEOL.REV.(AM.GEOL.INST)3		1076
56	BLENCH T.	1952	CIV.ENG.	22	167
57	BLENCH T.	1957	REGM.BEHAV.CANALS RIV. BUTTERWORTH		
58	BLISSENBACH E.	1952	J.SED.PETROL.	22	25
59	BLISSENBACH E.	1954	GEOL.SOC.AM.BULL.	65	175
60	BLUCK B.J.	1964	J.SED.PETROL.	34	395
61	BLUME H.	1963	AKAD.WISS.GOTTINGEN MAT.NACHR.		
62	BLACKBURN G.	1962	AUSTRALIAN J.SCI.	25	99
63	BORMANN F.H.-LIKENS G.E.	1967	SCIENCE	155	424
64	BOGARDI J.	1961	J.GEOPHYS.RES.	66	3337
65	BORST H.L.-WOODBURN R.	1960	SOIL CON.SER.TECH.PUB.	36	
66	BOYER M.C.	1954	TR.AM.GEOPHYS.UNION	35	957
67	BORLAND W.M.	1961	J.GEOPHYS.RES.	66	3347
68	BOWDEN K.L.-WALLIS J.R.	1964	GEOL.SOC.AM.BULL.	75	767
69	BOUWER H.	1966	WATER RES.RESEARCH	2	729
70	BONNET A.	1964	SOC.GEOL.FR.BULL.	5	543
71	BRADEN G.E.	1951	OKLA.ACAD.SCI.PROC.	30	125
72	BRADEN G.E.	1951	OKLA.ACAD.SCI.PROC.	31	73
73	BRADEN G.E.	1955	OKLA.ACAD.SCI.PROC.	35	89
74	BRADEN G.E.	1959	OKLA.ACAD.SCI.PROC.	36	88
75	BRADEN G.E.	1959	OKLA.ACAD.SCI.PROC.	39	115
76	BROCHU M.	1958	CAHIERS GEOL.	40	477
77	BROSCOE A.J.	1950	GEOL.SOC.AM.BULL.	61	1446
78	BROSCOE A.J.	1959	ONR TR18 COLUMBIA DEPT.GEOL.		
79	BRUSH L.M.JR.	1956	GEOL.SOC.AM.BULL.	67	1676
80	BRUSH L.M.JR.	1957	GEOL.SOC.AM.BULL.	68	1704
81	BRUSH L.M.JR.	1958	GEOL.SOC.AM.BULL.	69	1942
82	BRUSH L.M.JR.	1959	GEOL.SOC.AM.BULL.	70	1976
83	BRUSH L.M. JR.	1961	U.S.G.S.PROF.PAPER 282F		145
84	BRYAN K.	1940	ASS.AM.GEOGR.ANN.	30	254
85	BRYDON J.E.	1958	CANADIAN J.SOIL SCI.	38	150
86	BRYDON J.E.-MARSHALL C.E.	1957	MO.U.AGR.EX.STA.RES.BULL.623		
87	BRYDON J.E.-MARSHALL C.E.	1958	MO.U.AGR.EX.STA.RES.BULL.655		
88	BRYDON J.E.-HEYSTEK H.	1958	CANADIAN J.SOIL SCI.	34	171
89	BRADEN G.E.	1961	OKLA.ACAD.SCI.PROC.	41	100
90	BRADEN G.E.	1961	OKLA.ACAD.SCI.PROC.	41	104
91	BROWN B.R.	1961	GEOL.SOC.AM.BULL.	72	1675
92	BRUSH L.M.JR.	1961	AM.SOC.CIV.ENG.PROC.	87	
93	BRUSH L.M.JR.	1961	J.GEOPHYS.RES.	66	2547
94	BROWN J. ET AL.	1962	J.GEOPHYS.RES.	67	2447
95	BRAKENSIEK D.L.	1962	J.GEOPHYS.RES.	67	1401
96	BRUUN P.-LACKEY J.B.	1962	REVIEWS IN ENGR.GEOLOGY	1	39
97	BROWN D.A. ET AL.	1962	FLA.GEOL.SURV.INF.CIRC.32		
98	BRIGGS L.I.	1966	J.SED.PETROL.	36	272
99	BRAUN P.	1966	GEOL.SOC.AM.BULL.	77	959
100	BREMER H.	1960	BER.DEUT.LANDESK.	25	283
101	BREWER R.	1964	SOIL CLAY MINERALOGY		77
102	BRAUN P.	1966	GEOL.SOC.AM.BULL.	77	959
103	BRAVARD Y.	1964	SOC.GEOL.FR.BULL.	5	541
104	BREWER R.	1964	FABRIC.MINERAL ANAL.SOILS J. WILEY		
105	BUCKLEY A.B.	1922	PROF.INST.CIV.ENG.	216	183
106	BUNTING B.T.	1961	AM.J.SCI.	259	503
107	BURMISTER D.M.	1952	SOIL MECH. COLUMBIA UN.PR.		
108	BULL W.B.	1961	U.S.G.S.PROF.PAPER 424B		
109	BULL W.B.	1962	DISSERTATION ABSTRACTS	22	3682
110	BULL W.B.	1962	U.S.G.S.PROF.PAPER 450B		51
111	BULL W.B.	1962	GEOL.SOC.AM.SPEC.PAPER 68		11
112	BULL W.B.	1962	J.SED.PETROL.	32	211
113	BURFORD A.E.	1966	WEST VA.ACAD.SCI.PROC.	37	160
114	BULL W.B.	1964	U.S.G.S.PROF.PAPER 437A		
115	BULL W.B.	1964	U.S.G.S.PROF.PAPER 352E		
116	BULL W.B.	1964	AM.J.SCI.	262	249
117	BULL W.B.	1966	NEBR.ACAD.SCI.		137
118	BUTLER B.E.	1958	AUSTRAL.SCI.IND.RES.ORG.SOIL PUB.3		
119	BUNTING B.T.	1961	AM.J.SCI.	259	503
120	CARLSTON C.W.	1963	U.S.G.S.PROF.PAPER 422C		
121	CARRIGY M.A.	1959	PROC.WRLD.PETROLEUM CONG.		575
122	CARROLL D.	1952	AM.J.SCI.	250	790
123	CARROLL D.	1953	SOIL SCI.	75	87
124	CARROLL D.	1953	J.SED.PETROL.	23	106
125	CARROLL D.	1959	U.S.G.S.PROF.PAPER 314F		
126	CARROLL D.	1959	GEOL.SOC.AM.BULL.	70	749
127	CARTER R.W.-GODFREY R.G.	1960	U.S.G.S.WATER SUP.P. 1543B		61
128	CAZALIS P.	1960	CAHIERS GEOG.QUEBEC	9	33

111	BULL W.B.	[illegible]	[illegible]		11
112	BULL W.B.	1962	J.SED.PETROL.	32	211
113	BURFORD A.E.	1966	WEST VA.ACAD.SCI.PROC.	37	160
114	BULL W.B.	1964	U.S.G.S.PROF.PAPER 437A		
115	BULL W.B.	1964	U.S.G.S.PROF.PAPER 352E		
116	BULL W.B.	1964	AM.J.SCI.	262	249
117	BULL W.B.	1966	NEBR.ACAD.SCI.		137
118	BUTLER B.E.	1958	AUSTRAL.SCI.IND.RES.ORG.SOIL PUB.3		
119	BUNTING B.T.	1961	AM.J.SCI.	259	503
120	CARLSTON C.W.	1963	U.S.G.S.PROF.PAPER 422C		
121	CARRIGY M.A.	1959	PROC.WRLD.PETROLEUM CONG.		575
122	CARROLL D.	1952	AM.J.SCI.	250	790
123	CARROLL D.	1953	SOIL SCI.	75	87
124	CARROLL D.	1953	J.SED.PETROL.	23	106
125	CARROLL D.	1959	U.S.G.S.PROF.PAPER 314F		
126	CARROLL D.	1959	GEOL.SOC.AM.BULL.	70	749
127	CARTER R.W.,GODFREY R.G.	1960	U.S.G.S.WATER SUP.P. 1543B		81
128	CAZALIS P.	1960	CAHIERS GEOG.QUEBEC	5	33
129	CAZEAU C.J.	1960	AM.ASSOC.PETROL.GEOL.BULL.	44	630
130	CARLSTON C.W.	1962	GEOL.SOC.AM.SPEC.PAPER 68		145
131	CARLSTON C.W.	1965	AM.J.SCI.	263	864
132	CARLSTON C.W.	1966	INT.ASSOC.SCI.HYDROL.BULL.	11	62
133	CARRYER S.J.	1966	N.Z.J.GEOL.GEOPHYS.	9	91
134	CHANG F.M. ET AL.	1961	U.S.G.S.WATER SUP.P. 1498I		
135	CHAPMAN C.A.	1952	AM.J.SCI.	250	428
136	CHILINGAR G.V. ET AL.	1963	J.SED.PETROL.	33	784
137	CHORLEY R.J.	1956	J.GEOL.	64	422
138	CHORLEY R.J.	1956	UN.GEOGR.INT.RIO DE JAN.		42
139	CHORLEY R.J.	1957	J.GEOL.	65	628
140	CHORLEY R.J.	1957	GEOL.MAG.	94	140
141	CHORLEY R.J.	1958	AM.J.SCI.	256	208
142	CHORLEY R.J.	1959	AM.J.SCI.	257	503
143	CHORLEY R.J.	1962	U.S.G.S.PROF.PAPER 500B		
144	CHORLEY R.J.	1964	ASSOC.AM.GEOG.ANNALS	54	127
145	CHORLEY R.J.	1964	J.GEOPHYS.RES.	69	1507
146	CHORLEY R.J. ET AL.	1957	AM.J.SCI.	255	138
147	CHORLEY R.J.,MORGAN M.A.	1959	GEOL.SOC.AM.BULL.	70	1081
148	CHORLEY R.J.,MORGAN M.A.	1962	GEOL.SOC.AM.BULL.	73	17
149	CHORLEY R.J.	1966	ESSAYS IN GEOMORPH.ELSEVIER		275
150	CHATTERJEE S.P. ET AL.	1968	INDIAN SCI.CONG.PROC.		298
151	CLARK W.E.	1965	U.S.G.S.PROF.PAPER 525D		
152	CLARKE J.I.	1966	ESSAYS IN GEOMORPH.ELSEVIER		235
153	COATES D.R.	1958	T.R.10 ONR PROJ.389042		
154	COHEN P.	1963	U.S.G.S.WATER SUP.P. 1669H		
155	COLBERT E.H.	1956	PLATEAU	28	73
156	COLBERT E.H.	1958	BEHAVIOR AND EVOLUTION		27
157	COLBY B.R.	1957	TR.AM.GEOPHYS.UNION	38	708
158	COLBY B.R.	1961	U.S.G.S.WATER SUP.P. 1498D		
159	COLDWELL A.E.	1957	TR.AM.GEOPHYS.UNION	38	908
160	CONWALING M.	1966	TR.AM.SOC.CIV.ENG.	111	283
161	COOPER C.F.	1967	WATER RESOUR.RES.	3	131
162	CORBEL J.	1956	REV.CANADIENNE GEOGRAPHIE	10	240
163	CORBEL J.	1959	CAHIERS GEOG. QUEBEC	6	417
164	CORBEL J.	1959	ZEITS.FUR GEOMORPH.	3	1
165	CORNISH J.H.	1961	J.GEOPHYS.RES.	66	1065
166	COTTON C.A.	1940	J.GEOMORPH.	3	27
167	COURT A.	1961	J.GEOPHYS.RES.	66	1823
168	COOLEY M.E.,HARDT W.F.	1961	ARIZONA GEOL.SOC.DIGEST	4	59
169	CORTE A.E.	1961	US ARMY COLD REG.RES.LAB.REPT.85		
170	COOLEY M.E.	1962	U.S.G.S.PROF.PAPER 450D		48
171	CORBEILLE R.L.	1962	AM.ASSOC.PETROL.GEOL.BULL.	46	1963
172	COLBY B.R.	1964	ASCE J.HYDRAUL.DIV.	2	217
173	COLBY B.R.	1964	U.S.G.S.PROF.PAPER 462A		
174	COLLINS D.L.	1965	KANSAS WATER RES.BD.BULL.8		
175	COMMON R.	1966	ESSAYS IN GEOMORPH.ELSEVIER		53
176	COTTON C.A.	1964	N.Z.J.GEOL.GEOPHYS.	7	208
177	CORBEL J.	1959	REV.GEOMORPH.DYNAMIQUE	10	65
178	COTTON C.A.	1962	REV.GEOMORPH.DYNAMIQUE	13	30
179	CROFT A.R.,MARSTON R.B.	1950	TR.AM.GEOPHYS.UNION	31	83
180	CROFT A.R.	1961	J.GEOPHYS.RES.	66	2923
181	CULBERTSON J.K.,DAWDY D.R.	1964	U.S.G.S.WATER SUP.P.1498F		
182	CULLING W.E.H.	1957	J.GEOL.	65	259
183	CULLING W.E.H.	1957	J.GEOL.	65	451
184	CULLING W.E.H.	1959	GEOL.SOC.AM.BULL.	70	1081
185	CURTIS W.R.	1966	WATER RES.RESEARCH	2	311
186	DALRYMPLE T.	1960	U.S.G.S.WATER SUP.P.1543A		
187	DAVIS G.H.	1952	CAL.STATE WAT.RES.BD.BULL.6		89
188	DAVIS G.H.	1958	GEOL.SOC.AM.BULL.	69	1608
189	DAVIS G.H. ET AL.	1959	U.S.G.S.WATER SUP.P.1469		
190	DAWDY D.R.	1963	U.S.G.S.WATER SUP.P.1498C		
191	DAPL A.R.	1962	DISSERTATION ABSTRACTS	22	3604
192	DAVIS G.H.	1961	U.S.G.S.WATER SUP.P.1535B		
193	DAVIDSON E.S.	1961	U.S.G.S.PROF.PAPER 424C		
194	DAVIS G.H.,GREEN J.H.	1962	U.S.G.S.PROF.PAPER 450D		89
195	DAVIS G.H.	1966	GROUND WATER	4	5
196	DEWIEST R.J.M.	1966	ASCE JOUR.HYDRAUL.DIV.	5	161
197	DE SMET R.E.,SOUCHEZ R.	1962	REV.BELGE GEOG.	86	73
198	DIETZ R.S.	1952	AM.ASSOC.PETROL.GEOL.BULL.	36	1802
199	DIXON J.H.	1961	ALABAMA ACAD.SCI.J.	32	224
200	DOVE G.D.	1961	OHIO DIV.WATER TECH.REPT.4		
201	DOTY R.W.,HUBERT J.F.	1962	SEDIMENTOLOGY	1	7
202	DOUGLAS I.	1964	ZEITS.FUR GEOMORPH.	8	453
203	DOUGLAS [illegible]	1962	SEDIMENTOLOGY	1	167
204	DRINKWATER W.O.,JONES R.E.	1957	TR.AM.GEOPHYS.UNION	38	524
205	[illegible],HAYES C.R.	1952	J.AM.WAT.ASS.	45	369
206	[illegible]	1947	TR.AM.GEOPHYS.UNION	28	103
207	DUNCAN [illegible] ET AL.	1960	INT.ASSOC.SCI.HYDROL.COMM.SURF.	51	618
208	DURY G.H.	1954	AM.J.SCI.	252	193
209	DURY G.H.	1962	[illegible]		
210	DURY G.H.	1955	COTTESWOLD NAT.FIELD CLUB	31	206
211	EAKIN [illegible]	1955	[illegible].ACAD.SCI.PROC.	29	216
212	EAKIN H.M.	1935	TR.AM.GEOPHYS.UNION	2	467
213	EAKIN T.E.	1966	WATER RES.RESEARCH	2	251
214	EINSTEIN H.A.	1950	U.S.D.A.TECH.BULL. 1026		
215	EINSTEIN H.A.,BARBAROSSA N.L.	1952	TR.AM.SOC.CIV.ENG.	117	1121
216	ELDER J.	1956	NEBR.ACAD.SCI.PROC.		15
217	ELLISON W.D.	1950	SCIENCE	3	245
218	ELLIOTT [illegible]	1964	NATURE	204	651
219	EVERETT K.R.	1962	GEOL.SOC.AM.SPEC.P. 73		147
220	FAHNESTOCK R.K.	1963	U.S.G.S.PROF.PAPER 422A		211
221	FAIR G.M.,HATCH L.P.	1933	J.AM.WATER WORKS ASSOC.	25	1551
222	FARNSWORTH R.	1961	DISSERTATION ABSTRACTS	22	1128
223	FAIR [illegible]	1962	GEOL.SOC.AM.SPEC.PAPER 68		24
224	FARVOLDEN R.N.	1964	DISSERTATION ABSTRACTS	24	3667
225	FERRIS J.G.	1952	INT.ASSOC.SCI.HYDROL.BRUSSELS	2	168
226	FERRIS J.G.,SAYRE A.N.	1955	ECONOMIC GEOL.		716
227	FE[illegible] ET AL.	1961	[illegible]		
228	FENNER [illegible]	1962	OHIO J.SCI.	61	99
229	[illegible]	1962	[illegible]		129
230	FISHEL [illegible]	1955	U.S.G.S.WATER SUP.P. 887		55
231	FISHEL [illegible]	1961	J.GEOPHYS.RES.	66	3969
232	FISKELL J.G.A.,CARLISLE V.W.	1966	SOIL CROP SCI.SOC.FLA.PROC.	23	32
233	FLAMMER [illegible]	1964	[illegible] BULLETIN 1161A		
234	FLAXMAN E.M. ET AL.	1964	ASCE J.HYDRAUL.DIV.	6	249
235	FLAXMAN E.M.	1963	U.S.DEPT.AGRIC.MISC.PUB.970		134
236	FOLEY F.C.	1953	APPLIED SEDIMENTATION		113
237	FOLEY F.C.	1958	GEOL.SOC.AM.BULL.	69	1564

238	FOSTER E.E.	1948	RAINFALL AND RUNOFF MACMILLAN		
239	FOURNIER F.	1960	CLIMAT ET EROSION.PARIS UNIV.PR.		
240	FRANCESCHINI G.B.	1958	TR.AM.GEOPHYS.UNION	39	273
241	FRIEDMAN G.M.	1959	GEOL.SOC.AM.BULL.	70	1606
242	FROST R.E.	1950	ENG.EXPT.STA.PURDUE U.	2	53
243	FROST R.E.	1953	PHOTOGRAM.ENG.	19	427
244	FRYE J.C.	1959	J.GEOL.	67	111
245	FRYXELL R.	1961	NORTHWEST SCIENCE	35	159
246	FRYE J.C.	1961	J.GEOL.	69	600
247	FRINK C.R.	1965	SOIL SCI.AMER.PROC.	29	379
248	GABRIEL W.B. ET AL.	1957	WORLD OIL	145	89
249	GAGE M.	1953	J.SED.PETROL.	23	60
250	GAITHER A.	1953	J.SED.PETROL.	23	180
251	GARDNER W.R.	1961	J.GEOPHYS.RES.	66	3965
252	GETZ H.R.	1961	J.GEOL.	69	300
253	GHOSE B.,PANDEY S.	1963	INDIAN SOC.SOIL SCI.	11	250
254	GILBERT G.K.	1914	U.S.G.S.PROF.PAPER 86		
255	GLYMPH L.M. JR.	1957	TR.AM.GEOPHYS.UNION	38	903
256	GOLDTHWAIT R.P.	1956	OHIO ST.U.ENG.EXPT.STA.SPEC.REPT.		
257	GORHAM E.	1961	GEOL.SOC.AM.BULL.	72	795
258	GOTTSCHALK L.C.	1957	TR.AM.GEOPHYS.UNION	38	885
259	GOLE C.V.,CHITALE S.V.	1966	ASCE-J.HYDRAUL.DIV.	2	111
260	GOTTSCHALK L.C.	1964	HNDBK.APPLIED HYDROL. MCGRAW HILL		
261	GRAY D.M.	1961	J.GEOPHYS.RES.	66	1215
262	GRIFFIN J.J.,JOHNS W.D.	1958	GEOL.SOC.AM.BULL.	69	1576
263	GRIFFITHS J.C.	1950	PA.ST.COLL.MIN.IND.EXP.ST.BULL.56		138
264	GRIFFITHS J.C.	1952	PA.ST.COLL.MIN.IND.EXP.ST.TECH.P.189		
265	GRIFFITHS T.M.	1958	ASSOC.AM.GEOG.ANNALS	48	265
266	GRIM R.E.	1950	ILL.ST.GEOL.SURV.REP.INV.146		5
267	GRIM R.E.	1950	ILL.ST.GEOL.SURV.REP.INV.146		13
268	GRIM R.E.	1952	NAT.RES.COUNCIL PUB.213		
269	GRIM R.E.	1959	TR.AM.SOC.CIV.ENG.	85	
270	GRUNWALD H.R.	1961	SO.DAKOTA ACAD.SCI.PROC.	40	248
271	GRUET M.	1964	SOC.GEOL.FR.BULL.	5	658
272	GUERIN H.R.	1955	ASSOC.CAN.-FRAN.AV.SCI.AN.	21	126
273	GUYTON W.F.	1956	WATER WELL J.	10	6
274	GUY H.P. ET AL.	1966	U.S.G.S.PROF.PAPER 462I		
275	GUY H.P.	1965	U.S.DPT.AGRIC.MISC.PUB.970		30
276	GULBOV ZH	1951	BULGAR.AKAD.NAUK GEOL.INST.1		127
277	HACK J.T.	1956	VA.JOUR.SCI.	7	329
278	HACK J.T.	1957	GEOL.SOC.AM.BULL.	68	817
279	HACK J.T.	1957	U.S.G.S.PROF.PAPER 294B		45
280	HACK J.T.	1958	VA.JOUR.SCI.	9	425
281	HACK J.T.,YOUNG R.S.	1959	U.S.G.S.PROF.PAPER 354A		
282	HAINS C.F.	1952	U.S.G.S.WATER SUP.P.1110D		
283	HANSEN W.R.	1953	J.GEOL.	61	353
284	HANTUSH M.S.	1955	SOC.[illegible] N.MEX.INST.MIN.TECH.		
285	HANTUSH M.S.	1962	J.GEOPHYS.RES.	67	703
286	HAPP S.C.	1950	APPLIED SEDIMENTATION		319
287	HAPP S.C.	1950	GEOL.SOC.AM.BULL.	61	1568
288	HAPP S.C. ET AL.	1940	U.S.DEPT.AGRIC.TECH.BULL.695		134
289	HARPER H.J.,[illegible]	1950	OKLA.ACAD.SCI.PROC.	29	56
290	HARRIS W. ET AL.	1961	J.GEOPHYS.RES.	66	3319
291	HAVENS A.V. ET AL.	1961	J.GEOPHYS.RES.	66	539
292	HADLEY R.F.	1961	U.S.G.S.PROF.PAPER 424B		32
293	HARMS J.C. ET AL.	1962	AM.ASSOC.PETROL.GEOL.BULL.46		288
294	HARRIS D.W.	1961	DISSERTATION ABSTRACTS	21	3096
295	HADLEY R.F.	1961	U.S.G.S.PROF.PAPER 424C		
296	HARRISON R.W.	1961	ALLUV.EMPIRE PIONEER PRESS,1		5
297	HAUSHILD W.L. ET AL.	1961	U.S.G.S.PROF.PAPER 424D		17
298	HANN G.W.,HANSEN A.L.	1961	[illegible]		
299	HARRIS R.	1962	J.GEOPHYS.RES.	67	1003
300	HARR C.A.,JOHNSON M.P.	1966	GEOL.SOC.AM.BULL.	77	123
301	HARWOOD T.A.,RADFORTH N.W.	1966	CANADA-SOIL.SNOW MECH.TECH.MEMO.[illegible]		
302	HARRIS D.W.	1966	GEOL.SOC.AM.SPEC.PAPER 76		276
303	HARMS J.C.,FAHNESTOCK R.K.	1966	AM.ASSOC.PETROL.GEOL.BULL.48		530
304	HADLEY R.F.	1965	U.S.DPT.AGRIC.MISC.PUB.970		636
305	HEEDE B.H.	1965	J.SOIL WATER CONSERV.	20	216
306	HEM J.D.	1959	U.S.G.S.WATER SUP.P. 1473		
307	HENOCH W.E.S.	1961	CANADA DPT.MINES GEOG.BULL.15		
308	HEINDL L.A.,COSNER O.J.	1961	ARIZ.STATE LAND.DPT.WAT.RES.REP.9		
309	HELBIG K.M.	1961	GEOG.GESELL.HAMBURG MITT.	54	7
310	HINDS N.E.A.	1952	CAL.DPT.NAT.RES.DIV.MINES BULL.158		
311	HILL D.E.,TEDROW J.C.F.	1961	AM.J.SCI.	259	84
312	HILL H.M.	1966	ASCE-J.HYDRAUL.DIV.	2	127
313	HIDORE J.J.	1965	OKLA.ACAD.SCI.PROC.	45	201
314	HOLMAN W.W. ET AL.	1957	RUTGERS U.ENG.SOIL SURV.N.J.REP.22		
315	HORTON R.E.	1945	GEOL.SOC.AM.BULL.	56	275
316	HOWARD A.D.	1958	GEOL.SOC.AM.BULL.	69	575
317	HOWARD A.D.	1959	J.GEOL.	67	230
318	HOYT W.G.,LANGBEIN W.B.	1955	FLOODS PRINCETON U.PRESS		
319	HOPKINS D.M.,TABER B.	1962	GEOL.SOC.AM.SPEC.PAPER 68		33
320	HOOFE R.	1965	DISSERTATION ABSTRACTS	26	2133
321	HOLZNER L.,WEAVER G.D.	1965	ASSOC.AM.GEOG.ANNALS	55	592
322	HORTON J.H.,HAWKINS R.H.	1965	SOIL SCI.	100	377
323	HOURS R.G.	1966	ALA.ACAD.SCI.JOUR.	37	261
324	HUBBARD G.D.	1956	OHIO JOUR.SCI.	56	365
325	HUBBELL D.W.	1964	U.S.G.S.WATER SUP.P. 1748		
326	HUMBERT R.P.	1937	GEOL.SOC.AM.BULL.	48	1459
327	HUFF F.A.,NEILL J.C.	1957	TR.AM.GEOPHYS.UNION	38	541
328	HUSSEY K.M.,ZIMMERMAN H.L.	1953	IOWA ACAD.SCI.PROC.	60	390
329	HUTCHINSON J. ET AL.	1958	QUART.J.ROY.METEOR.SOC.	84	250
330	HUMPHREYS C.R.	1966	MICH.ST.UNIV.DPT.RES.DEVEL.		
331	HURD R.T.	1966	WATER RES.RESEARCH	2	657
332	HWANG L.S.	1965	DISSERTATION ABSTRACTS	26	2112
333	INDERBITZEN A.L.	1961	MATERIALS RES.STANDARDS	1	553
334	INESON J.,DOWNING R.A.	1964	JOUR.INST.WAT.ENG.LONDON	18	519
335	JACKSON M.L.	1958	SOIL CHEMICAL ANAL. PRENTICE HALL		
336	JACKSON M.L.	1959	INT.SER.MONS.EARTH SCI.	2	133
337	JACKSON M.L.,SHERMAN G.D.	1953	ADV.IN AGRON. ACADEMIC PRESS		
338	JAMES W.R.	1965	J.SED.PETROL.	35	748
339	JENNY H.	1941	FACTORS SOIL FORM. MCGRAW HILL		
340	JENNY H.,LEONARD C.D.	1934	SOIL SCI.	38	363
341	JOHNSON D.	1932	J.GEOL.	40	481
342	JOHNSON J.W.	1943	U.S.D.A.CON.SER.P. 50		
343	JOPLING A.V.	1965	ASCE J.HYDRAUL.DIV.	3	323
344	JORDAN P.R. ET AL.	1964	U.S.G.S.WATER SUP.P.1651		
345	JOHANSSON C.E.	1960	SVENSK.GEOG.ARSB.	36	138
346	JUDSON S.S.,R.	1958	N.Y.ACAD.SCI.TRANS.SER.2	20	305
347	JUDD W.E.	1964	DISSERTATION ABSTRACTS	25	3470
348	JUDSON S.	1963	SCIENCE	140	898
349	KALINSKE A.A.	1947	TR.AM.GEOPHYS.UNION	28	615
350	KAZMANN R.G.	1965	MODERN HYDROL. HARPER AND ROW		
351	KENNEDY R.J.	1964	PROC.AM.SOC.CIV.ENG.	90	75
352	KELLER W.D.	1961	J.SED.PETROL.	31	80
353	KENNEY T.C.	1966	NORGES GEOTEK.INST.PUB.63		
354	KESSELI J.E.,BEATY C.B.	1959	U.S.ARMY QTMSTR.R.E.TECH.REP.108		
355	KEMP P.H.	1963	NATURE	200	1085
356	KHALAF J.M.	1951	CHICAGO U.DPT.GEOG.RES.PAPER 22		
357	KING C.A.M.	1966	TECH.IN GEOMORPH. EDWARD ARNOLD LTD.		
358	KING L.C.	1953	GEOL.SOC.AM.BULL.	64	721
359	KING L.C.	1956	[illegible] RIO DE JAN.		105
360	KILPATRICK F.A.,BARNES H.H.,JR.	1964	U.S.G.S.PROF.PAPER 422E		
361	KINARD M.	1965	ASSOC.AM.GEOG.ANNALS	55	620
362	KIRCHMAYER M.	1960	REVUES [illegible]PALAONT.	18	446
363	KOHLER M.A.,LINSLEY R.K.	1951	WEATHER BUR.RES.P.	34	
364	KOLB C.R.	[illegible]	[illegible]		

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349	KALINSKE A.A.	1967	TR.AM.GEOPHYS.UNION	28	615
350	KAZMANN R.G.	1965	MODERN HYDROL. HARPER AND ROW		
351	KENNEDY R.J.	1964	PROC.AM.SOC.CIV.ENG.	90	75
352	KELLER W.D.	1961	J.SED.PETROL.	31	80
353	KENNEY T.C.	1966	NORGES GEOTEK.INST.PUB.63		
354	KESSELI J.E.-BEATY C.B.	1959	U.S.ARMY QTMSTR.R.E.TECH.RP.100		
355	KEMP P.H.	1963	NATURE	200	1085
356	KHALAF J.M.	1951	CHICAGO U.DPT.GEOG.RES.PAPER 42		
357	KING C.A.M.	1966	TECHN.IN GEOMORPH. ED.ARNOLD LTD.		
358	KING L.C.	1953	GEOL.SOC.AM.BULL.	64	721
359	KING L.C.	1956	UNIV.GEOGR.INT.RIO DE JAN.		105
360	KILPATRICK F.A.-BARNES H.H.JR.	1964	U.S.G.S.PROF.PAPER 422E		
361	KIRKBY M.J.	1965	ASSOC.AM.GEOG.ANNALS	55	626
362	KIRCHMAYER M.	1960	NEUES J.B.GEOL.U.PALAONT.	10	446
363	KOHLER M.A.-LINSLEY R.K.	1951	WEATHER BUR.RES.P.	34	
364	KOLB C.R.	1962	DISSERTATION ABSTRACTS	23	2000
365	KOSTER E.	1960	NATURW.VER.SCHLESWG-HOLSTN31	91	
366	LEOPOLD L.B.-MADDOCK T.	1954	FLOOD CONTR.CONTROV. RONALD PRESS		
367	LEOPOLD L.B.-MILLER J.P.	1956	U.S.G.S.PROF.PAPER 282A		
368	LEOPOLD L.B.-WOLMAN M.G.	1956	TR.AM.GEOPHYS.UNION	37	353
369	LEOPOLD L.B.-WOLMAN M.G.	1957	U.S.G.S.PROF.PAPER 282B		39
370	LEOPOLD L.B.-WOLMAN M.G.	1960	GEOL.SOC.AM.BULL.	71	769
371	LEOPOLD L.B.-LANGBEIN W.B.	1962	U.S.G.S.PROF.PAPER 500A		
372	LEOPOLD L.B. ET AL.	1964	FLUV.PROC.GEOMOR. W.H.FREEMAN		
373	LESSIG H.D.	1961	OHIO J.SCI.	61	25
374	LESSIG H.D.	1961	OHIO J.SCI.	61	286
375	LEWIS C.P.	1962	ARCTIC	15	145
376	LEE C.H.	1961	AM.SOC.CIV.ENG.PROC.	87	
377	LEOPOLD L.B.-LANGBEIN W.B.	1966	SCI.AMERICAN	214	60
378	LENNOX D.H.-JONES J.F.	1964	GROUND WATER	2	30
379	LEWIS L.A.	1966	PROF.GEOGRAPHER	18	230
380	LEITH C.J.-CRAIG R.M.	1965	AM.MINERALOGIST	50	1959
381	LEMOINE J.	1963	TERRES ET EAUX PARIS	15	4
382	LINSLEY R.K. ET AL.	1949	APPL.HYDROL. MCGRAW HILL		
383	LIAKOPOULOS A.C.	1966	WATER RES.RESEARCH	2	227
384	LOUCKS D.P.-LYNN W.R.	1966	WATER RESOUR.RES.	2	593
385	LOWELL W.R.	1955	GEOL.SOC.AM.BULL.	66	1591
386	LOGAN J.	1964	GROUND WATER	2	35
387	LUGN A.L.	1950	UTAH UNIV.ANTHRO.PAPERS	11	61
388	LUGN A.L.	1956	NEBR.ACAD.SCI.PROC.		13
389	LUGN A.L.-LUGN R.V.	1956	COMPASS	33	90
390	LUNDGREN L.W.	1964	CONN.GEOL.NAT.HIST.GUID.REP.15		
391	LURCHE J.R.	1964	AM.J.SCI.	262	325
392	LUSTIG L.K.	1966	J.GEOL.	74	95
393	LUSTIG L.K.	1965	U.S.G.S.PROF.PAPER 422F		
394	MACAR P.-FOURNEAU R.	1960	ZEITS.FUR GEOMORPH.	SB1	124
395	MACAR P.-LAMBERT J.	1960	ZEITS.FUR GEOMORPH.	SB1	128
396	MACK F.K. ET AL.	1964	U.S.G.S.WATER SUP.P. 1767		
397	MACKIN J.H.	1948	GEOL.SOC.AM.BULL.	59	463
398	MAUCH F.J.-DENNY C.S.	1966	WATER RESOUR.RES.	2	665
399	MAST R.F.-POTTER P.E.	1963	J.GEOL.	71	548
400	MATALAS N.C.-REIBER B.J.	1967	WATER RESOUR.RES.	3	215
401	MATHEWS W.H.	1956	CANADA-SOIL SRUN MECH.TECH.MEMO.41		
402	MATTHES G.H.	1949	TR.AM.GEOPHYS.UNION	30	421
403	MAXWELL J.C.	1955	TR.AM.GEOPHYS.UNION	36	520
404	MATLOCK W.G.	1966	DISSERTATION ABSTRACTS	26	4534
405	MAXWELL J.C.	1960	TR.AM.GEOPHYS.UNION	41	54
406	MADERAK M.L.	1966	U.S.G.S.WATER SUP.P.1823		
407	MALDE H.E.-VAN HORN R.	1965	NEBR.ACAD.SCI.HANDBOOK		40
408	MARSAL D.	1965	MONTREAL INT.CONF.SOIL MCH.F.ENG.		
409	MAUCH F.W.-DENNY C.S.	1966	WATER RES.RESEARCH	2	665
410	MAUCH F.W. ET AL.	1965	U.S.DPT.AGRIC.MISC.PUB.970		151
411	MANER S.B.	1965	U.S.DPT.AGRIC.MISC.PUB.970		108
412	MARKOV K.K.	1953	AKAD.NAUK SSSR PERIODA	8	64
413	MANCINI F.	1958	RICERCA SCI.ROME	28	1396
414	MCCAMY K.-MEYER R.P.	1964	J.GEOPHYS.RES.	69	691
415	MCGRAIN P.-MITCHELL W.	1952	IND.ACAD.SCI.PROC.	62	266
416	MCKEE E.D.	1953	ONR PROJECT 180108(NR081123)		
417	MCKEE E.D.	1957	J.SED.PETROL.	27	129
418	MCKEE E.D.	1957	AM.ASSOC.PETROL.GEOL.BULL.	41	1704
419	MCKEE E.D.-WEIR G.W.	1953	GEOL.SOC.AM.BULL.	64	381
420	MCCLYMONDS N.E.	1961	U.S.G.S.PROF.PAPER 424D		
421	MCQUEEN I.S.	1961	U.S.G.S.PROF.PAPER 424B		20
422	MCCLYMONDS N.E.-WARD P.E.	1967	U.S.G.S.PROF.PAPER 550C		
423	MCCONNELL R.L.	1965	TR.3D CARIBBEAN GEOL.CONF.		
424	MEIER M.F.	1954	GEOL.SOC.AMER.BULL.	65	1283
425	MEIER M.F.-SIMONS M.W.	1957	WEST.SNOW CONF.SANTA BARB.CAL.59		
426	MEINZER O.E.	1920	GEOL.SOC.AM.BULL.	31	329
427	MELTON F.A.	1952	PHOTOGRAM.ENG.	16	744
428	MELTON F.A.	1959	J.GEOL.	67	351
429	MELTON M.A.	1956	GEOL.SOC.AM.BULL.	67	1740
430	MELTON M.A.	1957	T.R.11 ONR PROJ.389042		
431	MELTON M.A.	1957	COLUMBIA U.TECH.REP.11 NAONR 27130		
432	MELTON M.A.	1958	J.GEOL.	66	35
433	MELTON M.A.	1958	GEOL.SOC.AM.BULL.	69	355
434	MELTON M.A.	1958	J.GEOL.	66	442
435	MELTON M.A.	1958	T.R.10 ONR PROJ.389042		
436	MELTON M.A.	1958	COLUMBIA U.TECH.REP.10 NAONR 27130		
437	MELTON M.A.	1960	GEOL.SOC.AM.BULL.	71	133
438	MELTON M.A.	1961	AM.J.SCI.	259	231
439	MELTON M.A.	1962	J.GEOPHYS.RES.	67	1485
440	MELTON M.A.	1965	J.GEOL.	73	715
441	MENARD H.W.JR.	1950	J.SED.PETROL.	20	98
442	MENARD H.W.JR.	1952	J.SED.PETROL.	22	148
443	MENARD H.W.	1961	J.GEOL.	69	154
444	METSGER F.	1961	J.GEOPHYS.RES.	66	2203
445	MEYER R.R.-FLORIAN R.R.JR.	1955	U.S.G.S.WATER SUP.P.1299		
446	MELTON M.A.	1962	J.GEOPHYS.RES.	67	1485
447	MERRE C.W. ET AL.	1956	FLA.GEOL.SURV.INF.CIRC.		
448	MELTON M.A.	1966	J.GEOL.	74	[illegible]
449	MEYERHOF G.G.	1965	ASCE J.SOIL MECH.FND.DIV.		132
450	MEDINA R.F.	1966	GEOL.Y METALURGIA	2	36
451	MELTON M.A.	1965	J.GEOL.	73	715
452	MILLER J.P.-WOLMAN M.G.	1957	TR.AM.GEOPHYS.UNION	38	216
453	MILLER J.P.	1952	GEOL.SOC.AM.BULL.	63	1279
454	MILLER J.P.	1953	ISRAEL RES.COUN.SPEC.PUB.	2	453
455	MILLER J.P.	1958	N.MEX.INST.MIN.TECH.MEMOIR 4		
463	MORAN D.F.-STEINBERGER R.	1956	GEOL.SOC.AM.BULL.	65	1288
456	MILLER R.L.	1953	COLUMBIA U.TECH.REP. NAONR 27130		
457	MILLER R.L.	1956	T.R.3 ONR PROJ.389042		
458	MIFFLIN M.D.	1964	GEOL.SOC.AM.SPEC.PAPER 76		284
459	MILLER C.R.	1962	J.GEOPHYS.RES.	67	1481
460	MILLER J.P.-SHULTZ R.	1962	LAB.STUDIES IN GEOLOGY 200		
461	MIDDLETON G.V.	1965	[illegible] SCI.	132	36
462	MOCKEL R.	1956	[illegible]		
464	MORAN P.A.P.	1957	TR.AM.GEOPHYS.UNION	38	519
465	MORISAWA M.E.	1957	TR.AM.GEOPHYS.UNION	38	86
466	MORISAWA M.E.	1958	J.GEOL.	66	587
467	MORISAWA M.E.	1959	COLUMBIA U.TECH.REP. NAONR 27130		
468	MOUNT [illegible]	1961	J.GEOPHYS.RES.	66	3619
469	M[illegible] ET AL.	1961	GEOL.SOC.AM.BULL.	72	547
470	MORISAWA M.	1962	GEOL.SOC.AM.BULL.	73	1025
471	MORISAWA M.	1962	GEOL.SOC.AM.SPEC.PAPER 68		233
472	MOAN [illegible]	1959	REV.GEOMORPH.DYNAMIQUE	10	152

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473	MORAWETZ S.	1960	OSTERREICH.GEOG.GES.	102	41
474	MUNDORFF J.C.,JORDAN P.R.	1958	U.S.G.S.CIRC. 406		
475	MUSGROVE G.N.	1947	J.SOIL WATER CONS.	2	133
476	MUSTONEN S.E.	1967	WATER RESOUR.RES.	3	123
477	MUNDORFF J.C.,SCOTT C.H.	1964	U.S.G.S.WATER SUP.P.1798A		
478	MUIR J.W.	1962	J.SOIL SCI.	13	22
479	NACE R.L. ET AL.	1961	U.S.G.S.WATER SUP.P.1587		
480	NEAL J.H.	1938	MO.AGR.EX.STAT.RES.BULL.280		
481	NELSON M.E.,BENEDICT P.C.	1951	TR.AM.SOC.CIV.ENG.	116	891
482	NEMENYI P.F.	1952	GEOL.SOC.AM.BULL.	63	595
483	NELSON J.G.	1966	ASSOC.AM.GEOG.ANNALS	56	24
484	NEILL C.R.	1964	ASCE-J.HYDRAUL.DIV.	4	391
485	NEEF E.	1966	GEOLOGIE (BERLIN)	15	97
486	KOSTER E.	1960	LEITF.GRANULOM.U.MORPHOM.	C.HANSER	
487	KRUMBEIN W.C.,MILLER R.L.	1953	J.GEOL.	61	510
488	KRUMBEIN W.C.,MILLER R.L.	1954	J.GEOL.	62	192
489	KRUMBEIN W.C.,LIEBLEIN J.	1956	TR.AM.GEOPHYS.UNION	37	313
491	KRYNINE D.P.,JUDD W.R.	1957	ENG.GEOL.GEOTECH. MCGRAW HILL		
492	KRUMBEIN W.C.,GRAYBILL F.A.	1965	STAT.MOD.GEOL. MCGRAW HILL		
493	KRUMBEIN W.C.,SLOSS L.L.	1963	STRAT.AND SED. W.H.FREEMAN		
494	KRIZ G.J.	1966	DISSERTATION ABSTRACTS	26	4543
495	KREBS R.D. ET AL.	1962	CLAYS.CLAY MINERALS PERGAMMON PR.		
496	KUENEN PH.H.	1959	AM.J.SCI.	257	17
497	KUNKLE G.R.	1962	J.GEOPHYS.RES.	67	1543
498	KUGLER H.	1964	DEUT.INST.LANDERK.WISS.VEROFF.54		
499	LAMBE T.W.	1953	AM.SOC.CIVIL ENG.PROC.	79	
500	LANE E.W.	1951	U.N.SCI.CONF.CONSERV.PROC.4		306
501	LANE E.W.,BORLAND W.M.	1953	AM.SOC.CIV.ENG.PROC.	79	
502	LANE E.W.,CARLSON E.J.	1954	TR.AM.GEOPHYS.UNION	35	453
503	LANGBEIN W.B.	1949	TR.AM.GEOPHYS.UNION	30	879
504	LANGBEIN W.B. ET AL.	1947	U.S.G.S.WATER SUP.P. 968C		
505	LANGBEIN W.B.,SCHUMM S.A.	1958	TR.AM.GEOPHYS.UNION	39	1076
506	LANGBEIN W.B.,ISERI K.T.	1960	U.S.G.S.WATER SUP.P. 1541A		
507	LANGSTON R.B. ET AL.	1958	CALIF.JOUR.MINES.GEOL.	54	215
508	LATTMAN L.H.	1954	MICH.ACAD.SCI.PROC.	35	361
509	LATTMAN L.H.	1959	GEOL.SOC.AM.BULL.	70	1635
510	LAURSEN E.M.	1956	7TH ANN.N.C.ST.COLL.SYMP.PROC.36		
511	LAURSEN E.M.	1958	AM.SOC.CIV.ENG.PROC.	84	
512	LA MARCHE V.	196	GEOL.SOC.AM.BULL.	72	1579
513	LATTMAN L.H.,PARIZEK R.R.	1964	GROUND WATER	2	55
514	LATTMAN L.H.,PARIZEK R.R.	1964	J.HYDROL.	2	73
515	LANGBEIN W.B.	1964	U.S.G.S.PROF.PAPER 501B		119
516	LANEY R.L.	1965	U.S.G.S.PROF.PAPER 525C		
517	LANGBEIN W.B.,LEOPOLD L.B.	1966	U.S.G.S.PROF.PAPER 422H		
518	LEONARD A.R.	1952	KANS.ST.GEOL.SURV.BULL.98		
519	LEONARD A.R.,FRYE J.C.	1951	GEOL.SOC.AM.BULL.	62	1460
520	LEOPOLD L.B.	1951	AM.J.SCI.	249	152
521	LEOPOLD L.B.	1951	TR.AM.GEOPHYS.UNION	32	347
522	LEOPOLD L.B.	1952	TR.AM.GEOPHYS.UNION	33	334
523	LEOPOLD L.B.	1953	AM.J.SCI.	251	606
524	LEOPOLD L.B.	1954	SCIENCE	119	326
525	LEOPOLD L.B.	1956	MAN ROLE CHANG.FACE EART.U.CHICAGO		
526	LEOPOLD L.B.	1959	U.S.G.S.CIRC. 410		
527	LEOPOLD L.B.,SNYDER C.T.	1951	U.S.G.S.WATER SUP.P.1110A		
528	LEOPOLD L.B.,MADDOCK T.	1953	U.S.G.S.PROF.PAPER 252		
529	NIETO C.L.	1951	ING.HIDRAUL.MEXICO	5	22
530	NIZERY A.R.M.,BRAUDEAU G.	1953	MINN.INT.HYDR.CONV.PROC.		49
531	NIMLOS T.J.,MCCONNELL R.C.	1962	NORTHWEST SCIENCE	36	99
532	NORDIN C.F.JR.,CULBERTSON J.K.	1961	ASCE PROC.J.HYDRAUL.DIV.	6	233
533	NORTON E.A.,SMITH R.S.	1930	J.AM.SOC.AGRON.	22	251
534	NORDIN C.F.JR.	1964	U.S.G.S.WATER SUP.P.1498H		
535	NORDIN C.F.JR.	1964	ASCE-J.HYDRAUL.DIV.	5	273
536	NORDIN C.F.JR.,NEILL C.R.	1964	ASCE-J.HYDRAUL.DIV.	6	309
537	NORDIN C.F.JR.,ALGERT J.H.	1965	ASCE J.HYDRAUL.DIV.	3	367
538	NUNNALLY N.R.	1966	DISSERTATION ABSTRACTS	26	7255
539	OGLE B.A.	1953	CAL.DPT.NAT.RES.DIV.MINES BULL.164		
540	OLLIER C.D.,HARROP J.F.	1963	AM.J.SCI.	261	376
541	ORE H.T.,WHITE E.D.	1958	COMPASS	36	23
542	ORE H.T.	1966	WYO.GEOL.ASSOC.FIELD CONF.GUIDEBK.		
543	ORE H.T.	1964	WYO.UNIV.CONTR.GEOLOGY	3	1
544	PARIZEK E.J.	1954	GA.ACAD.SCI.BULL.	12	110
545	PARIZEK E.J. WOODRUFF J.F.	1955	ASSOC.AM.GEOG.ANNALS	45	288
546	PARIZEK E.J.,WOODRUFF J.F.	1957	J.GEOL.	65	24
547	PARIZEK E.J.,WOODRUFF J.F.	1957	J.GEOL.	65	653
548	PARSONS D.A.	1960	PROC.AM.SOC.CIV.ENG.	86	21
549	PATTISON A.	1965	WATER RESOUR.RES.	1	489
550	PARSON R.L.	1964	CONSER.AMER.RESOUR. PRENTICE HALL		
551	PALMQUIST R.C.	1966	DISSERTATION ABSTRACTS	26	5372
552	PARIZEK E.J.,WOODRUFF J.F.	1955	ASSOC.AM.GEOG.ANNALS	45	288
553	PARDE M.	1965	COLLOQ.GEOGR.BONN UNIV.	7	21
554	PETERSON H.V.	1958	TR.AM.GEOPHYS.UNION	39	527
555	PETERSON H.V.,HADLEY R.F.	1952	TR.AM.GEOPHYS.UNION	33	332
556	PETTIJOHN F.J.	1962	AM.ASSOC.PETROL.GEOL.BULL.46		1468
557	PELTIER L.C.	1962	PROF.GEOGRAPHER	14	24
558	PETERSON R.G.,CALVIN L.D.	1966	AM.SOC.AGRON.-AGRONOMY	9	54
559	PIKE J.G.	1964	J.HYDROL.	2	116
560	PINCUS H.J.	1951	GEOL.SOC.AM.BULL.	62	81
561	PIPPAN T.	1964	20TH INT.GEOG.CONG.ABS.PAPERS		125
562	POLLACK J.M.	1959	DISSERTATION ABSTRACTS	20	998
563	PONDER R.M.,MILES A.J.	1954	MO.U.SCH.MIN.METALL.BULL.	84	
566	POTTER W.D.	1949	TR.AM.GEOPHYS.UNION	30	735
564	POOLE F.G.	1961	U.S.G.S.PROF.PAPER 424C		139
565	POTTER P.E. ET AL.	1963	GEOCH.ET COSMOCH.ACTA	27	669
567	POTTER W.D.	1957	TR.AM.GEOPHYS.UNION	38	333
568	POTTER W.D.	1958	TR.AM.GEOPHYS.UNION	39	100
569	POUQUET J.	1956	UN.GEOGR.INT.RIO DE JAN.		85
570	POWERS W.E.	1962	AM.ASSOC.ADV.SCI.PUB.	71	29

549	PATTISON A.	1965	WATER RESOUR.RES.	1	409
550	PARSON R.L.	1964	CONSER.AMER.RESOUR. PRENTICE HALL		
551	PALMQUIST R.C.	1966	DISSERTATION ABSTRACTS	26	5372
552	PARIZEK E.J..WOODRUFF J.F.	1955	ASSOC.AM.GEOG.ANNALS	45	208
553	PARDE M.	1965	COLLOQ.GEOGR.BONN UNIV.	7	21
554	PETERSON H.V.	1958	TR.AM.GEOPHYS.UNION	39	527
555	PETERSON H.V..HADLEY R.F.	1952	TR.AM.GEOPHYS.UNION	33	332
556	PETTIJOHN F.J.	1962	AM.ASSOC.PETROL.GEOL.BULL.	46	1468
557	PELTIER L.C.	1962	PROF.GEOGRAPHER	14	24
558	PETERSON R.G..CALVIN L.D.	1966	AM.SOC.AGRON.-AGRONOMY	9	54
559	PIKE J.G.	1964	J.HYDROL.	2	116
560	PINCUS H.J.	1951	GEOL.SOC.AM.BULL.	62	81
561	PIPPAN T.	1964	20TH INT.GEOG.CONG.ABS.PAPERS		125
562	POLLACK J.M.	1959	DISSERTATION ABSTRACTS	20	998
563	PONDER R.M..MILES A.J.	1954	MO.U.SCH.MIN.METALL.BULL.	84	
566	POTTER W.D.	1949	TR.AM.GEOPHYS.UNION	30	735
564	POOLE F.G.	1961	U.S.G.S.PROF.PAPER 424C		139
565	POTTER P.E. ET AL.	1963	GEOCH.ET COSMOCH.ACTA	27	669
567	POTTER W.D.	1957	TR.AM.GEOPHYS.UNION	38	333
568	POTTER W.D.	1958	TR.AM.GEOPHYS.UNION	39	100
569	POUQUET J.	1956	UN.GEOGR.INT.RIO DE JAN.		89
570	POWERS W.E.	1962	AM.ASSOC.ADV.SCI.PUB.	71	29
571	PREUSSE H.U.	1957	HESS.LANDESAMT BODENF.NOT.	85	334
572	QUINN J.H.	1959	GEOL.SOC.AM.BULL.	70	1659
573	RADFORTH N.W.	1950	CANADA-SOIL.SNOW MECH.TECH.MEMO.16		
574	RADFORTH N.W.	1958	CANADA-SOIL.SNOW MECH.TECH.MEMO.54		
575	RAINWATER F.H..THATCHER L.L.	1960	U.S.G.S.WATER SUP.P.1454		
576	RAGAN D.M.	1962	GEOL.SOC.AM.SPEC.PAPER 68		118
577	REED E.W. ET AL.	1952	OKLA.PLAN.RES.BRD.DIV.WAT.RES.BUL9		
578	REINHART K.G..TAYLOR R.E.	1954	TR.AM.GEOPHYS.UNION	35	791
579	REED J.E..WEDINGER M.S.	1962	U.S.G.S.PROF.PAPER 450B		88
580	REED J.E..WEDINGER M.S.	1961	J.GEOPHYS.RES.	66	2423
581	REEVE R.C..KIRKHAM D.	1951	TR.AM.GEOPHYS.UNION	32	582
582	REMSON I. ET AL.	1965	ASCE-J.HYDRAUL.DIV.	3	133
583	RICHTER R.C.	1958	GSA ENG.GEOL.CASE HIST.	2	25
584	RICCIO J.F.	1962	COMPASS	39	87
585	RIGGS H.C.	1964	U.S.G.S.PROF.PAPER 501B		165
586	RIGGS H.C.	1964	INT.ASSOC.SCI.HYDROL.PUB.63		352
587	ROBINSON A.H..THROWER N.J.W.	1957	GEOG.REV.	47	507
588	ROBINSON G.M. ET AL.	1961	SOIL SCI.	92	129
589	ROLFE B.N.	1959	GEOL.SOC.AM.BULL.	70	1811
590	ROSE H.G..SMITH H.F.	1957	ILL.STATE WAT.SURV.DIV.CIRC.59		
591	ROSE H.G..SMITH H.F.	1957	WATER WELL JOUR.	11	10
592	ROUSE H.	1939	IOWA INST.HYDRAUL.RES.		
593	ROUX J.C.	1965	FR..BUR.RECH.GEOL.MIN.BULL.3		
594	ROBERT M.	1966	ACAD.SCI.PARIS.C.R.	262	1519
595	RUHE R.V.	1956	SOIL SCI.	82	441
596	RUHE R.V.	1959	SOIL SCI.	87	223
597	RUHE R.V.	1956	GEOL.SOC.AM.BULL.	67	1730
598	RUHE R.V..DANIELS R.B.	1958	SOIL SCI.SOC.AM.PROC.	22	66
599	RUSSELL R.J.	1954	ISTANBUL U.REV.GEOG.INST.	1	28
600	RUSSELL R.J.	1958	GEOL.SOC.AM.BULL.	69	1
601	RUBIN J.	1966	WATER RES.RESEARCH	2	739
602	RUDEL A.	1964	SOC.GEOL.FR.BULL.	5	468
603	RZEDOWSKI J.	1955	CIENCIA	15	141
604	SAVIGEAR R.A.G.	1956	UN.GEOGR.INT.RIO DE JAN.		66
605	SAVIGEAR R.A.G.	1960	ZEITS.FUR GEOMORPH.	SB1	156
606	SAITO M.	1963	OSAKA CITY U.JOUR.GEOSCI.	7	145
607	SCHEIDEGGER A.E.	1965	U.S.G.S.PROF.PAPER525B		B187
608	SCHEIDEGGER A.E.	1966	WATER RESOUR.RES.	2	199
609	SCHEIDEGGER A.E.	1966	WATER RESOUR.RES.	2	785
610	SCHEIDEGGER A.E.	1967	WATER RESOUR.RES.	3	103
611	SCHIFF L..DREIBELBIS F.R.	1949	TR.AM.GEOPHYS.UNION	30	759
612	SCHNEIDER W.J.	1963	TR.AM.GEOPHYS.UNION	44	870
613	SCHUMM S.A.	1955	UN.INT.GEOD.GEOPH.	1	216
614	SCHUMM S.A.	1955	INTERNAT.ASSOC.HYDROL.PUB.36		
615	SCHUMM S.A.	1956	GEOL.SOC.AM.BULL.	67	597
616	SCHUMM S.A.	1956	AM.J.SCI.	254	693
617	SCHUMM S.A.	1956	J.SED.PETROL.	26	284
618	SCHUMM S.A.	1958	GEOL.SOC.AM.BULL.	69	1640
619	SCHUMM S.A.	1960	U.S.G.S.PROF.PAPER 352B		
620	SCHUMM S.A.	1961	U.S.G.S.PROF.PAPER 352C		31
621	SCHUMM S.A.	1961	AM.J.SCI.	259	234
622	SCHUMM S.A..HADLEY R.F.	1957	AM.J.SCI.	255	161
623	SCHUMM S.A..HADLEY R.F.	1959	GEOL.SOC.AM.BULL.	70	1812
624	SCHUMM S.A..HADLEY R.F.	1961	U.S.G.S. CIRC. 437		
625	SCHUMM S.A.	1961	U.S.G.S.PROF.PAPER 352C		
626	SCHMUDDE T.H.	1961	ASSOC.AM.GEOG.ANNALS	51	421
627	SCHEIDEGGER A.E.	1962	ROYAL ASTRON.SOC.GEOPHYS.J.	7	40
628	SCHEIDEGGER A.E.	1964	U.S.G.S.CIRC.485		
629	SCHNEIDER W.J.	1965	WATER RES.RESEARCH	1	509
630	SCHEIDEGGER A.E..LANGBEIN W.B.	1966	INT.ASSOC.SCI.HYDROL.BULL.	11	43
631	SCHEIDEGGER A.E.	1962	GEOPHYS.J.LONDON	7	40
632	SEARCY J.K.	1959	U.S.G.S.WATER SUP.P. 1542A		
633	SEARCY J.K.	1960	U.S.G.S.WATER SUP.P. 1541C		67
634	SERRA E.F.	1950	U.S.G.S.CIRC.67		
635	SEEGER D.	1961	EL SALVADOR SERV.GEOL.NAC.AN.BOL.4		
636	SEARS J.D.	1962	U.S.G.S.PROF.PAPER 374I		
637	SENGUPTA S.	1966	J.SED.PETROL.	36	362
638	SEGERSTROM K.	1963	GEOL.SOC.AM.SPEC.PAPER 73		238
639	SENO K.	1956	BALNEOL.SOC.JAPAN JOUR.	7	100
640	SHARP R.P.	1950	GEOL.SOC.AM.BULL.	61	1502
641	SHARP R.P.	1954	CAL.DPT.NAT.RES.DIV.MINES BULL.170		
642	SHEFFIELD D.L.L.	1956	UN.GEOGR.INT.RIO DE JAN.		16
643	SHERMAN I.	1951	J.SED.PETROL.	21	173
644	SHOCKLEY W.G.	1953	INT.CONF.SOIL MECH..FOUND.1		203

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645	SHRADER W.D.,HUSSEY K.M.	1954	IOWA ACAD.SCI.PROC.	60	408
646	SHREVE R.L.	1966	J.GEOL.	74	17
647	SHANSTSER E.V.	1961	VOPROSY GEOLOGII ANTROPOGENA		188
648	SIMONS D.B. ET AL.	1961	U.S.G.S.WATER SUP.P.1498A		
649	SIMONS D.B. ET AL.	1961	U.S.G.S.WATER SUP.P.1498G		
650	SIMONS D.B.,RICHARDSON E.V.	1961	U.S.G.S.WATER SUP.P.1498E		
651	SIMONS D.B.,RICHARDSON E.V.	1961	ASCE PROC.J.HYDRAUL.DIV.	6	
652	SIMONS D.B.,RICHARDSON E.V.	1966	U.S.G.S.PROF.PAPER 422J		
653	SIMONS D.B.,RICHARDSON E.V.	1965	U.S.DPT.AGRIC.MISC.PUB.970		193
654	SIBRAVA V.	1966	GEOLOGIE (BERLIN)	15	67
655	SLAYTER R.O.,MABBUTT J.A.	1964	HANDBK.APPLIED HYDROL.,MCGRAW HILL		
656	SMITH G.D.,PUHE R.V.	1955	U.S.D.A.YEARBOOK WATER		121
657	SMITH K.G.	1950	AM.J.SCI.	248	655
658	SMITH R.M.,STANEY W.L.	1965	SOIL SCI.	100	414
659	SMIT SIBINGA G.L.	1953	GEOL.,MIJNBOUW	15	121
660	SNYDER W.M.	1961	ANN.MEET.AM.GEOPHYS.UN.WASH.D.C.		
661	SNYDER W.M.	1962	J.GEOPHYS.RES.	67	721
662	SOIL.SCI.SOC.AM.	1964	AM.SOC.AGRON.SPEC.PUB. 4		
663	SOLE SABARIS L.	1956	UN.GEOGR.INT.RIO DE JAN.		107
664	SOLOMON S.	1967	WATER RESOUR.RES.	3	163
665	SOUCHEZ R.	1962	SOC.ROY.BELGE GEOG.	85	7
666	SPORNS U.	1964	ARCH.METEOR.GEOPH.BIOKL.	130	438
667	SPREEN W.C.	1947	TR.AM.GEOPHYS.UNION	28	285
668	SPIEGEL Z.	1962	SANTA FE.N.MEX.STATE ENG.SPEC.REP.		
669	SPEER D.R. ET AL.	1966	U.S.G.S.PROF.PAPER 448F		
670	SPARROW G.W.A.	1966	GEOGR.J.	132	390
671	STERNBERG H.O.	1956	DISSERTATION ABSTRACTS	16	1661
672	STERNBERG H.O.,RUSSELL R.J.	1956	INT.GEOG.CONG.17 WASH.D.C.		380
673	STOKES W.L.	1950	GUIDEBOOK GEOLOGY OF UTAH 5		97
674	STOKES W.L.	1954	GEOL.SOC.AM.BULL.	65	1309
675	STOKES W.L.	1955	GEOL.SOC.AM.BULL.	66	1622
676	STRAHLER A.N.	1950	ASSOC.AM.GEOG.ANNALS	40	209
677	STRAHLER A.N.	1950	AM.J.SCI.	248	673
678	STRAHLER A.N.	1951	PHYS.GEOGRAPHY J.WILEY		
679	STRAHLER A.N.	1952	GEOL.SOC.AM.BULL.	63	923
680	STRAHLER A.N.	1952	GEOL.SOC.AM.BULL.	63	1117
681	STRAHLER A.N.	1952	GEOL.SOC.AM.BULL.	63	1301
682	STRAHLER A.N.	1953	TR.AM.GEOPHYS.UNION	34	345
683	STRAHLER A.N.	1954	J.GEOL.	62	1
684	STRAHLER A.N.	1954	19 INT.GEOL.CONG.ALGIERS		341
685	STRAHLER A.N.	1954	GEOL.SOC.AM.BULL.	65	1310
686	STRAHLER A.N.	1955	GEOL.SOC.AM.BULL.	66	1623
687	STRAHLER A.N.	1956	MAN ROLE CHANG.FACE EART.U.CHICAGO		
688	STRAHLER A.N.	1956	GEOL.SOC.AM.BULL.	67	571
689	STRAHLER A.N.	1956	GEOL.SOC.AM.BULL.	67	1737
690	STRAHLER A.N.	1957	TR.AM.GEOPHYS.UNION	38	913
691	STRAHLER A.N.	1957	ASSOC.AM.GEOG.ANNALS	47	179
692	STRAHLER A.N.	1958	GEOL.SOC.AM.BULL.	69	279
693	STRAHLER A.N.	1963	EARTH SCI. HARPER AND ROW		
694	STRAHLER A.N.	1965	INTRO.PHYS.GEOGR. J.WILEY		
695	STRAHLER A.N.,KOONS D.	1957	PROG.REP.ONR PRJCT 389042		
696	STRAHLER A.N.,KOONS E.D.	1959	GEOL.SOC.AM.BULL.	70	1813
697	STRICKLIN F.L.JR.	1957	PROC.CONF.WAT.FOR TEXAS.COLL.STAT.		
698	STRICKLIN F.L.JR.	1957	GEOL.SOC.AM.BULL.	68	1800
699	STRINGFIELD V.T.,COOPER H.H.JR.	1951	AM.WAT.WORKS ASSOC.JOUR.	43	803
700	STEWART J.H.	1962	U.S.G.S.PROF.PAPER 450B		106
701	STEWART J.H.	1961	U.S.G.S.PROF.PAPER 424B		
702	STUART D.M. ET AL.	1961	SOIL SCI.SOC.AM.PROC.	25	132
703	STANLEY D.J.	1966	AM.ASSOC.PETROL.GEOL.BULL.50		636
704	STRAHLER A.N.	1964	ONR T.R.4 COLUMBIA U.DEPT.GEOL.		
705	STONE J.E.	1964	GEOL.SOC.AM.SPEC.PAPER 76		159
706	STRAHLER A.N.,KOONS D.	1962	COLUMBIA U.DPT.GEOL.ONR TECH.REP.		
707	STRINGHAM G.E.	1966	J.SED.PETROL.	36	271
708	STEPANICH F.C. ET AL.	1964	ASCE-J.WATWYS.,HARBRS DIV.2		1
709	STPIFFLER W.D.	1965	U.S.DPT.AGRIC.MISC.PUB.970		144
710	ST.ARNAUD R.J.,WHITESIDE E.P.	1963	J.SOIL SCI.	14	267
711	SUGISAKI R.	1961	AM.J.SCI.	259	144
712	SUOMI V.E.,TANNER C.B.	1958	TR.AM.GEOPHYS.UNION	39	298
713	SUMSION C.T.	1964	GEOL.SOC.AM.SPEC.PAPER 76		258
714	SUGISAKI R.	1961	AM.J.SCI.	259	144
715	SWARTZENDRUBER D.,HUBERTY M.R.	1958	TR.AM.GEOPHYS.UNION	39	84
716	SWENSON F.A.	1961	J.GEOPHYS.RES.	66	3568
717	TANNER W.F.JR.	1955	GEOL.SOC.AM.BULL.	66	1698
718	TANNER W.F.JR.	1955	AM.ASSOC.PETROL.GEOL.BULL.39		2471
719	TANNER W.F.JR.	1955	SHALE SHAKER	6	7
720	TANNER W.F.JR.	1956	SHALE SHAKER	6	14
721	TANNER W.F.JR.	1956	TR.AM.GEOPHYS.UNION	37	605
722	TANNER W.F.JR.	1959	AM.J.SCI.	257	458
723	TANNER W.F.JR.	1959	FORT SMTH.GEOL.SOC.GUIDEB.		3
724	TANNER W.F.JR.,MALLAMS P.	1950	J.SED.PETROL.	20	224
725	TATOR B.A.	1952	19 INT.GEOL.CONG.ALGIERS		121
726	TATOR B.A.	1952	GEOL.SOC.AM.BULL.	63	255
727	TATOR B.A.	1954	PHOTOGRAM.ENG.	20	412
728	TATOR B.A.	1958	PHOTOGRAM.ENG.	24	549
729	TATOR B.A.	1949	GEOL.SOC.AM.BULL.	60	1771
730	TEDROW J.C.F.	1954	SOIL SCI.SOC.AM.PROC.	18	479
731	TEDROW J.C.F.	1958	J.SOIL SCI.	9	33
732	TEDROW J.C.F.,WILKEHSON A.S.	1953	SOIL SCI.	75	345
733	TERS M.	1964	SOC.GEOL.FR.BULL.	5	464
734	THOMPSON L.M.	1957	SOILS.SOIL FERTILITY MCGRAW HILL		
735	THORP J.	1931	SOIL SCI.	32	283
736	THORP J.	1950	NEBR.ACAD.SCI.PROC.		16
737	THORP J.,SMITH G.D.	1949	SOIL SCI.	67	117
738	TODD D.K.	1959	GROUND WATER HYDROL. J.WILEY		
739	TRIM J.	[illegible]	[illegible]	[illegible]	[illegible]

721 TANNER W.F.JR. 1956 TR.AM.GEOPHYS.UNION 37 605
722 TANNER W.F.JR. 1959 AM.J.SCI. 257 458
723 TANNER W.F.JR. 1959 FORT SMTH.GEOL.SOC.GUIDEB. 3
724 TANNER W.F.JR.,MALLANS P. 1950 J.SED.PETROL. 20 224
725 TATOR B.A. 1952 19 INT.GEOL.CONG.ALGIERS 121
726 TATOR B.A. 1952 GEOL.SOC.AM.BULL. 63 255
727 TATOR B.A. 1954 PHOTOGRAM.ENG. 20 412
728 TATOR B.A. 1958 PHOTOGRAM.ENG. 24 549
729 TATOR B.A. 1949 GEOL.SOC.AM.BULL. 60 1771
730 TEDROW J.C.F. 1954 SOIL SCI.SOC.AM.PROC. 18 479
731 TEDROW J.C.F. 1958 J.SOIL SCI. 9 33
732 TEDROW J.C.F.,WILKERSON A.S. 1953 SOIL SCI. 75 345
733 TERS M. 1964 SOC.GEOL.FR.BULL. 5 464
734 THOMPSON L.M. 1957 SOILS.SOIL FERTILITY MCGRAW HILL
735 THORP J. 1931 SOIL SCI. 32 283
736 THORP J. 1950 NEBR.ACAD.SCI.PROC. 16
737 THORP J.,SMITH G.D. 1949 SOIL SCI. 67 117
738 TODD D.K. 1959 GROUND WATER HYDROL. J.WILEY
739 TOTH J. 1962 J.GEOPHYS.RES. 67 4375
740 TOLER L.G. 1965 U.S.G.S.PROF.PAPER 525C
741 TRASK P.D. 1950 APPLIED SEDIMENTATION 3
742 TRASK P.D. 1952 PROC.COAST.ENG.CONF.1951 145
743 TRASK P.D. 1959 GEOL.SOC.AM.BULL. 70 569
744 TRASK P.D.,ROLSTON J.W. 1950 SCIENCE 3 666
745 TRASK P.D.,CLOSE J.E.H. 1958 PROC.COAST.ENG.CONF. 1957 827
746 TRIMBLE D.E. 1950 NORTHWEST SCIENCE 24 84
747 TROELSEN J.C. 1952 DANSK GEOL.FOREN.MEDDEL. 12 221
748 TRICART J.,MILLIES L.A. 1963 SOC.GEOL.FR.BULL. 4 201
749 TROFIMOV A.M. 1966 AKAD.NAUK SSSR.DOKL. 167 645
750 TROLL C.,SCHMIDT-KRAEPELIN E. 1965 ERDKUNDE 19 14
751 TRICART J. 1961 REV.GEOMORPH.DYNAMIQUE 12 3
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13. ABSTRACT

This report describes a system for organizing a set of topics and related literature references in a selected field of the earth sciences. The concept of a drainage basin was selected to illustrate a conceptually-distinct field of research of interest to geologists and physical geographers. Problems associated with coding and integration of the relevant literature are pointed out.

The concept of a drainage basin, initially selected as a fairly self-contained subject, was found to be more complex than originally realized. To keep the report within reasonable bounds, the subject was subdivided into several major topics, which include first the geometry of the basin considered as a physical object definable as a natural subdivision of the earth's land surface. This is followed by various attributes associated with the basin, such as soils and bedrock, streams and subsurface water in the basin, and climatic features.

The system used here includes three types of punched cards. The first relates to the topics discussed, the second ties in the relevant literature, and the third provides comments and specific references to individual items. Machine print-outs provide tabulated examples of the system, and a condensed bibliography of drainage-basin literature is given in an Appendix.

14. KEY WORDS	LINK A		LINK B		LINK C	
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