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CLIMATE OF NORTH VIETNAM

PREPARED BY
TECHNICAL SERVICES
20TH WEATHER SQUADRON
APO 96525

1ST WEATHER WING
SPECIAL STUDY 105-4
(REVISED)

20TH WEATHER SQUADRON
1ST WEATHER WING (MATS)
UNITED STATES AIR FORCE
APO San Francisco 96525

June 1965

1. 1st Weather Wing Special Study 105-4 "Climate of North Vietnam" was prepared primarily as a planning aid to assist detachments within 1st Weather Wing and its subordinate squadrons in providing basic climatic data for North Vietnam. This revised edition supersedes 1WWSS 105-4 dated September 1964. It contains up to date charts for most parameters as well as new and more comprehensive ceiling/visibility data for individual stations listed in the back of the book.

2. This is one of a series of such studies which are being prepared for all countries in Southeast Asia, including Indonesia, Philippines and Taiwan. Climatological information to support a specific mission or excercise should be requested through appropriate Air Weather Service channels.

3. Further interpretation of the data contained in this study should be made by a Staff Weather Officer.

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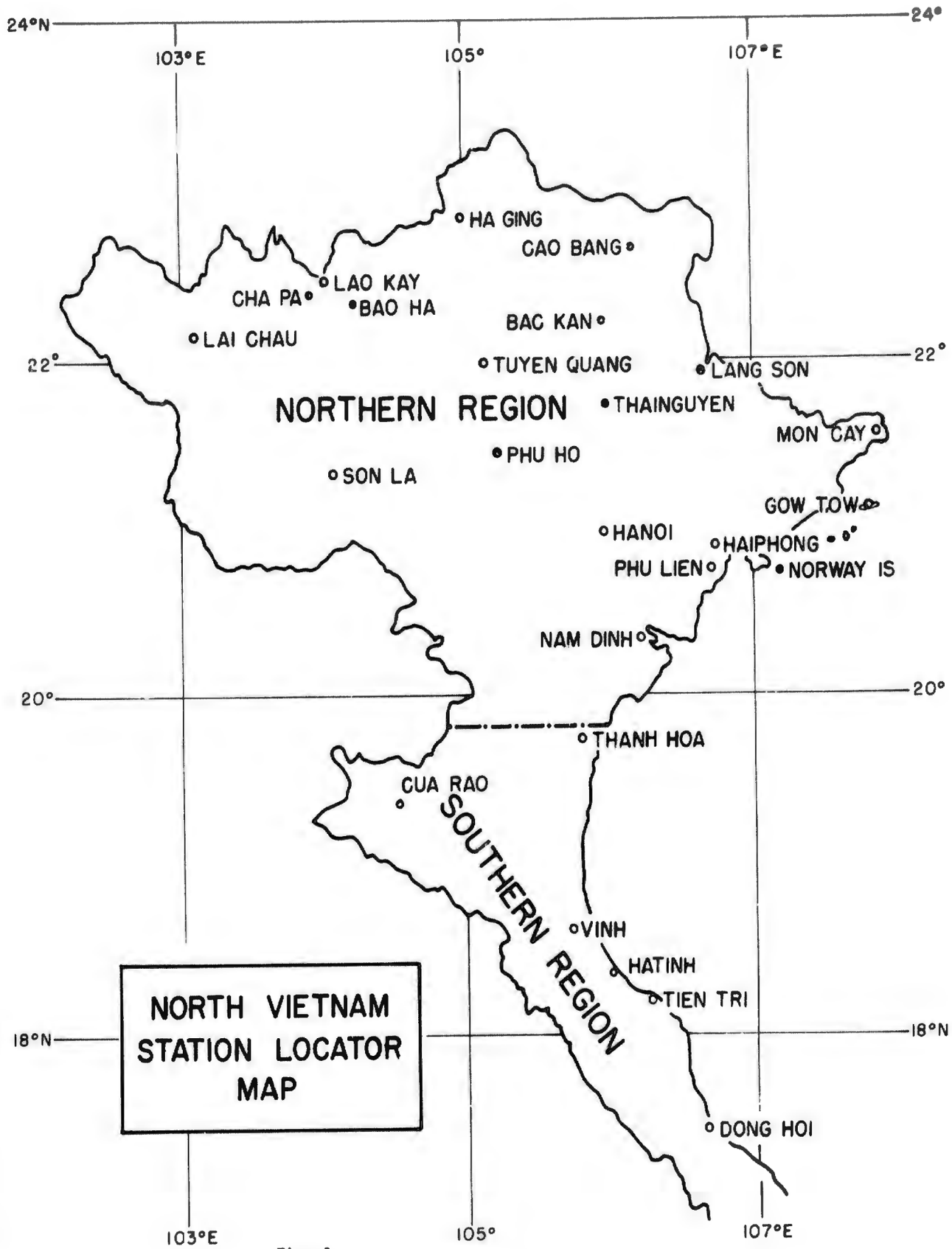
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24°
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HA GING
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BAO HA
BAC KAN
LAI CHAU
22°
TUYEN QUANG
LANG SON
NORTHERN REGION
THAINGUYEN
MON CAY
PHU HO
SON LA
GOW TOW
HANOI
HAIPHONG
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NORWAY IS
NAM DINH
20°
THANH HOA
CUA RAO
SOUTHERN REGION
VINH
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18°N
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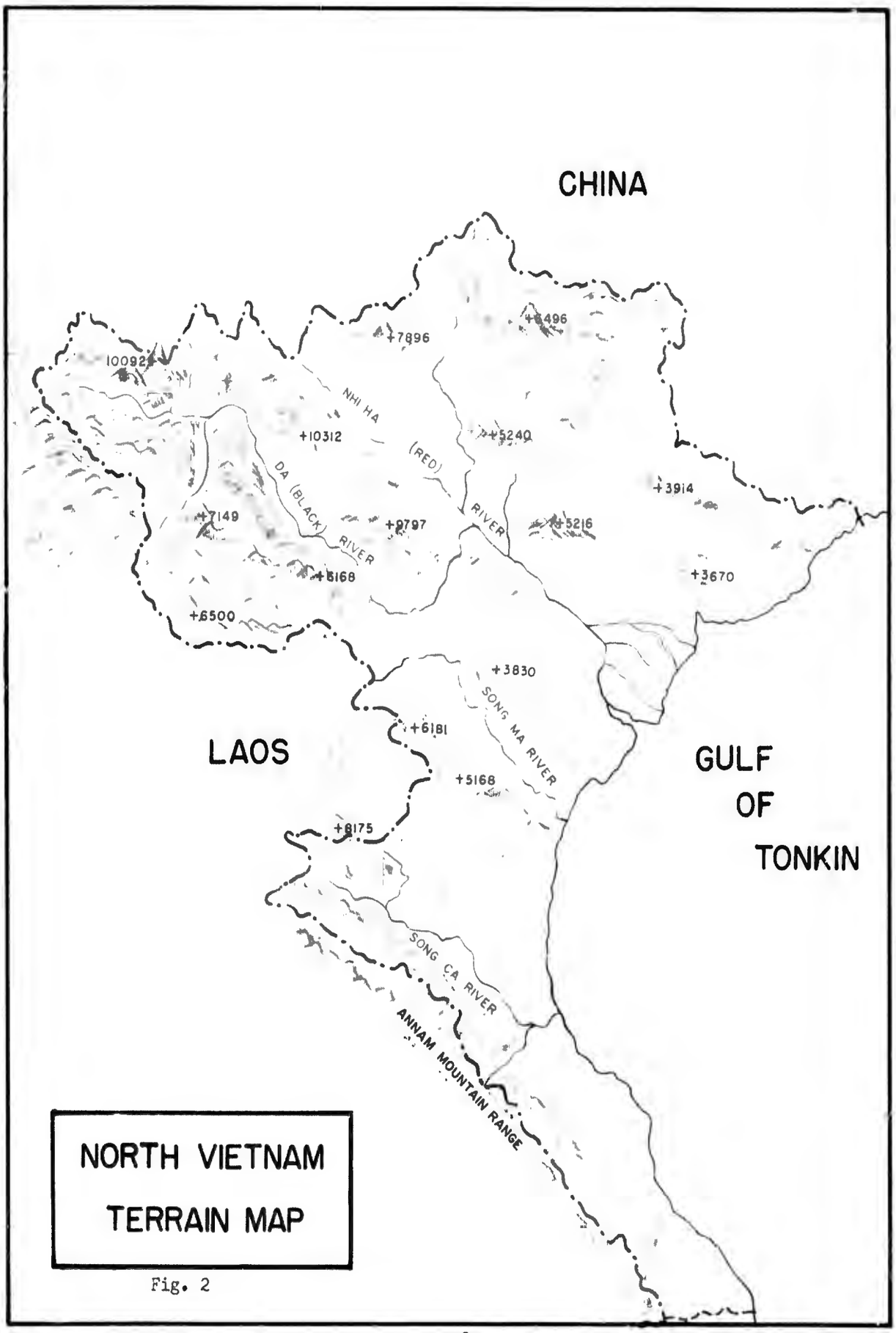
NORTH VIETNAM
STATION LOCATOR
MAP

Fig. 1



NORTH VIETNAM
TERRAIN MAP

Fig. 2

INTRODUCTION

1. Geography:

North Vietnam, the northeastern part of what was formerly French Indochina, lies completely within tropical latitudes. It extends from about 17°N to 23°N latitude and from 102°E to 108°E longitude and varies in elevation from sea level to the peak of Fan Si Pan at an altitude of approximately 10,300 feet. North Vietnam is bordered on the east by the Gulf of Tonkin, on the north by China, on the west by Laos, and, along a rather short southern boundary, by the Republic of Vietnam.

North Vietnam has several rather distinct types of topography. The extensive deltas of the Red River, Song Ma, and Song Ca extend along the coast from about 18°30'N to 21°00'N. They average 25 to 40 miles in width except near Hanoi, where the Red River delta lowlands extend inland approximately 75 miles. Except for a small range of hills that divides the Red River from Song Ma and Song Ca, the greater part of these deltas is less than 10 feet in elevation. The shoreline is characterized by shallow lagoons, sand dunes, and alluvial flats. West and north of the delta region are highlands. The highland region east of the Red River contains ranges, low plateaus, and valleys. Most of the mountain ranges run northwest to southeast, and, except for small areas in the north, are under 5,000 feet in elevation. The rivers generally flow parallel to the mountain ranges and in many cases flow in deep, narrow gorges. West of the Red River and of the delta lowlands as far south as 18°30'N are mountain ranges also oriented northwest to southeast and separated by rivers flowing in deep, narrow gorges. Elevations are generally higher than in the mountains east of the Red River. In fact, the highest part of North Vietnam is in the Fan Si Pan range immediately west of the Red River. South of 18°30'N are the coastal plains bordering the Gulf of Tonkin and the rather steep eastern slopes of the Annam Range which lie along the border between North Vietnam and Laos. The long, narrow plain, composed of alluvial terraces, flats, sand dunes, and lagoons, is broken in places by spurs of the Annam Mountain Range reaching to the sea.

2. Climate:

The climate of North Vietnam is, strictly speaking, monsoonal in nature, similar to that of Burma or peninsular India, although topography and trajectory of airstreams do much to modify this pattern in terms of the weather actually experienced in the country. The climate in general is characterized by two major seasons---the southwest monsoon, usually prevailing from mid-May to mid-September, and the northeast monsoon, usually prevailing from mid-October to mid-March. These major seasons are separated by two rather short transitional periods---the spring transition, mid-March to mid-May, and the autumn transition, mid-September to mid-October.

During the southwest monsoon season, precipitation is moderate to heavy in most of the country, and, north of about 20°N, the southwest monsoon is the season of maximum precipitation. Humidities are high and cloudiness is extensive; average temperatures reach their annual maximum and, except at higher elevations, are tropical in nature. In contrast, the northeast monsoon is a relatively dry season or period of small precipitation amounts in the northern part of the country and only light to moderate precipitation in the southern part. This is the season of lowest temperatures. Humidities are high, especially toward the latter part of the season; at some locations they are at a maximum. Cloudiness increases to a maximum at most locations by the end of the northeast monsoon. The spring transition season is characterized by an increase in frequency and amounts of precipitation, except in the south where the frequency actually decreases somewhat. Early in this season, cloudiness is at or near the maximum at most stations, decreasing through the season; late in the season, cloudiness reaches the minimum over the southern part of the country. Although temperatures in general are not as high as during the southwest monsoon season, in most localities this is the season having the highest maximum temperatures on record, an indication of the monsoonal nature of the climate. Climatic changes are more rapid during the autumn transition season than during the spring transition. The autumn transition is characterized by decreasing precipitation amounts and frequencies in the northern part of the country and by the greatest amounts and highest frequencies of the year in the southern part. This is also the season of minimum cloudiness and lowest humidities in the north. Temperatures decrease everywhere as the southwest monsoon is replaced by the rapidly advancing northeast monsoon. At times during this season, North Vietnam is invaded by typhoons entering the Gulf of Tonkin, with resultant widespread destruction from heavy precipitation, high winds, and wave action along the coasts.

North Vietnam can be divided into two rather distinct climatic regions for discussion purposes. Although variations, both in area and time, exist in the behavior patterns of the meteorological elements, none are equal in magnitude or effect to those of the precipitation regime, and it is on this basis, therefore, that the country is divided into two discussion regions. Pertinent variations in the other elements, generally resulting from differences in elevation and exposure, will be discussed and explained where necessary. That part of the country having a coastline oriented northeast - southwest and hereafter referred to as the Northern Region has its maximum rainfall in July and August. The remainder, with a coastline oriented approximately northwest - southeast and hereafter referred to as the Southern Region, has its rainfall maximum in September and October. The approximate boundry between these two discussion regions runs from Thanh Hoa on the coast west to the Laotian border. This boundary represents a zone of transition rather than an abrupt change.

I. CLIMATIC CONDITIONS

1. Climatic Controls

The climate of North Vietnam is essentially controlled by the positions of the large semipermanent high-pressure and low-pressure centers in the temperate regions of the Northern and Southern Hemispheres, the topography in and around North Vietnam, and its location with respect to both latitude and warm oceanic waters. Transitory weather phenomena must also be considered among the climatic controls, although their influence on the climate is minor compared to that of the other three controls.

a. Circulation and Air Masses: The climate of North Vietnam is principally controlled by a circulation between the high-pressure and low-pressure centers of Asia, the North Pacific Ocean, Australia, and the Indian Ocean. From about mid-May to mid-September, air flows northeastward from the Southern Hemispheric highs across North Vietnam to the low-pressure area over interior Asia. From about mid-October to mid-March a reversal in pressure prevails, resulting in a flow of air southwestward across North Vietnam from the Siberian and North Pacific highs toward the equatorial low-pressure belt. The boundary zone between these flows is called the intertropical convergence zone (ITCZ). It migrates annually across the area during the short transitional seasons between the two flows. The characteristic features of each season are discussed individually in Section II.

b. Topographic Influences: Two major influences of topography are apparent in North Vietnam. The first is the influence of the low-lying delta regions, which allows the effects of high winds, storm tides, and river flooding to be easily felt. The other is the effect of the mountains, particularly the Annam Range, in blocking the moist flow of the southwest monsoon and in precipitating a great deal of the moisture contained in the northeast monsoon.

A large part of the delta region of the Red River is less than 10 feet in elevation. During times of strong southeasterly winds, storm tides resulting from typhoons in the Gulf of Tonkin, and flooding of the Red River, much of this land is apt to be inundated and surface movement of any type is practically impossible. Many natural and some artificial embankments confine the river to its course, but these are only effective during normal conditions. Any serious flooding by the river or strong storm tides would probably breech many of the levees and flood extensive portions of the region.

The effects of mountainous terrain are more widespread. The Annam Range lies almost perpendicular to the southwest monsoonal flow. As a result of this orientation, a great deal of the moisture contained in the flow is forced to precipitate on the windward slopes in neighboring Laos as the air rises to cross over the barrier. In consequence, the

rainfall received in North Vietnam is much less than would otherwise be felt during the southwest monsoon. Once the flow has crossed the barrier, it turns somewhat so as to approach the Northern Region from the southeast and, in doing so, regains some of its lost moisture in passing over the Gulf of Tonkin. As it passes over the delta regions and starts rising to flow over the higher lands in the interior, considerable precipitation results. This trajectory pattern accounts for the unexpectedly light precipitation during the southwest monsoon season in the Southern Region and the more substantial but seldom heavy accumulations received in the Northern Region; amounts are somewhat lower than those at comparable locations in areas to the west and south of North Vietnam. This same pattern of flow pouring down the leeward slopes of the Annam Range is also responsible for the hot dry winds occasionally experienced along the coastal plains of the Southern Region during the southwest monsoon.

When this flow pattern is reversed during the northeast monsoon, the slopes of the Annam Range cause a great deal of the moisture to precipitate over the Southern Region. This is particularly true during the autumn transition and in the early part of the northeast monsoon season. The northeasterly flow, impinging upon the mountain slopes, together with the effect of typhoons, causes this region to receive its maximum rainfall during September and October.

The deeply entrenched river valleys of the Northern Region produce a channeling effect on surface winds whenever the valley orientation is approximately that of the airflow. On the other hand, if valley orientations are nearly perpendicular to the airflow, or should the flow be extremely weak, the valley provides a sheltered location in which fog forms quite easily. This fog formation is quite frequently augmented by cold air drainage from the surrounding mountains.

c. Latitude and Oceanic Influences: The latitudinal position of North Vietnam, extending from about 17°N to 23°N, results in strong solar heating most of the year. Thus, temperatures remain high throughout the year except in December, January, and February. During these three months, temperatures at low levels are comfortable but at high levels are cool. In addition to heating from the sun, nearby oceanic waters also help maintain relatively high temperatures by warming and adding moisture to the flow.

d. Transitory Weather Phenomena: North Vietnam is situated too far south to be affected by the usual type of cyclonic storm and attendant frontal activity that characterizes much of the weather of temperate latitudes, but is affected on occasion during the monsoons by increases in the strength of the flow.

North Vietnam is affected at times by weak tropical disturbances moving in a general westerly direction. Their passage is not marked by any distinct weather phenomena. They may, however, bring a temporary interruption to the existing wind pattern and cause an increase in cloudiness and precipitation. Statistics on the frequency of occurrence of these westerly moving disturbances are not available. Since they usually occur near the ICZ, the relative occurrance of such disturbances over North Vietnam can be obtained by observing the activity of that zone. In this part of the world the ICZ varies from about 10°S. to 26°N. From November through April the ICZ is south of the Equator. It passes over North Vietnam generally in early May in its northward advance. Disturbances moving westward along the ICZ in this season may occasionally influence the country, particularly the northern mountains. During the height of the southwest monsoon, the ICZ moves northward into China and becomes indistinguishable; however, tropical disturbances moving westward across the South China Sea occasionally affect North Vietnam. During the autumn transition, the ICZ moves southward and the usual track of these westward moving disturbances moves with it. Their passage across North Vietnam is a typical feature of this season, resulting at times in extremely heavy shower activity. The ICZ continues to move southward; by mid-October it is south of the area and disturbances cease to affect the country.

2. General Weather Phenomena

a. Temperature: North Vietnam has moderately high surface temperature the year round at all but higher elevations. Recorded mean annual temperatures range from 70°F at Son La in the northern mountains to 78°F at Dong Hoi on the coast in the southern part of the country. Mean daily maximums and minimums range from a daily minimum of 50°F at Son La and Lang Son in January to a daily maximum of 94°F during the southwest monsoon at Ha Giang, Dong Hoi, and Vinh. Observed absolute extremes have varied from 29°F at Lao Kay to 109°F at Hanoi and Lao Kay. The range in mean temperatures from the coldest month, January, to the warmest month, usually June or July, is 18° to 25°F over most of the country. Average daily ranges in temperature vary from 7° at Gow Tow to 27° at Son La. Daily ranges in temperature at most locations are greatest in the relatively cloud free months of October and November, and minimum daily ranges are associated with crachin occurrences.

In a region with such varied topography and ground cover as North Vietnam, it should be remembered that large microclimatic variations in temperatures exist. The temperatures used in this study were observed over areas free of vegetation, in accordance with standard meteorological practices. A leaf canopy such as that encountered in the tropical rain forests would alter the surface temperature considerably from that observed over the open ground. In such

circumstances, maximum temperatures occurring below a vegetation canopy are less and minimum temperatures are higher than those observed in open areas or immediately above the canopy. Unfortunately, insufficient data on the many factors involved preclude any quantitative statement on this effect at any given locale in North Vietnam; however, the variations resulting from forest cover should be recognized and taken into account when planning operations in which local temperature variations may have a strong effect.

In open areas on still nights, particularly during the colder months, cold air has a tendency to collect in sinkholes or small narrow ravines, resulting in an appreciable temperature difference within the space of a few feet. Standard temperature records seldom indicate such areas; however, they can frequently be recognized by the tendency for ground fog to form earlier in them than over the surrounding ground. Knowledge of such an effect can be used to promote personnel comfort when pitching tents or delineating sleeping areas.

There is a rather uniform decrease in temperatures with altitude over all of North Vietnam. Little temperature data are available from elevations exceeding 1,000 feet, but existing data substantially verify the general meteorological assumption that temperatures decrease at an approximate rate of 3.3 Fahrenheit degrees for every 1,000 feet in the lower atmosphere. Employing this assumption, lowest temperatures at any given time in North Vietnam would be found at the higher elevations in the northern and western parts of the country with extremes at most locations probably no lower than 15° below those reported at Son La.

b. Relative Humidity: Mean relative humidities are comparatively high in all seasons. The highest humidities occur in December through April at most locations influenced by the crachin; the high humidities are associated with this phenomenon. At locations in the northern and northwestern mountains less subject to the influence of the crachin, the year's highest mean monthly humidities are associated with the southwest monsoon. In the mountains of the Northern Region, the lowest mean humidities occur in the spring transition season, but elsewhere in this region, they generally occur in October and November with the relatively cloud free skies of that period. In the Southern Region, June is the month of lowest humidities, probably because of recurring "winds of Laos."

The small amount of data available for analysis of diurnal trends indicates that, at any time of year, the highest relative humidities occur in the early morning hours, when convective activity is at a minimum and the atmosphere tends to stratify with relatively cooler air in the lowest layers. Mid-afternoon tends to be the period of minimum humidity, probably as a result of the convective mixing which carries a great deal of the moisture aloft as well as from the normal increase in afternoon temperatures. The magnitude of the range between the daily maximum and daily minimum is approximately 15% to 20%, with

smallest ranges near or on the coast and offshore islands. Relative humidities would be higher in local showers and thunderstorms and at higher elevations shrouded by cloud. In forests, where wind speeds are restricted and temperature maximums subdued relative to those at the treetops or over open ground, higher relative humidities should also be expected.

c. Precipitation: Precipitation over North Vietnam is relatively abundant and has definite seasonal variation, which is more pronounced in some localities than in others. In the Northern Region, approximately 65% of the yearly rainfall occurs during the southwest monsoon, about 15% during the northeast monsoon, and the remainder during the two transitional seasons. In the Southern Region, approximately 40% of the annual precipitation occurs during the southwest monsoon, 35% during the northeast monsoon, and the greater part of the remaining 25% during the autumn transition.

The areal distribution of precipitation is not entirely clear because of the limited number of stations for which data are available. However, average amounts appear to be heaviest on the lower slopes of mountains facing to the south or east. Of the low-level stations, those on terrain open to the sea almost always have higher average amounts than those in mountain valleys. This is partially a result of the high but rather frequent precipitation received with crachin spells at the more open locations, compared to the relative dryness of the northeast monsoon at stations located in the mountainous interior and highlands. The Southern Region stations receive annual amounts slightly above those of most of the Northern Region stations because of topographic effects during the northeast monsoon as well as the influence of typhoons in the Gulf of Tonkin. The many variations in topography, as well as the convective nature of a great deal of the precipitation, result at times in appreciable variation in precipitation amounts over very short distances.

The principal factor affecting the amount of precipitation received is the exposure of the station. Other factors being equal, stations in sheltered valleys receive less rainfall than those in open areas. This is also true of most stations on leeward mountain slopes, except those at the very top which receive rainfall blown over the crest. Stations located on windward slopes and at the foot of windward slopes generally receive higher precipitation amounts than those on the surrounding plains areas. In general, there is an increase in precipitation amounts received with an increase in elevation; however, at some point, slightly above the usual level of the cloud bases producing the precipitation, amounts received gradually decrease to the crest. Unfortunately, there are an insufficient number of properly located rainfall stations in North Vietnam to accurately determine the altitude at which this decrease starts. Considering the usual level of the cloud bases over North Vietnam, the reversal appears to take place somewhere between 3,000 and 5,000 feet.

Mean annual rainfall varies from 55 inches at Moc Chau to 128 inches at Tam Dao. However, the majority of stations in the Northern Region record annual amounts ranging from 55 to 80 inches; 70 to 90 inches is usually recorded in the Southern Region. In general, the largest amounts are found at elevations above 2,000 feet open to the sea, and the least amounts are found in interior valleys sheltered from the direct impact of the rainbearing winds.

Data used were taken from the records of every reliable station taking precipitation observations at the present time or in the past. Unfortunately, the great majority of these stations are in river valleys at elevations below 2,000 feet. Since a great deal of the terrain in North Vietnam is above 2,000 feet, care should be used in applying generalizations made here to the higher elevations.

Variations in monthly amounts from one year to the next are considerable and often exceed the range from the wettest to the driest month. An annual total as high as 216 inches has been recorded at one station, while an annual total as low as 30 inches has been recorded at another.

Precipitation occurs almost exclusively as rainfall during most of the year except in crachin spells when it occurs chiefly as drizzle. Although snow is a possibility at higher elevations in the northern mountains and highlands, the fact that the coldest temperatures usually occur during relatively dry periods makes the probability of snow rather small. On occasion, hail at the surface occurs with a thunderstorm but reports of this phenomenon are rather rare. Precipitation occurs most frequently during the southwest monsoon in the Northern Region and during the autumn transition in the Southern Region. The greater part of the precipitation which occurs over North Vietnam occurs in the form of heavy showers, resulting from the southwest monsoon or the influence of a typhoon or tropical disturbance. Such showers are generally heavy in amount but of rather short duration at any given locality. In contrast, from December through early April a great deal of the precipitation is light and protracted, and occurs as drizzle accompanying the crachin. This contrast is quite well seen at Hanoi, where precipitation is received on an average of 53 days in the period June through August as compared to an average of 40 days for the period January through March, a ratio of about 1.3 to 1. In comparing amounts of precipitation received during these periods, however, we find that 33.9 inches fell in June through August as compared to 3.9 inches for January through March, a ratio of about 9 to 1. Expressed in another manner, an average rainy day during June through August at Hanoi would produce about 7 times as much rain as an average rainy day in January through March.

d. Thunderstorms: Thunderstorms are principally the result of local convective instability and are seldom associated with squall lines. They are therefore mainly afternoon phenomena. Conditions favorable for their development appear during the spring transition season when the lower layers of air become warm more quickly than the upper layers and the air becomes convectively unstable. The air remains unstable throughout the southwest monsoon, with frequent afternoon thunderstorm activity. The turbulence that attends thunderstorms varies from light to severe. During the morning light turbulence begins near the surface as the ground becomes warmed. This turbulence gradually extends upward and becomes moderate by noontime, when cumulus clouds dot the sky. On many occasions the convective activity culminates in thunderstorms, with cumulonimbus clouds frequently extending above 30,000 feet. Although the storms are generally local in character, the attendant turbulence is often severe.

e. Cloudiness: Mean cloudiness is high throughout the year. Cloud data indicate an annual mean cloud amount of about 72% over North Vietnam as a whole. As a general rule, cloudiness is most extensive near the coasts and least in the northern and northwestern parts of the country. The two major flows which dominate the climate of North Vietnam have widely varying histories, one having spent the greater part of its trajectory over warm water and the other partially over a dry cold land mass and partially over the cold coastal waters of the China coast. Together with the blocking influence of the Annam Range this results, at times, in marked variation in cloudiness over North Vietnam. The last half of the northeast monsoon and the beginning of the spring transition season are the cloudiest periods, the autumn transition and early part of the northeast monsoon the least cloudy. Over the country as a whole, mean cloud amounts range from approximately 60% to about 80%, giving a variation of only about 20%. Individual stations may depart from this figure considerably; for instance, Son La has a variation of 41% and Phu Lien a variation of 32%. In general, aircraft flying at high altitudes over North Vietnam would be most apt to encounter undercast conditions during the period January through April and scattered or clear conditions during the period September through November.

f. Visibility: In general, surface visibility is fairly good during most of the year except from mid-December through April, when frequent crachin spells cause a prevalence of low visibilities. In some deeper valleys morning fog may be present the year round with considerable amount even in afternoons. Data used in this report are visibilities observed on the ground. Surface data do not always adequately describe air-to-ground visibility conditions; for example, during periods of fog or low haze layers, prominent objects may project above the obstructions and permit identification from the air. On the other hand, a high haze layer may reduce air-to-ground visibility without noticeably affecting the surface visibility.

g. Combined Ceiling and Visibility: For many air-to-ground operations, particularly landings and takeoffs, the distribution and frequency of certain ceiling and visibility criteria are of major importance. Reliable data of this type for many locations in North Vietnam are not available. Unfavorable conditions everywhere exist most frequently in the early morning hours when visibility is reduced below 2½ miles by fog. In some of the deeper river valleys in the northern mountains, such unfavorable conditions may occur on as many as 90% of the mornings during the latter half of the northeast monsoon season; however, 40% to 50% is probably more representative of the delta regions and coastal plains. In the extreme northwestern part of the country, out of the river valleys, unfavorable conditions may not exist at all during the northeast monsoon. Favorable conditions become more frequent everywhere as the day progresses, and generally, the most favorable time of day is between 1300 and 1600. After sunset, surface visibilities generally deteriorate, with a resulting increase in unfavorable conditions. Seasonally, the southwest monsoon season has the highest frequency of favorable conditions in most locations. The latter half of the northeast monsoon has the lowest frequency because of the crachin.

h. Surface Winds: Two major factors control the surface winds of North Vietnam, the monsoonal airflows and the predominantly hilly or mountainous terrain. In general, surface wind directions reflect which monsoon is dominating the country although frequent exceptions brought about by terrain configuration do occur. Wind speeds exceeding 16 knots occur about 4% to 5% of the time in each season and are confined chiefly to the coastal areas and islands just offshore. Speeds exceeding 30 knots are rare and experienced chiefly in the latter part of the southwest monsoon and early autumn transition seasons, probably in connection with typhoons or other tropical disturbances. It should be borne in mind that speeds in these categories may occur but go unrecorded; a wind speed briefly exceeding 50 knots occurring with a violent thunderstorm would not be unusual. Also to be considered is the effect of vegetation on surface winds. Winds used in this report are taken from observations recorded in clear or open areas. Forest cover, which is present over a large part of North Vietnam, exerts a marked influence on wind speeds. The wind, in penetrating the forest crown, has its speed drastically reduced, sometimes by as much as two-thirds of its original value. Beneath the crown, there is little change in speed, except another slight reduction in the first few feet above the forest floor. The overall reduction is far greater during the period when the leaves are unfolded than when the trees are bare; however, even during leafless periods there is a noticeable reduction in speed between that registered just above the tops and that at the level of the forest floor. It is quite probable that, except for a narrow border near clearings, wind speeds at ground level in the denser forest regions never exceed 5 knots.

A large percentage of the reported observations show calm conditions. At the major reporting stations calms are observed from 5% to 45% of the time, the higher frequencies being reported from the inland stations. There is a large diurnal variation in wind speed, particularly at locations in the highlands and river valleys in the northern mountains. At stations such as Lao Kay and Cao Bang, calms are reported on 85% to 95% of the observations taken at 0700 LST. During the afternoons there is a general increase in wind speeds at most locations with a resultant decrease in the frequency of calm conditions reported. Toward evening, speeds again decrease as daytime convective activity subsides. Generally, the diurnal range in speeds becomes smaller closer to the Gulf of Tonkin. Extreme speeds are usually associated with thunderstorms, squall lines, and typhoons. Although winds exceeding 25 knots have occurred during the autumn transition season.

i. Low-Level Temperature Inversions: The most important low-level inversion in North Vietnam is that which results in the crachin. A deep, widespread, and persistent inversion results from cooling of the lower layers of the northeast monsoon flow by the cold offshore waters over which it passes. This inversion, most prevalent in December through April, may reach thicknesses of 6,000 feet, and is characterized by stratus cloud, drizzle, and fog below the inversion and by clear skies above. A more complete discussion of the crachin is given in paragraph 3c of section I.

No data are available on local low-level temperature inversions; however, some general remarks can be made. In view of the absence of strong winds, particularly at night, and the prevalence of a high frequency of calm conditions between midnight and 0900 LST, local ground inversions may be expected frequently over all of North Vietnam except on mountain slopes and peaks and in the immediate vicinity of the coast. Ground inversions are probably strongest and most frequent in the deeper northern valleys during the autumn transition and first half of the northeast monsoon. This type of inversion is formed as a result of nocturnal cooling of the ground surface, and it is generally destroyed by solar heating after sunrise; however, in deep valleys it may persist throughout the day. It seldom exists with any appreciable wind speed, and its strength is noticeably reduced by any type of higher cover such as an overcast sky or forest canopy.

Another type of low-level inversion which might be found frequently in North Vietnam is that created by a leaf canopy. In dense forest areas, the crown of leaves created by the treetops acts as a ground surface to the incoming radiation of the sun and the temperature is actually several degrees higher at treetop level than on the forest floor during midafternoon. At night, a reversal takes place, with a maximum of radiational cooling taking place at the crown; quite frequently the minimum temperature at the treetop level is lower than that occurring at the ground level or in the free air above the tree canopy.

j. Low-Level Turbulence: Low-level turbulence is generally not as severe as that experienced at higher levels. Over North Vietnam, low-level turbulence from convective activity is apt to be found most often in the southwest monsoon and autumn transition seasons and least likely to be found during the latter half of the northeast monsoon. Occurrences of severe low-level convective turbulence are rather frequent in the ICZ in April and May and in typhoons. At other times, except in severe down-drafts near the bases of isolated thunderstorms, low-level convective turbulence severe enough to interfere with aircraft operations is rather rare. Mechnical turbulence, created by strong windflow over uneven terrain, may be expected and varies with the unevenness of the terrain and the speed of the flow. Minimum low-level turbulence may be expected in all seasons between sunset and sunrise.

k. Upper-Air Winds: In general, during the southwest monsoon the upper winds over North Vietnam show a strong southwesterly flow at low levels overridden by an easterly flow farther aloft, and during the northeast monsoon the low-level flow is northeasterly or easterly, with an overriding westerly flow higher aloft. Upper winds are discussed further in paragraphs 1h, 2h, 3h and 4h of section II.

l. Upper-Air Temperatures and Aircraft Icing: Over the Southern Region the mean height of the freezing level, ranges from 15,000 to 17,500 feet with an annual average of 16,000 feet. Over the Northern Region, however, the height of the freezing level is 1,000 or 2,000 feet lower, and may drop as low as 8,000 feet in January and February. The -20°C isotherm is found at an altitude of 25,000 to 30,000 feet above sea level. The greatest danger from icing to aircraft would be found between these temperature limits, in a layer of air approximately 10,000 feet thick immediately above the freezing level. Any aircraft meeting or caught in icing conditions can usually avoid them by flying lower or higher.

Absolute minimum surface temperatures below freezing have been at higher elevations in the Northern Region; however, in most cases, this is probably the result of a nocturnal ground inversion rather than a lowering of the freezing level to the extent that it intersects the surface. Under such inversion conditions, temperatures encountered with increasing altitude at first remain constant or increase in the lowest atmospheric layers and then decrease to the tropopause. Normally, the temperature aloft over North Vietnam decreases with altitude to the tropopause located at an altitude ranging from 55,000 to 60,000 feet.

Icing is not possible without moisture. Therefore aircraft icing is most likely to be encountered from May through September. At this time, abundant moisture in cloud form is available for icing. The dense masses of cumulus and cumulonimbus found in the afternoons and evenings should be regarded as highly potential areas of severe icing. Thunderstorms associated with the ICZ and heavy cloud concentrations associated with occasional typhoon activity should also be regarded as dangerous from the standpoint of heavy icing and hail.

When North Vietnam is under the influence of the northeast monsoon, vertical development of clouds is greatly reduced in comparison to that of the southwest monsoon. Clouds building to or above the freezing level are rare except in cases of isolated thunderstorms which can be easily circumnavigated. The great concentration of moisture associated with the crachin is generally well stratified and below the freezing level. For these reasons, the northeast monsoon season presents the least danger to aircraft operations with respect to icing.

3. Special Weather Phenomena

a. Typhoons: These storms, which are noted for their destructive effects, occur in the western parts of tropical seas, primarily from late July through early November in the Northern Hemisphere. The typhoons which affect North Vietnam are similar to the hurricanes which frequently strike the coasts of the southeastern United States. Either gusts or sustained wind speeds must equal or exceed 64 knots on the surface when the storm is classified as a typhoon. These storms enter North Vietnam from the South China Sea. Approximately 70% of the typhoons which affect this sea and North Vietnam originate in the Pacific Ocean east of the Philippines; the remainder originate over the South China Sea itself.

MAY
TRACKS OF TYPHOONS AFFECTING NORTH VIETNAM, 1947–1963

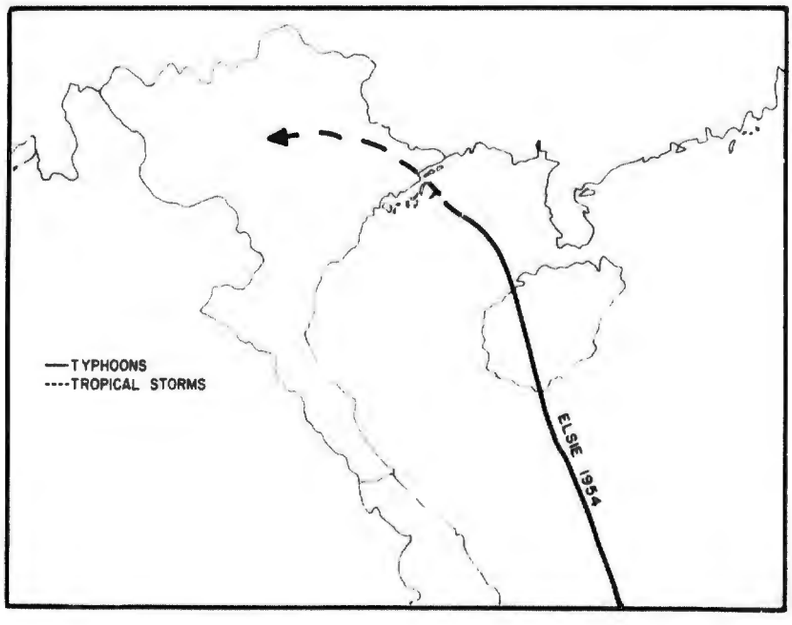


Fig. 3

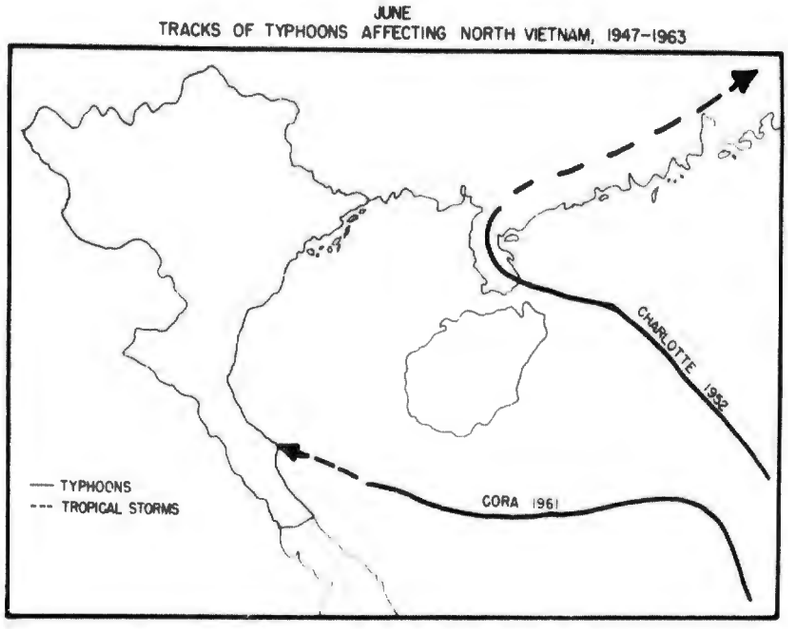

JUNE
TRACKS OF TYPHOONS AFFECTING NORTH VIETNAM, 1947-1963
CHARLOTTE 1952
CORA 1961
TYPHOONS
TROPICAL STORMS

Fig. 4

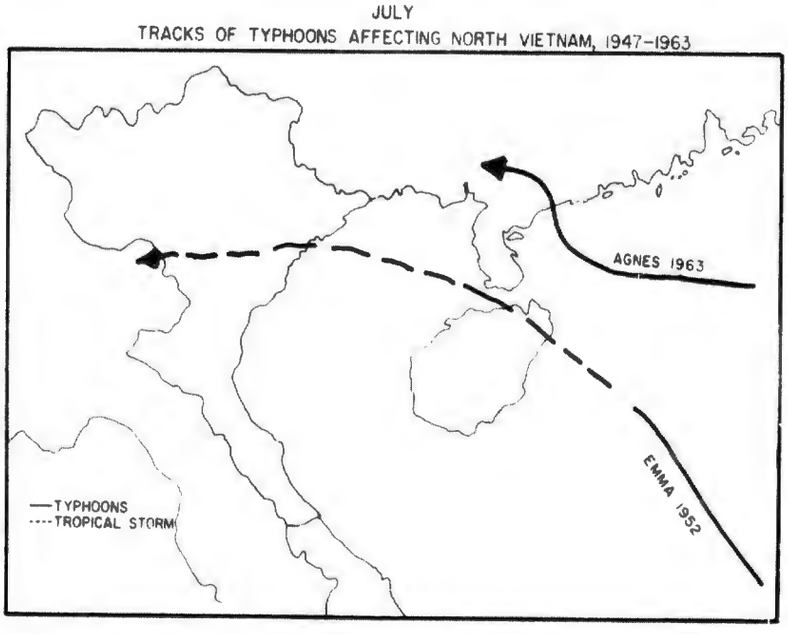

JULY
TRACKS OF TYPHOONS AFFECTING NORTH VIETNAM, 1947-1963
AGNES 1963
EMMA 1952
TYPHOONS
TROPICAL STORM

Fig. 5

AUGUST
TRACKS OF TYPHOONS AFFECTING NORTH VIETNAM, 1947–1963

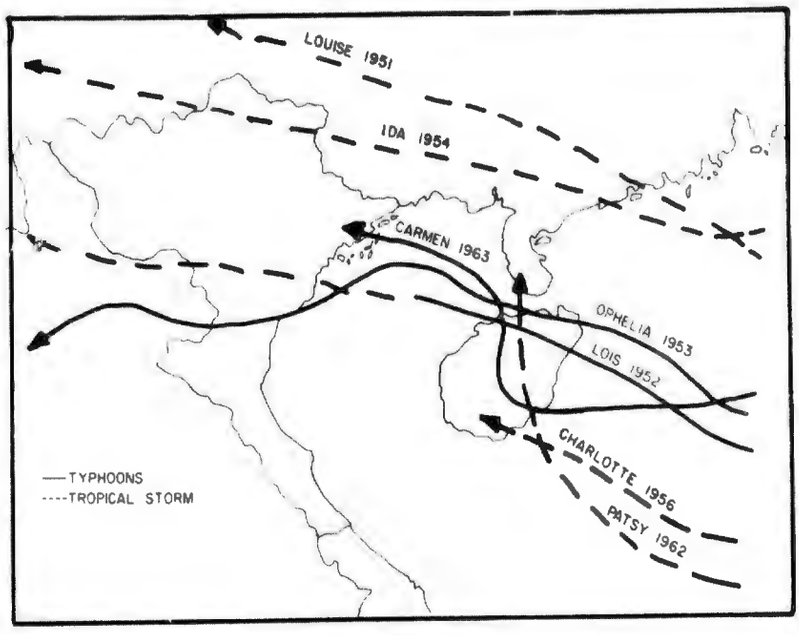


Fig. 6

SEPTEMBER
TRACKS OF TYPHOONS AFFECTING NORTH VIETNAM, 1947–1963

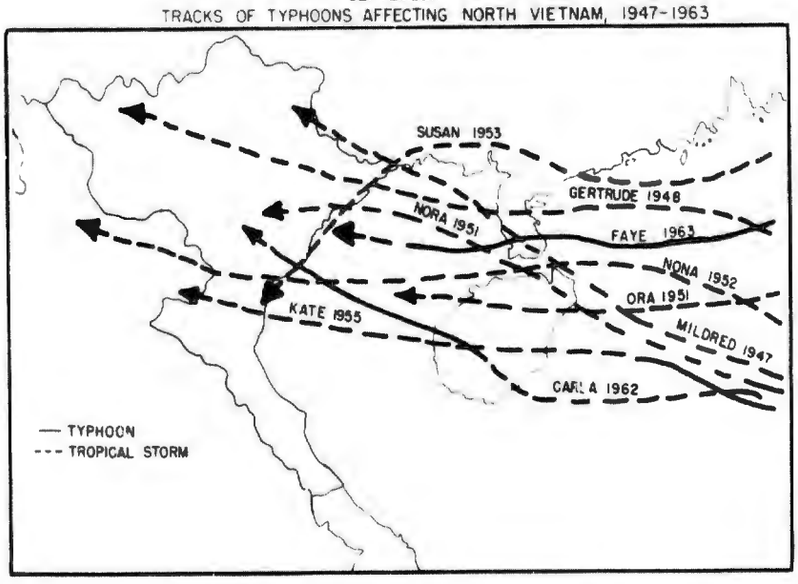


Fig. 7

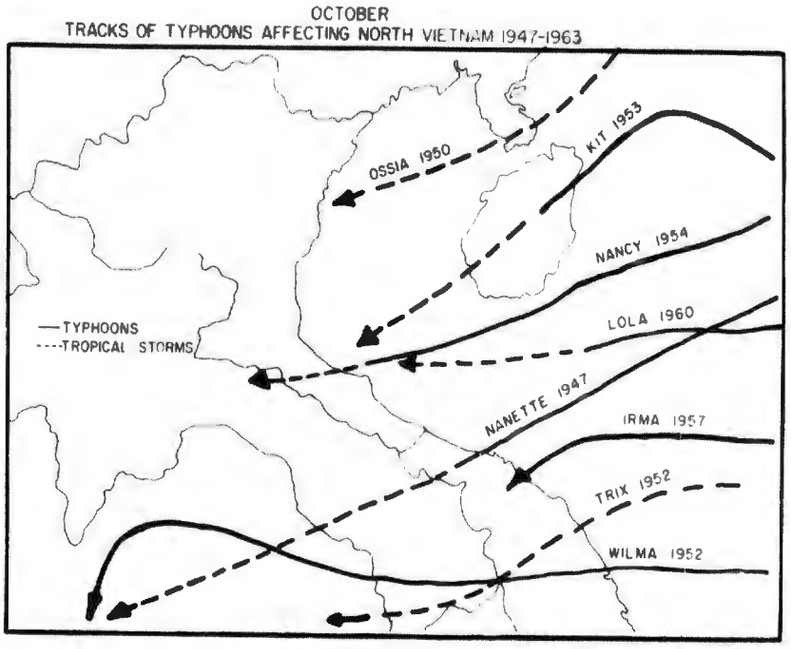

OCTOBER
TRACKS OF TYPHOONS AFFECTING NORTH VIETNAM 1947-1963
OSSIA 1950
KIT 1953
NANCY 1954
LOLA 1960
NANETTE 1947
IRMA 1957
TRIX 1952
WILMA 1952
—TYPHOONS
----TROPICAL STORMS

Fig. 8

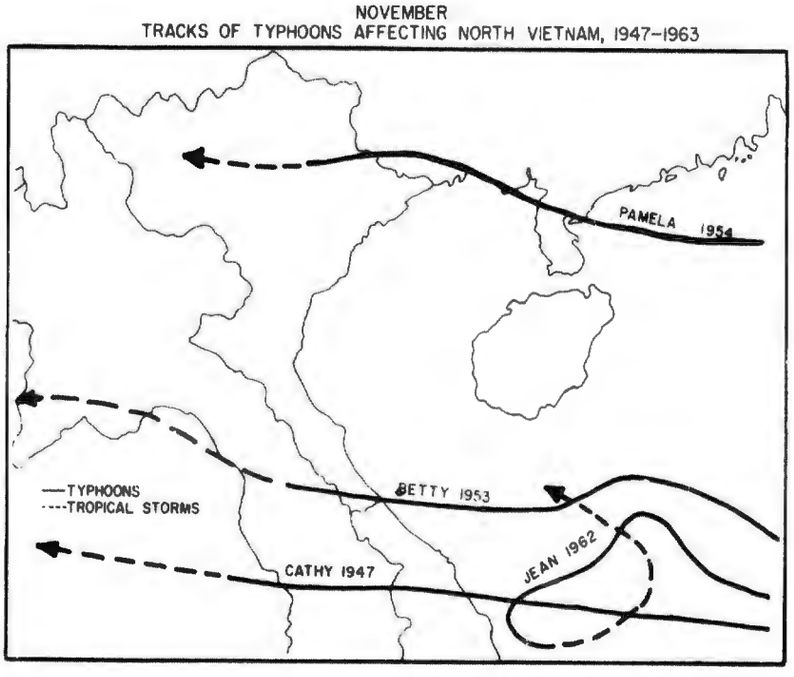

NOVEMBER
TRACKS OF TYPHOONS AFFECTING NORTH VIETNAM, 1947-1963
PAMELA 1954
BETTY 1953
JEAN 1962
CATHY 1947
—TYPHOONS
----TROPICAL STORMS

Fig. 9

Forty-seven centers entered the western portion of the South China Sea between 1947 and 1963. All forty seven centers entered from May through December and seventeen of them actually moved onshore into North Vietnam as typhoons or tropical storms, another five entered the coast as tropical depressions. August through early November are the months of maximum activity. There is little typhonic activity anywhere from January through March and during the remaining months the majority of the storms curve northward into Asia or pass to the south, across the southern tip of the Republic of Vietnam.

The formation and subsequent movement of typhoons is difficult to predict. Typical rates of movement for storms approaching North Vietnam from the east and southeast are 5 to 12 knots, though movement as rapid as 18 knots has been observed. More rapid movement is common after a storm begins to move to the north or east, and fast-moving storms in the northern Gulf of Tonkin may exceed 18 knots. Typhoons usually slow down and dissipate after moving inland and may affect the country for several days.

Typical wind velocities in a typhoon are about 25 knots at a distance of 150 miles from the storm center, 45 knots 50 miles from the center, and 65 knots or more 30 miles from the storm center. Within 100 miles of the storm center, dense nimbostratus and cumulonimbus clouds occur from near the surface to above 20,000 feet. Very heavy rain is characteristic of this area of the storm. A rising tide with heavy seas and swells causes severe flooding in the delta regions in advance of a typhoon and frequently drives ships aground. Rain may cause flooding over wide areas in the delta regions and coastal plains, strong winds often uproot trees and demolish buildings, and river channels are frequently shifted. Numerous deaths and extensive damage to crops and property often result from the passage of such a storm.

b. Crachin: The crachin is a prolonged period of widespread fog and drizzle or light rain which affects primarily the delta regions and coastal plains, although its influence occasionally is felt far into the highlands. The low-level stratus characteristic of the crachin is accompanied by prolonged precipitation, although amounts are generally small. The top of the stratus layer rarely extends above 6,000 feet, and clear dry air is usually found above. The clouds are generally 3,000 to 5,000 feet thick, with ceilings under 1,000 feet and frequently below 500 feet. In most cases visibility is quickly and greatly reduced at the onset of the crachin, generally below 2 miles and frequently below 1/2 mile.

Periods of crachin may first appear as early as November but usually do not become common until late December. They are most frequent in March and disappear by early May. Although the periods have been known to last 22 consecutive days, this phenomenon generally occurs in recurring periods of from 2 to 5 days each.

When, on occasion, a cold front penetrates as far south as North Vietnam, crachin conditions develop as a result of mixing at the frontal surface. The lifting of the warm air may result in precipitation and some lowering of visibility and cloud bases, but the effect is usually weak and of short duration.

The most important process by which the crachin develops is the cooling of a warm moist air mass at the surface. Two distinct meteorological situations result in this type of crachin. One situation, most common in late January and February, occurs when a high cell of polar continental air moves eastward off the Asian mainland. The air on the eastern side of this high moves southward over the warm waters south of Japan, then westward across the colder waters along the coast of China and North Vietnam. There, rapid cooling and turbulent mixing often result in crachin development. At first, a stratus layer forms beneath the inversion and then, as the moisture content of the incoming air steadily increases, stratus builds downward. Drizzle generally occurs and eventually sea fog may form. When the high becomes stationary south of Japan, an intense and persistent crachin develops which can only be dispersed by a fresh surge of the monsoon.

Becoming increasingly frequent in March and April is a second situation leading to crachin development from the cooling of warm moist air. As the semipermanent Siberian high decreases in intensity, the pressure gradient over the Asian land mass becomes flatter. If, during the time this slack gradient exists, a wedge of the North Pacific high extends across the Philippines to China, a flow of tropical maritime air is directed into the Asian coastal regions including the Gulf of Tonkin. The contrast in temperatures between this air and the coastal region is marked and crachin conditions generally result, frequently taking the form of dense sea fog.

Over land, marked diurnal variation of crachin conditions may occur. When the high center lies far to the east and the pressure gradient is slack, mechanical turbulence is insufficient to counteract the effect of increasing temperature during the day, and the stratus may be temporarily dissipated. The crachin is seldom observed more than 100 miles offshore, but when easterly winds are persistent and the terrain permits, the stratus may penetrate far up the river valleys into the interior.

c. Winds of Laos: In the extreme southern portion of the country a phenomenon known as "Winds of Laos" occurs during the southwest monsoon. These winds are foehn winds which originate on the high plateaus of Laos and the Annam Range and blow down the eastern slopes to the Gulf of Tonkin. They are hot and dry and sometimes blow rather strongly, causing extreme evaporation along their path.

MEAN & MAX NUMBER DAYS WITH CRACHIN WEATHER

* 0.5 day

Station		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann	Years Record
Gow Tow	Mean	6	5	8	4	1	0	0	0	0	0	2	7	33	6
	Max	8	8	19	14	4	0	0	0	0	0	9	17	67	
Haiphong	Mean	9	10	17	12	1	0	0	0	0	*	2	8	59	6
	Max	12	16	26	17	3	0	0	0	0	1	6	16	73	
Hanoi	Mean	11	12	19	13	1	*	0	*	0	1	3	8	68	6
	Max	18	20	23	20	3	1	0	1	0	3	9	17	98	
Mon Cay	Mean	11	12	16	12	*	0	0	0	0	1	5	8	65	6
	Max	16	18	25	19	1	0	0	0	0	2	13	21	100	
Nam Dinh	Mean	10	13	19	12	1	0	0	0	*	1	5	8	69	6
	Max	15	18	27	18	3	0	0	0	2	3	10	16	92	
Dong Hoi	Mean	9	9	10	4	0	0	0	0	0	1	7	8	48	6
	Max	17	18	16	9	0	0	0	0	0	1	14	17	74	

Fig. 10

d. Land and Sea Breezes: During the entire year, land and sea breezes are common along the delta regions and coastal plains. They are caused by the differential heating of land and water and generally influence an area approximately 10 miles on either side of the coastline. The sea breeze usually begins about 1000 LST, reaches a maximum in early afternoon, and ceases about sunset. During the late evening a land breeze develops and lasts until sunrise. The effect of land and sea breezes is most noticeable along those sections of coastline sheltered by the land configuration from the prevailing winds. In such places, the local wind may even reverse the prevailing flow at low levels. Land and sea breezes are at a minimum during the northeast monsoon and at a maximum during the southwest monsoon. Their influence seldom extends higher than the lower 3,000 feet of the atmosphere.

II. SEASONAL WEATHER

1. Northeast Monsoon Season

a. Synoptic Pattern: The airstreams that comprise the northeast monsoon originate in the intense, cold Siberian and the warm North Pacific highs. Early in this season the cold, dry polar continental (cP) air from the Siberian high flows southward, principally over land, toward the equatorial low-pressure belt. It is warmed somewhat in passing over China and also retains much of its dryness, so that it arrives over North Vietnam as a rather cool, dry air mass. Later in the season, as the Siberian high reaches maximum intensity, the trajectory of the cP air results in a longer sweep over the China Sea. It becomes warmer and more moist and merges with warm tropical air from the western Pacific high before reaching the area. In consequence, the air over North Vietnam during the second half of this season is quite moist in comparison with that of the first half. This distinction between airstream trajectories is important since it results in the frequent formation of extensive low cloudiness and drizzle, the crachin, during the latter half of the season. The northeasterly flow pattern which dominates North Vietnam from about mid-October to mid-March is the product of a dynamic balance between the semipermanent Siberian high, the semipermanent North Pacific high, and the permanent warm equatorial low-pressure belt. Variations in the intensity of one or more of these component pressure systems result in day-to-day variations in the strength and direction of this monsoonal flow as it affects North Vietnam. The flow pattern is developed to the fullest extent in December and January when the Siberian high has reached maximum development. This general pattern of airflow extends to about 5,000 feet; above this level the flow shifts to a westerly direction.

b. Temperatures: Mean temperatures decrease from the beginning of the year in January. Mean daily maximums at locations below 1,000 feet show a rather sharp decline between November and December, as the frequency of crachin weather increases. From December through the end of this season, mean daily maximums below 1,000 feet are mostly in the upper 60's and lower 70's. Minimums for the same period are about 10 to 15 Fahrenheit degrees lower. At slightly higher elevations or at locations where the crachin is frequently blocked out, such as Son La, mean daily maximum are in the lower 70's and minimums are near 50°F. At elevations higher than Son La, lower temperatures may be expected. Frost has never been reported; however, the absolute minimum temperature on record in North Vietnam is 29°F at Lao Kay, and since much of northern and western North Vietnam lies at altitudes higher than this station, frost undoubtedly does occur on the higher plateaus and mountain slopes.

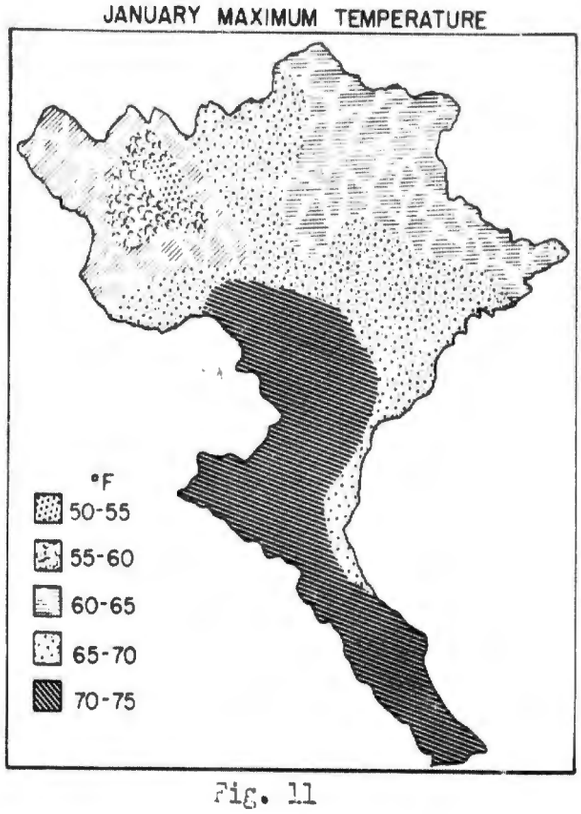


Fig. 11

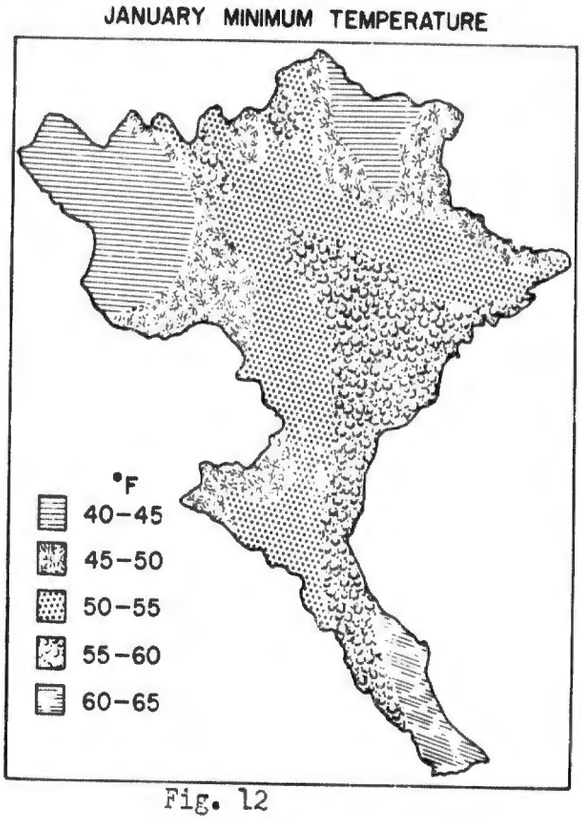


Fig. 12

c. Precipitation: The Northern Region receives about 15% of its annual precipitation during this season and the Southern Region about 35%. In the Northern Region, average totals for the period November through February are between 3 and 7 inches at most locations, although locations with certain types of exposure receive more than others. Locations experiencing the most rain in the Northern Region accumulate 9 to 11 inches during this period. In the Southern Region, average totals for November through February average 15 to 24 inches. Unlike the other seasons, most of the precipitation falling in this season, especially in the Northern Region, is in the form of drizzle, coming in protracted spells associated with the crachin. This "light but long" nature of the rainfall is well illustrated by the fact that most localities in the Northern Region affected by the crachin have rainfall on 24 to 40 days during November through February. In the Southern Region, rainfall occurs on 45 to 50 days during these months. Precipitation amounts of 1.2 inches or more in 1 day seldom occur in the Northern Region and only on about 5 days during these months in the Southern Region. The maximum 24-hour rainfall on record during this 4-month period in the Northern Region, 8.8 inches at Mon Cay in November, probably occurred with a typhoon passage. Most of the heaviest recorded 24-hour falls are below 3 inches. In the Southern Region 12.4 inches in 24 hours have occurred at Don Hoi in November; however, except during typhoon occurrences, less than 4 to 5 inches is to be expected.

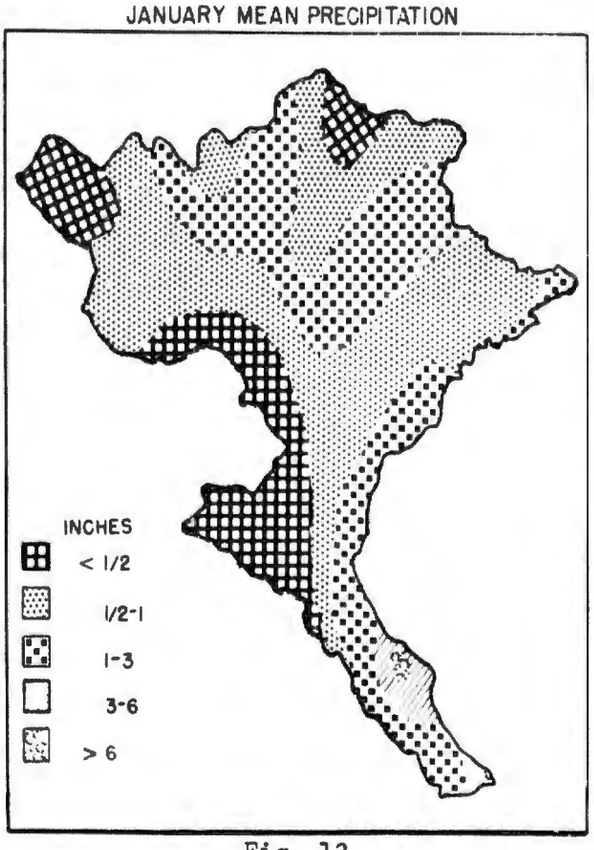


Fig. 13

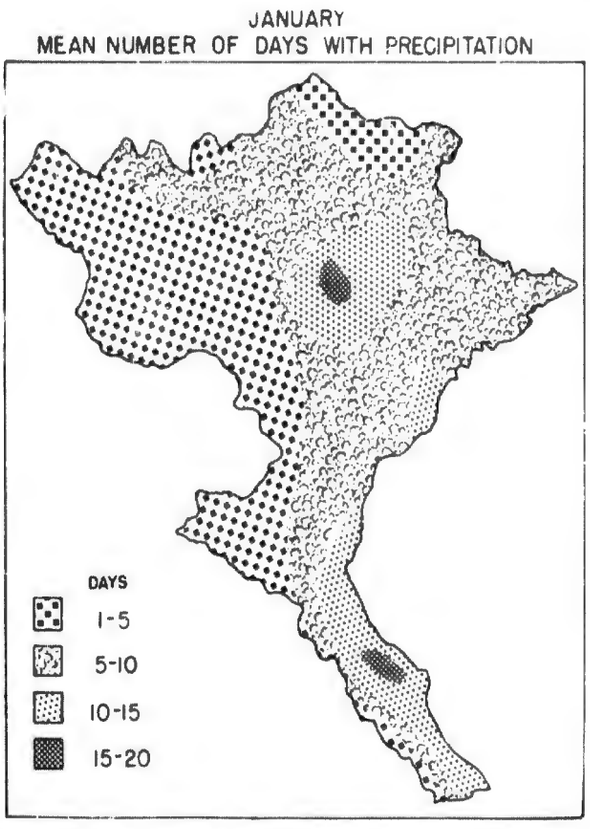


Fig. 14

d. Thunderstorms and Turbulence: Thunderstorm activity reaches a minimum during the northeast monsoon. From late October through early February thunderstorms are observed on an average of less than 1 day per month in late February and March thunderstorms are reported on 1 to 3 days. From November through early March, severe turbulence caused by convection probably does not occur over North Vietnam except in isolated thunderstorms. However, light to moderate turbulence should always be expected over the northern mountains and the Annam Range and in the shear zone between the northeasterly surface flow and the higher westerly flow.

e. Cloudiness and Ceilings: Until mid-December, the period of fair weather which began in the autumn transition continues over most of North Vietnam. Over the southern portion of the Southern Region; however, there is an increase in the frequency of cloud bases at low altitudes where the airflow impinges on the eastern slopes of the Annam Range. The early part of the northeast monsoon season is the cloudiest time of the year over the extreme southern portion of the country. Elsewhere, overall cloudiness shows a slight increase, but the frequency of cloud bases reported below 5,000 feet continues to decrease. A low cloud cover of 6-tenths or more is reported at Hanoi approximately 35% of the time during this season prior to late

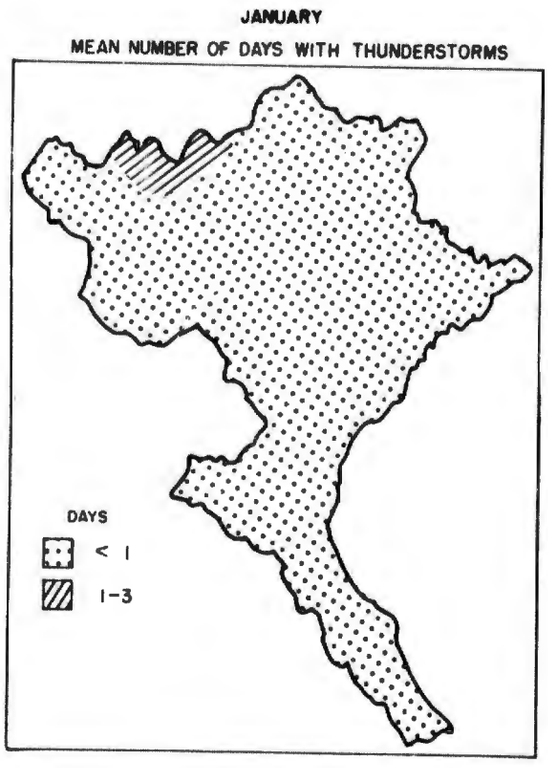


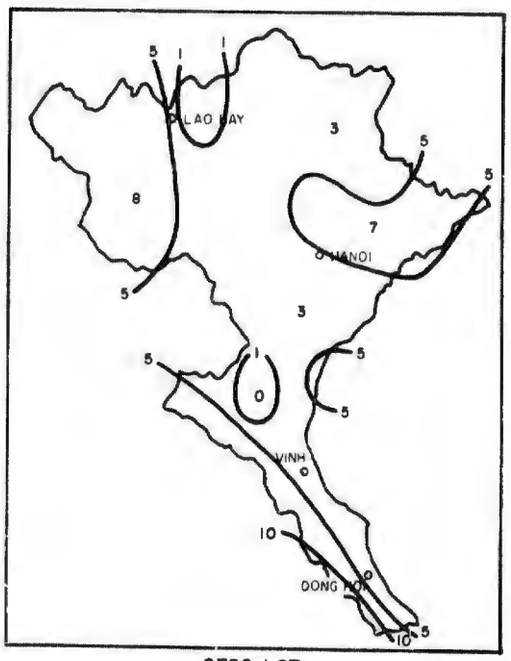
Fig. 15

December. Over the northwestern mountains and plateaus conditions average somewhat better, with a high frequency of clear mornings and of afternoons with scattered cumulus with bases between 2,000 and 3,000 feet. With respect to low cloudiness and ceilings, this early part of the northeast monsoon is the best part of the year for conducting most air-to-ground operations.

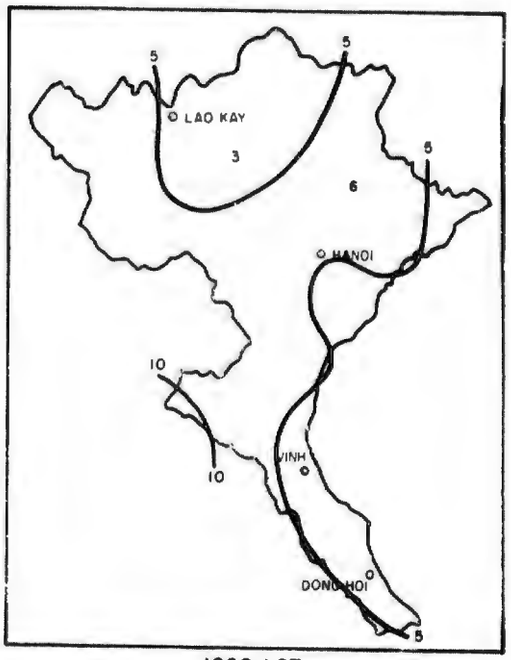
Throughout December there is a rapid increase in the frequency and amount of low cloud over most of North Vietnam as it comes under the influence of the crachin. This period of low, persistent overcasts lasts through the remainder of the northeast monsoon and into the spring transition. The bases of these clouds are frequently below 1,000 feet in the morning, lifting somewhat and amounts decreasing slightly in mid-afternoon and then increasing in amount and lowering again at night. On occasion, the bases may drop below 150 feet, particularly in the early morning hours. In the deeper river valleys

JANUARY

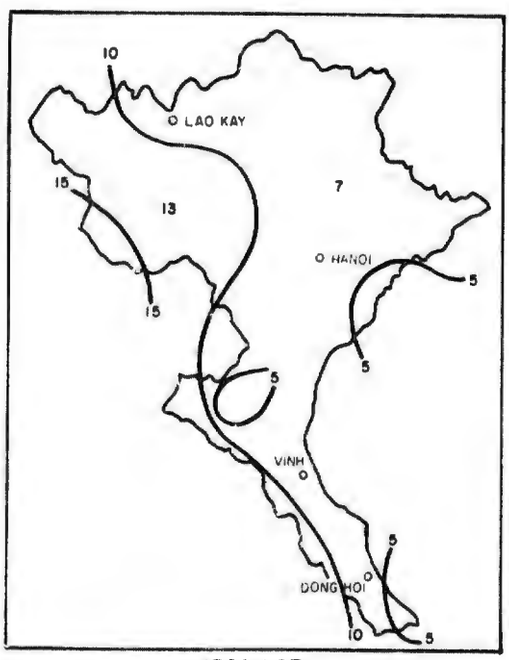
NUMBER OF DAYS WITH CLOUD COVER ≤3/10 AND VISIBILITY ≥2½ MILES



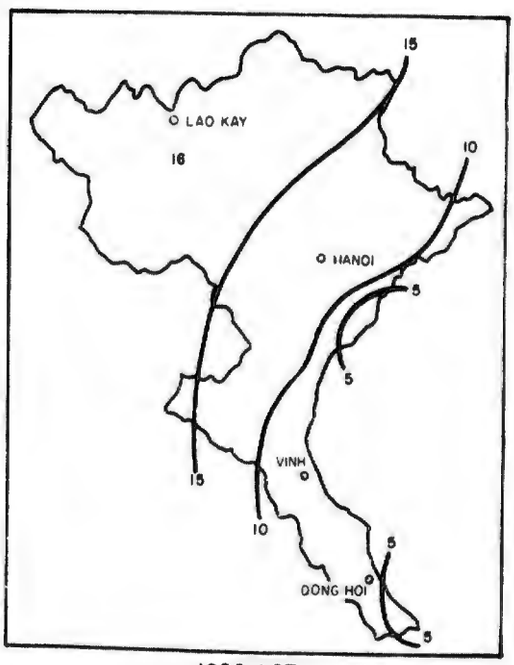
0700 LST



1000 LST



1300 LST



1600 LST

Fig. 16

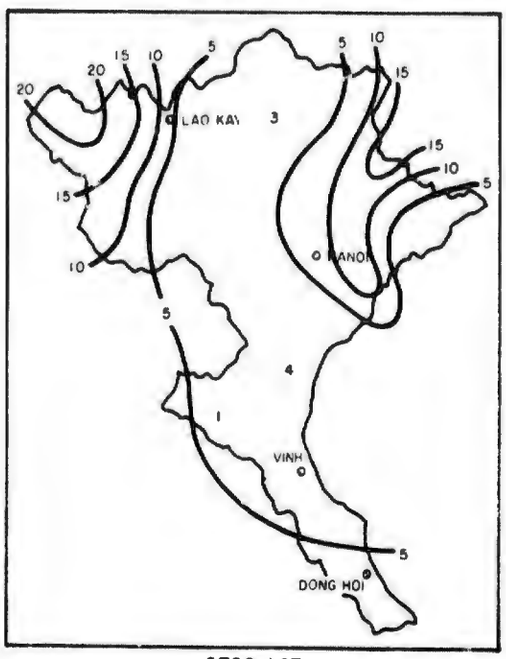
of the eastern highlands and northwestern mountains, there is a tendency in this season for low stratus to form over the rivers in the early morning hours, although it usually burns off by 0900 LST. However, this local stratus may at times, where the topography permits, be augmented by a crachin situation extending up the river valley, in which case such conditions may last all day. Lao Kay is an excellent example of a station with such conditions. In the extreme northwest near the Chinese border, where terrain is high enough to block the crachin, the fair conditions experienced earlier continue to the end of the season. With respect to amount and height of low cloudiness, this latter half of the northeast monsoon is the worst time of the year for conducting most air-to-ground operations over most of the Northern Region of North Vietnam, and conditions are only slightly better over the Southern Region. Cloud bases during this latter half of the season occur most frequently from 1,000 to 3,000 feet, but bases below 1,000 feet occur approximately 40% to 50% of the time in the early mornings. These clouds are generally 3,000 to 4,000 feet thick, and cloud tops occasionally reach 8,000 feet. Generally, clear skies prevail above this altitude.

f. Visibility: Surface visibilities show a continued deterioration during this season with a pronounced increase in low visibilities in late December as crachin occurrences become frequent. Visibilities in general tend to be somewhat lower in the Southern Region and in the deeper mountain valleys and plateaus of the Northern Region. In the Northern Region, because of the steadily decreasing low cloudiness, slant-range visibilities are probably fair to good during the early part of this season but become very poor after mid-December because of the crachin. In the more remote sections of the northern and northwestern mountains, where the crachin is blocked out, slant-range visibility is the best of the entire year. In the Southern Region, the increasing low cloud and low surface visibility would result in continuing poor air-to-ground visibilities throughout the season. From mid-December through early April in the delta regions, coastal plains, and highlands east of the Red River, the frequent and persistent low cloud, drizzle and low surface visibilities which blanket these sections would make air-to-ground operations frequently impossible if the operations depend on visual contact with the ground.

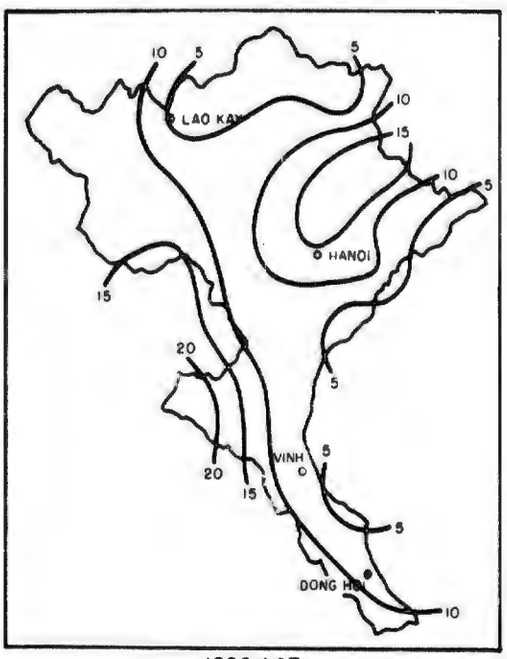
Diurnal changes in visibility are also marked in this season. As in other seasons, the deep river valleys in the northern parts of the country act as basins for nocturnal formation of fog and low stratus. There is also a nighttime maximum of fog and low stratified clouds over the coastal plains and delta regions. These clouds and fog tend to burn off somewhat as the day progresses, reaching minimum amounts by midafternoon; however, convective activity reaches a maximum at this time. As a result of these two trends, 0900 to 1100 LST is probably the best time of day for good slant-range visibilities and midafternoon the best regarding surface visibilities. In the evening,

JANUARY

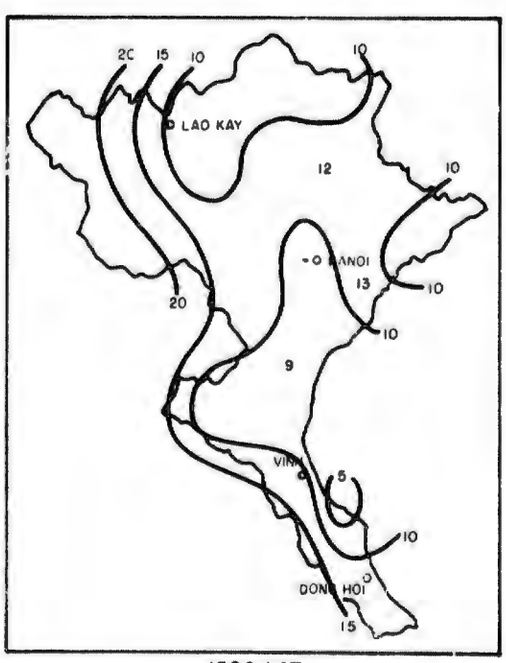
NUMBER OF DAYS WITH CEILINGS ≥5000 FT AND VISIBILITY ≥5 MILES



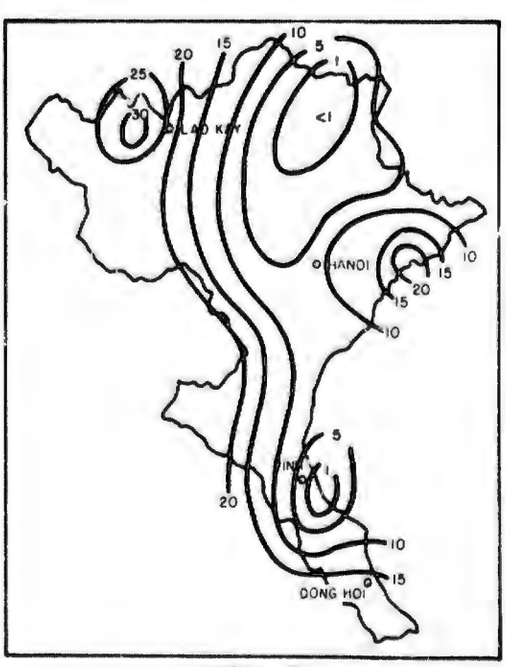
0700 LST



1000 LST



1300 LST

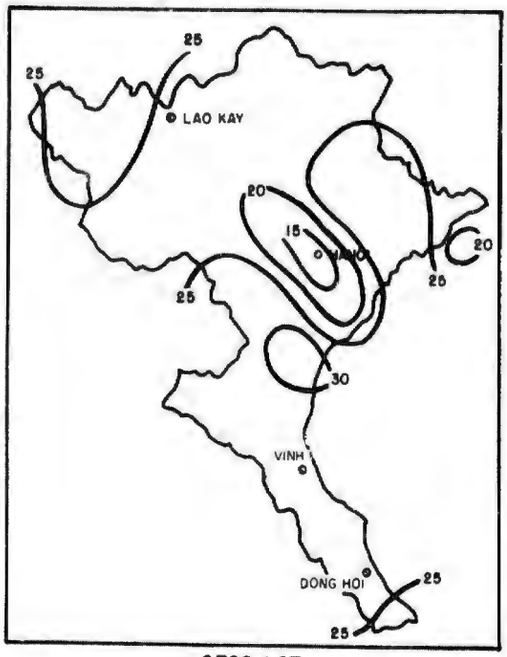


1600 LST

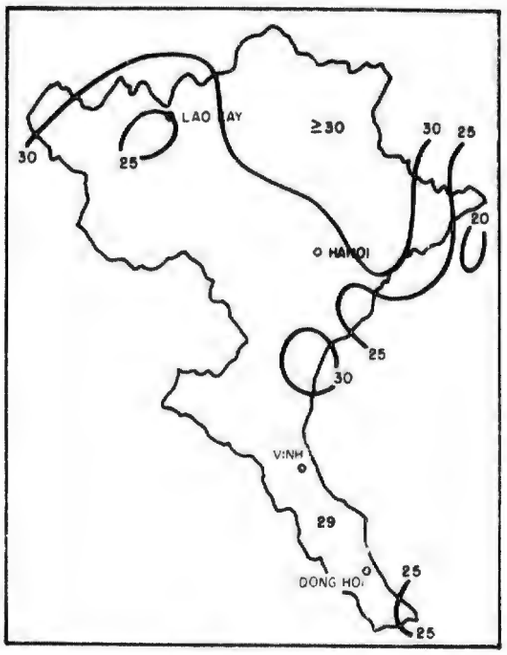
Fig. 17

JANUARY

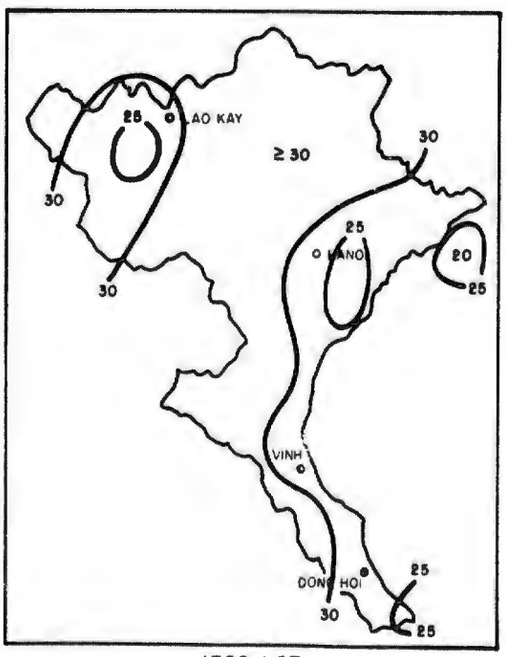
NUMBER OF DAYS WITH CEILINGS ≥1000FT AND VISIBILITY ≥2½ MILES



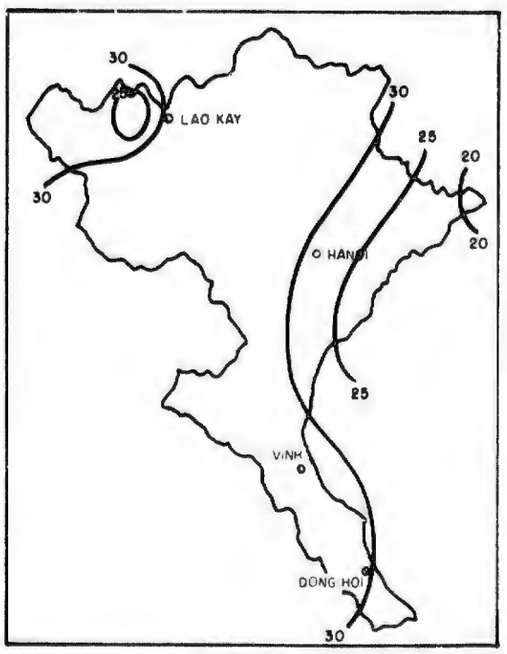
0700 LST



1000 LST



1300 LST



1600 LST

Fig. 18

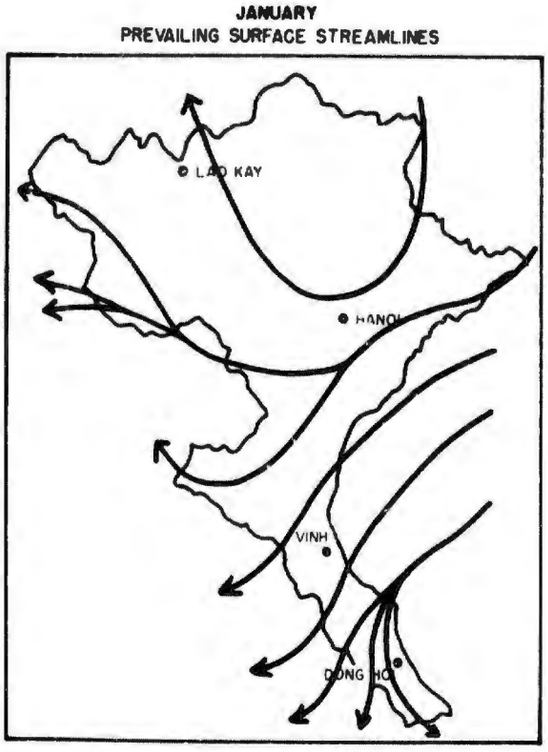


Fig. 19

prior to sunset, during the early part of the season, slant-range visibility improves slightly as cumulus activity decreases; however, after sunset, nocturnal cooling gives rise to lower surface visibilities and stratus formation, again lowering slant-range visibility. In the latter half of the season, crachin situations, which may have improved slightly during midafternoon, quickly deteriorate after 1700 LST and visibilities, both slant-range and surface, are poor throughout the night.

g. Surface Winds: With the passage of the ICZ and the onset of the northeast monsoon, surface winds over most of North Vietnam become predominantly northeasterly in direction, terrain permitting. At higher elevations in the northernmost part of the country, some mountain sections may show a predominance of westerly winds since the northeast monsoon is somewhat shallow and the upper westerlies may frequently reach to the surface at higher elevations. Speeds seldom exceed 16 knots except over the higher plateaus and mountaintops, along the immediate coast, and on islands lying just off the coast. There is, as in other seasons, a definite diurnal variation to the wind speed, with afternoons showing a maximum of speed in conjunction with increased convective activity. Mornings and evenings are usually calm, and nights are frequently calm or have very light drainage winds in the mountains and light land breezes near the coast.

h. Upper Winds: During the earlier part of this season the winds are predominantly easterly to 10,000 feet; however, by December and January a southwesterly stream penetrates as low as 5,000 feet over North Vietnam. The flow below this altitude, except where influenced by surface terrain, is easterly. In February the westerly current reaches its lowest point during this season when it penetrates as low as 4,000 feet. Wind speeds in the lower easterly airstream average between 10 and 15 knots. In the upper westerly airstream, speeds increase to the north. Wind speeds average between 30 and 70 knots, increasing with altitude until the jet stream is reached near 40,000 feet. Maximum winds in the jet stream over North Vietnam have run as high as 150 knots.

NORTHEAST MONSOON

MEAN UPPER WINDS, TEMPERATURES AND "D" VALUES

	NORTHERN REGION			SOUTHERN REGION		
	dd/ff	TT	"D" Value	dd/ff	TT	"D" Value
850 MB	177/5	11	262	144/4	13	266
700 MB	272/12	5	351	261/5	6	372
500 MB	260/32	-10	781	247/15	-8	837
300 MB	262/62	-33	1366	260/35	-31	1580
200 MB	254/72	-52	1843	238/42	-52	2014
150 MB	262/69	-68	1593	258/43	-70	1744
100 MB	268/50	-76	1155	272/29	-77	1267
50 MB	158/15	-68	-4	137/12	-68	29

Fig. 20

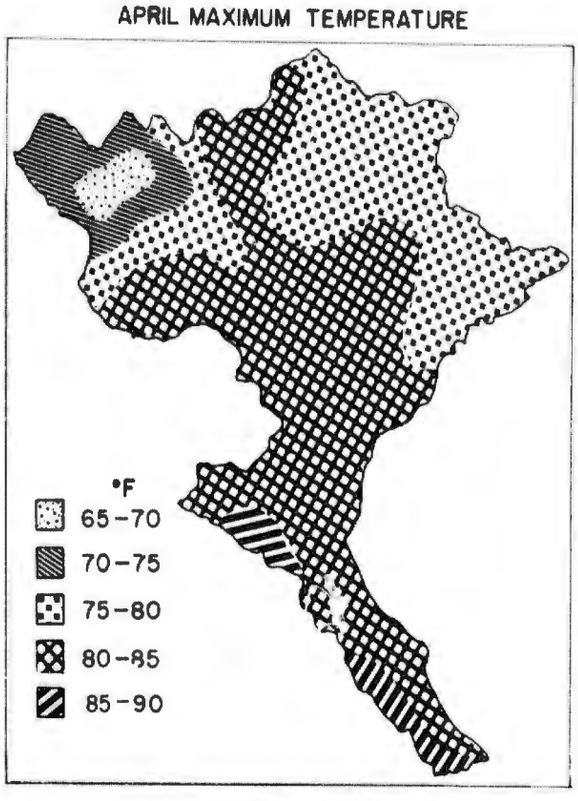


Fig. 21

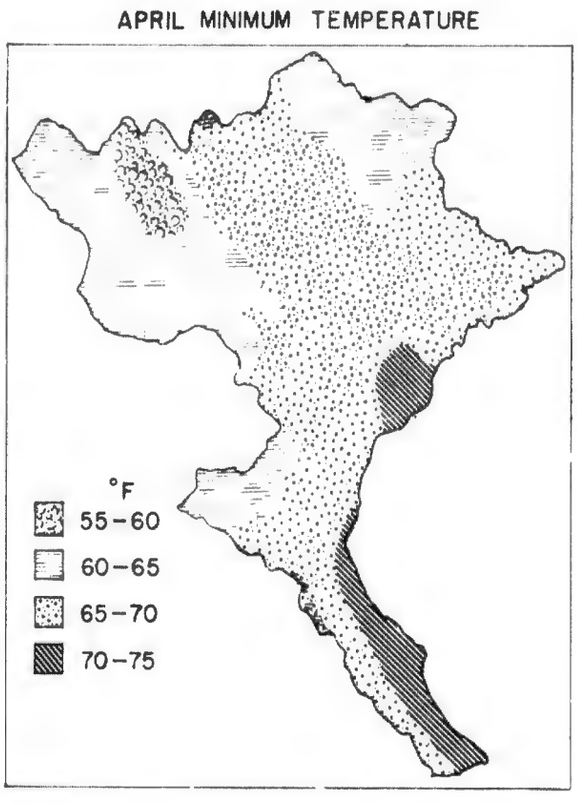


Fig. 22

2. Spring Transition Season

a. Synoptic Pattern: The spring transition, lasting somewhat longer than the autumn counterpart, usually begins in mid-March with the retreat of the northeast monsoon caused by the weakening of the Siberian high. Unlike the autumn transition, when one flow immediately replaces the other, there is, in the spring transition, a lag of three or four weeks during which the circulation over North Vietnam is rather weak. Near the end of the season, in early May, the ITCZ passes over the country on its northward migration, ushering in the southwest monsoon.

b. Temperatures: Temperatures throughout the country climb rather rapidly during the spring transition season as the frequency of crachin occurrences declines and the sun advances northward from the Equator. By the time of arrival of the southwest monsoon, mean daily temperatures are averaging only 2 to 3 Fahrenheit degrees below those at the height of the southwest monsoon. Absolute maximums have exceeded 100°F at practically every station by early May, and at many locations the record extreme has been recorded in this season. In comparison to the temperatures experienced in June and July, these relatively high temperatures in late spring are a reflection of the monsoonal nature

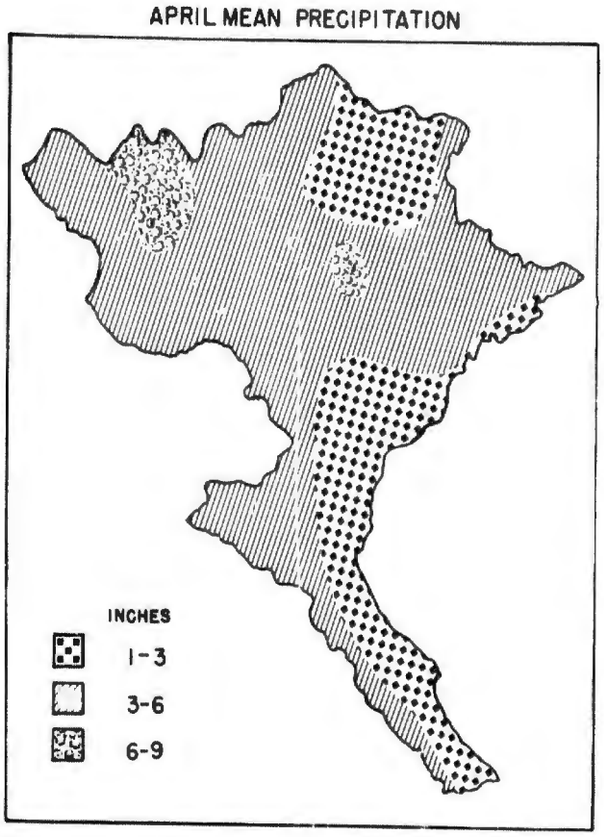


Fig. 23

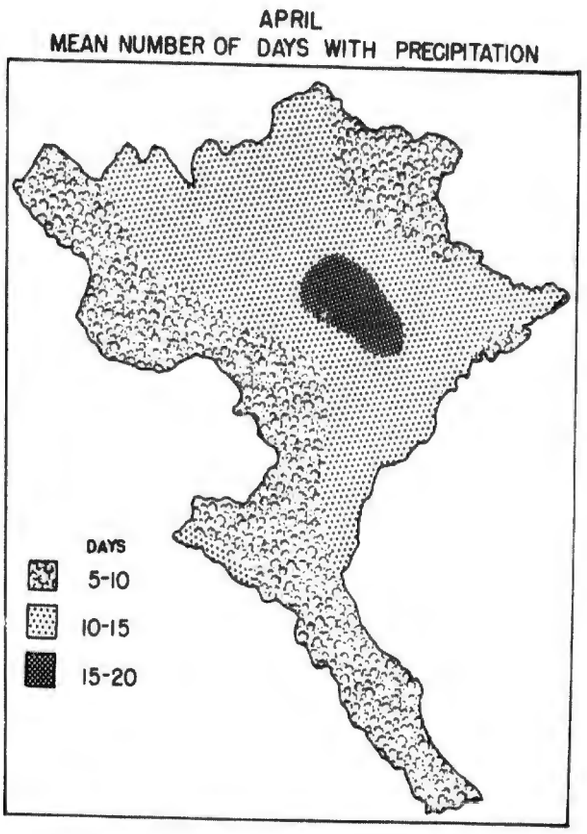


Fig. 24

of the climate. Temperatures at elevations exceeding 1,000 feet should show a decrease in proportion to the increase in altitude. Minimums during this season are between those of the northeast and southwest monsoon seasons.

c. Precipitation: Early in the season, the precipitation regime is still similar to that of the northeast monsoon as crachin occurrences with their drizzle and light rain tend to persist until mid-April. Rainfall amounts gradually increase as the season progresses. This is due to the retreat of the northeast monsoon, resulting in a weak circulation pattern in which thunderstorms tend to develop quite easily. Rainshowers and thunderstorms become quite common. Along the coasts and regions affected by the crachin there is little change in precipitation frequency, but farther inland there is a decided increase in the number of days per month with rain as warmer, more moist air begins to enter the area. Sometime in May, the ITCZ passes over North Vietnam and ushers in the southwest monsoon and all its attendant precipitation.

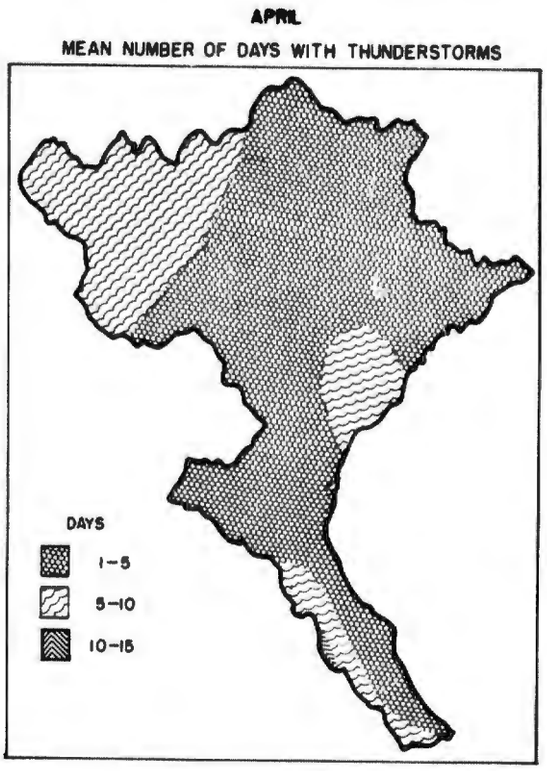


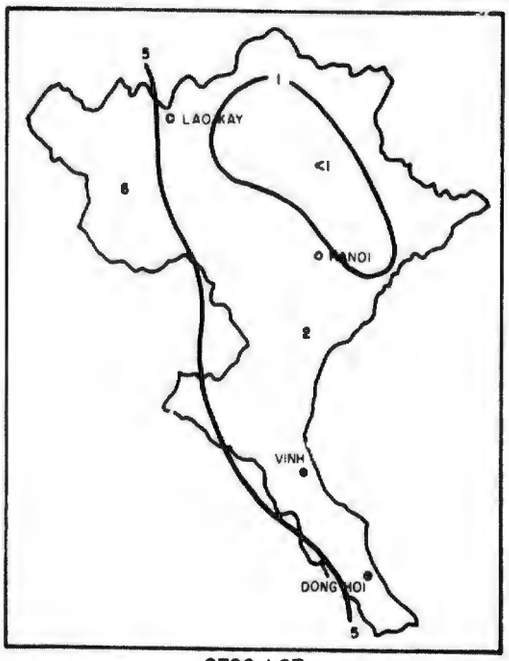
Fig. 25

d. Thunderstorms and Turbulence: Thunderstorms become a prominent climatic feature during the spring transition season. At the surface, occasional influxes of warm, moist equatorial air become heated by the sun which is almost directly overhead in April and May. When a current of cooler, drier air from the northwest occasionally overrides this warm air at the surface extreme instability results, quite often causing violent thunderstorms in the afternoon and early evening hours. Although no precise data are available on the violence of these thunderstorms, there are accounts in reports from neighboring areas of winds of 50 to 80 knots, hailstones as large as 2 inches in diameter, and extremely heavy rain.

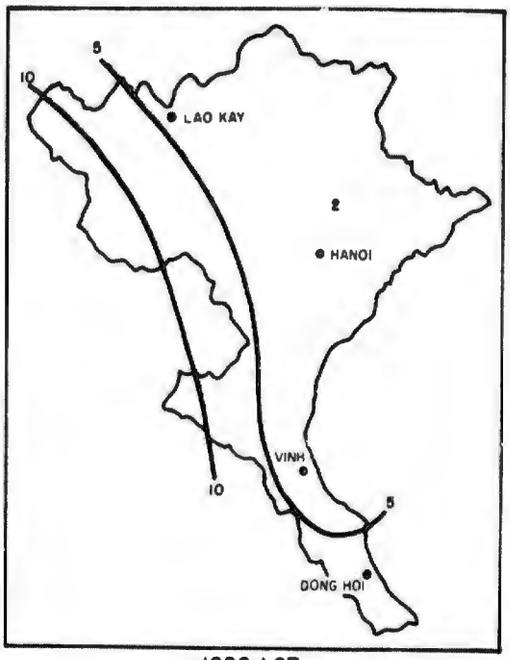
The widespread convective activity of the spring transition season creates much turbulence in the atmosphere over North Vietnam, particularly in the towering cumulus and cumulonimbus clouds. Within thunderstorm areas, severe turbulence should be expected. Light to moderate turbulence should often be expected in the clear air immediately surrounding these clouds. Occasional reports of large hailstones offer evidence of the violent up- and down-drafts to be found in the thunderstorms of this season, especially those associated with the ICZ. Although few data are available, moderate turbulence during afternoon and evening thunderstorms can be expected at altitudes to 12,000 feet. Minimum turbulence would be found at night after 2200 and before 0800 LST.

APRIL

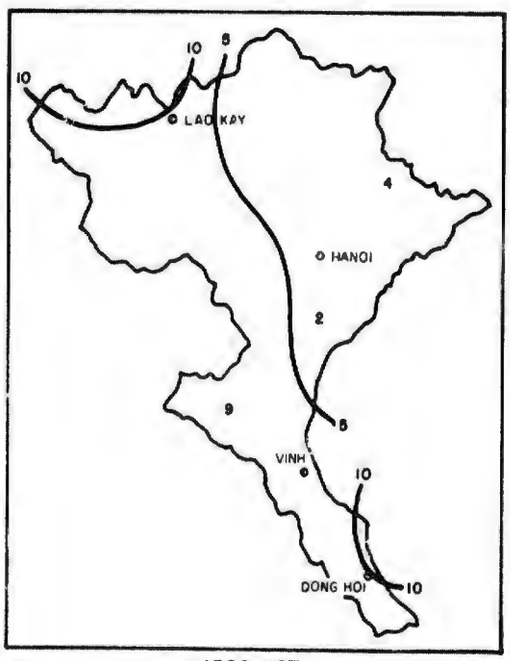
NUMBER OF DAYS WITH CLOUD COVER ≤3/10 AND VISIBILITY ≥2½ MILES



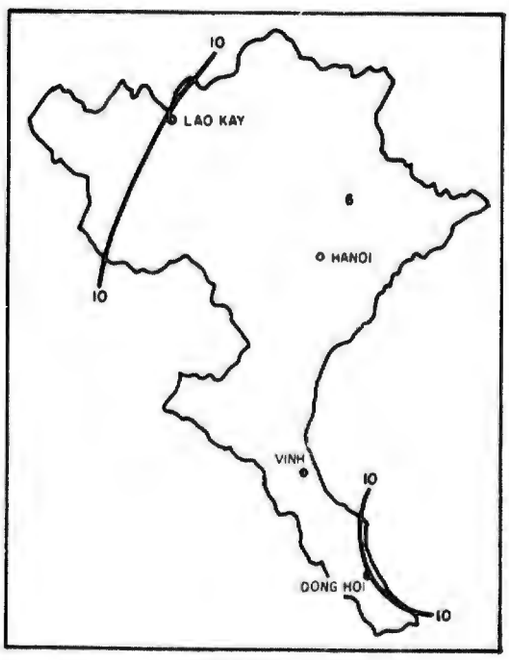
0700 LST



1000 LST



1300 LST

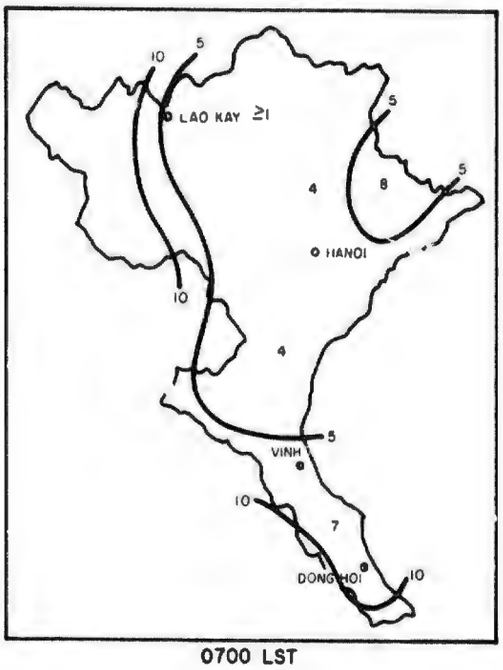


1600 LST

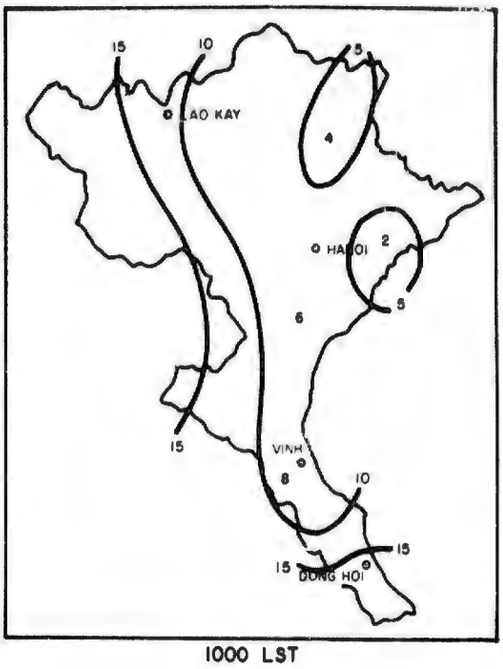
Fig. 26

APRIL

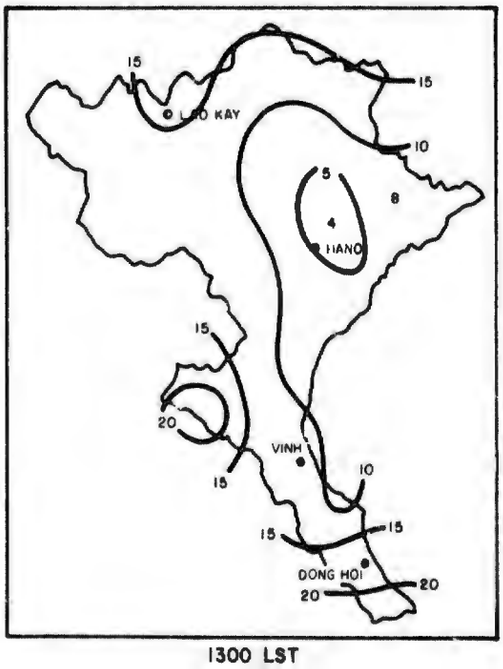
NUMBER OF DAYS WITH CEILINGS ≥5000FT AND VISIBILITY ≥5 MILES



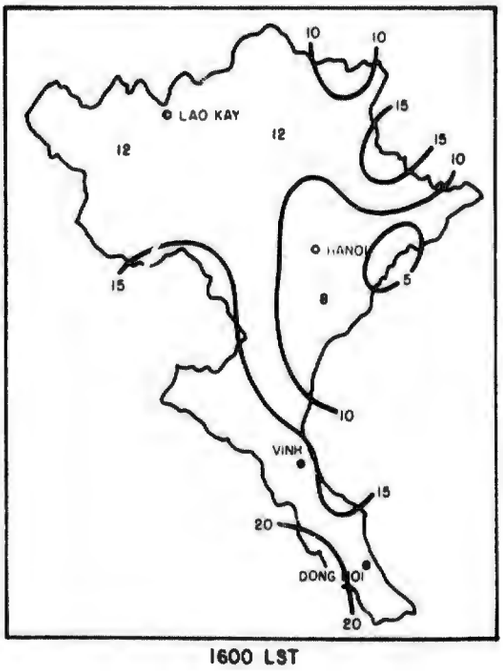
0700 LST



1000 LST



1300 LST

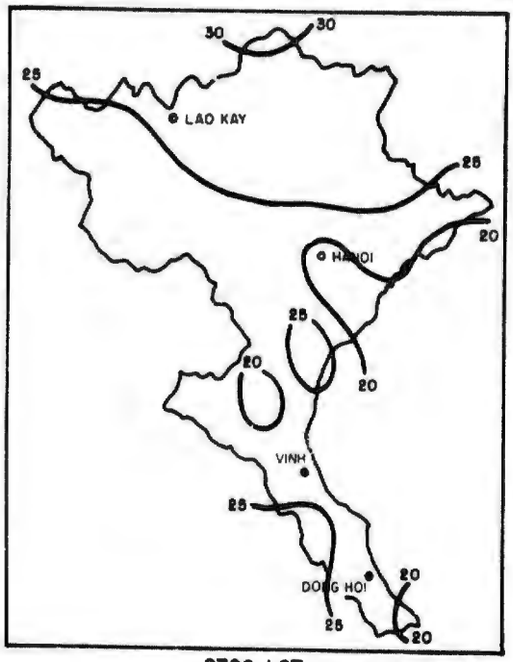


1600 LST

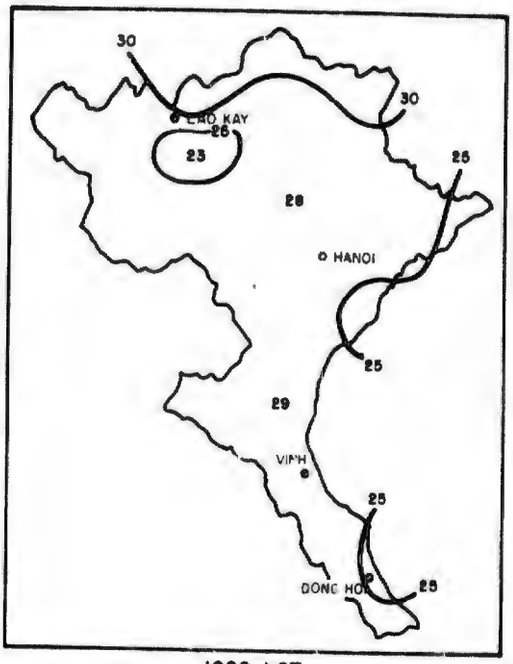
Fig. 27

APRIL

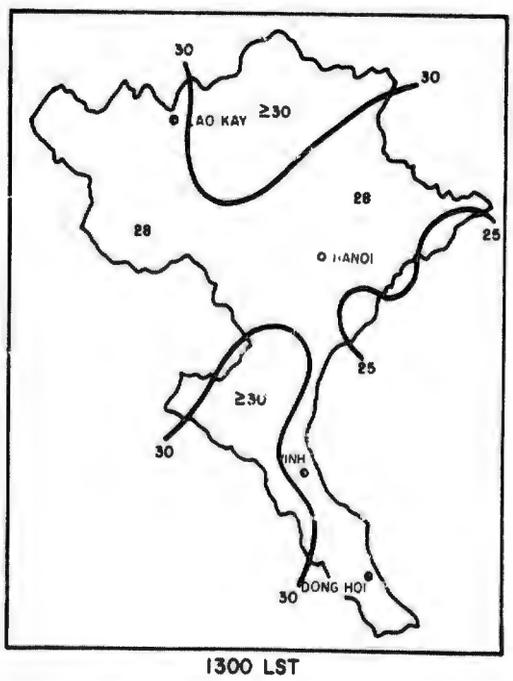
NUMBER OF DAYS WITH CEILINGS ≥1000 FT AND VISIBILITY ≥2½ MILES



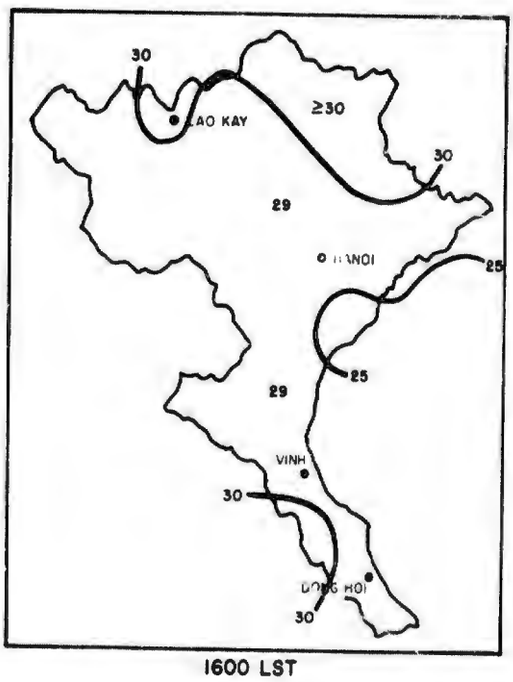
0700 LST



1000 LST



1300 LST



1600 LST

Fig. 28

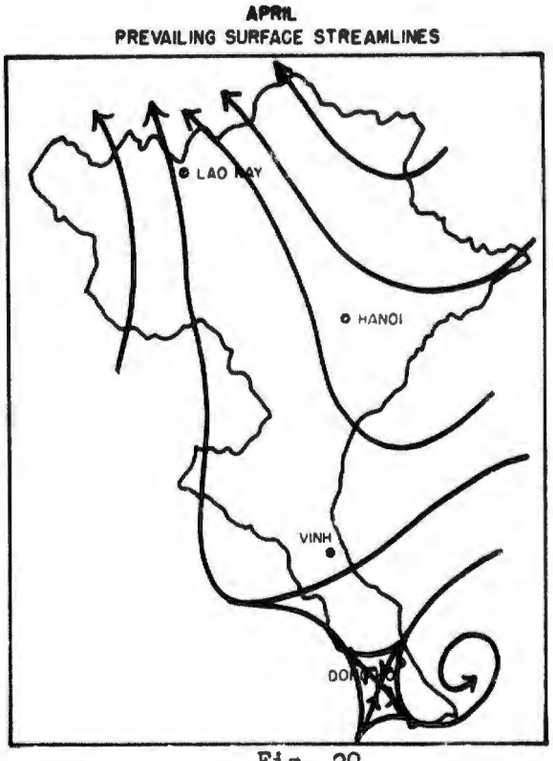


Fig. 29

c. Cloudiness and Ceilings: With the weakening of the forces which create and maintain the crachin, the associated cloudiness steadily decreases from the highest mean of the year at the season's beginning. The spring transition, therefore, is a season of decreasing cloudines; however, cloudiness over the country as a whole still remains quite high. Some locations particularly in the southern region have their lowest mean cloudiness during the early part of May. The weak circulation and the heating from the northward migrating sun helps to burn off much of the early morning stratus, but often results in the formation of afternoon cumulus. Therefore while there is a decrease in ceilings below 2000 feet there is an increase in those between 3000 and 5000 feet especially in the afternoon. Late in the season the ICZ accompanied by towering cumulus and cumulonimbus passes over the area and there is a rather pronounced change in the weather. Following the passage partial clearing sometimes occurs, but only for a very short period before the full force of the southwest monsoon with its attendant cloudiness is observed.

f. Visibility: Throughout the spring transition, there is an increase in surface visibilities, becoming rather pronounced after mid-April as the crachin all but disappears. Some deep river valleys in the Northern Region still act as traps for fog and stratus, but even here the general trend is one of improving conditions. The decreasing frequency of the crachin, resulting in a general decrease in low cloudiness, causes an improvement in slant-range visibility over that experienced in the latter half of the northeast monsoon season. In the Southern Region, air-to-ground visibility, though not as good as in the southwest monsoon season, is generally fair and better than that over the Northern Region.

Diurnally, surface visibilities are poorest in the late night and early morning hours and best in midafternoon. Since this visibility pattern is accompanied by a tendency for low-level stratus to decrease from early morning to afternoon accompanied by increasing cumulus activity, the best slant-range visibility probably exists from 0900 to 1100 LST. Slant-range visibility is worst in showers and thunderstorms in midafternoon, especially in the ICZ.

g. Surface Winds: Early in the season there is a predominance of northeasterly winds, shifting late in the season to southerly or southwesterly as the southwest monsoon approaches. During most of the season, speeds are light and directions variable. Winds are calm or very light from sunset through the early morning hours. Speed maximums occur during the afternoons in connection with thunderstorm activity and westerly moving disturbances along the ICZ. During such thunderstorms and disturbances, winds exceeding gale force have occurred.

h. Upper Winds: During this season the easterly circulation in the lowest layers of the atmosphere weakens considerably and by the end of the season has been replaced by a southerly to southwesterly flow near the surface. This flow is stronger and more apparent in the south than it is over the more northerly parts of the area. In conjunction with this, the upper westerly circulation of the northeast monsoon season continues to penetrate to lower levels and finally joins the low-level westerly flow. Average speeds are slightly lower than in the other seasons, particularly in the lower levels.

SPRING TRANSITION

MEAN UPPER WINDS, TEMPERATURES AND "D" VALUES

	NORTHERN REGION			SOUTHERN REGION		
	dd/ff	TT	"D" Value	dd/ff	TT	"D" Value
850 MB	241/6	16	213	224/5	16	223
700 MB	271/9	9	391	270/4	10	403
500 MB	261/23	-10	829	230/14	-8	884
300 MB	264/49	-33	1403	257/31	-31	1537
200 MB	262/49	-53	1809	257/31	-52	1954
150 MB	268/62	-64	1589	271/40	-65	1716
100 MB	276/44	-76	1292	292/23	-78	1383
50 MB	188/9	-67	219	157/9	-68	240

Fig. 30

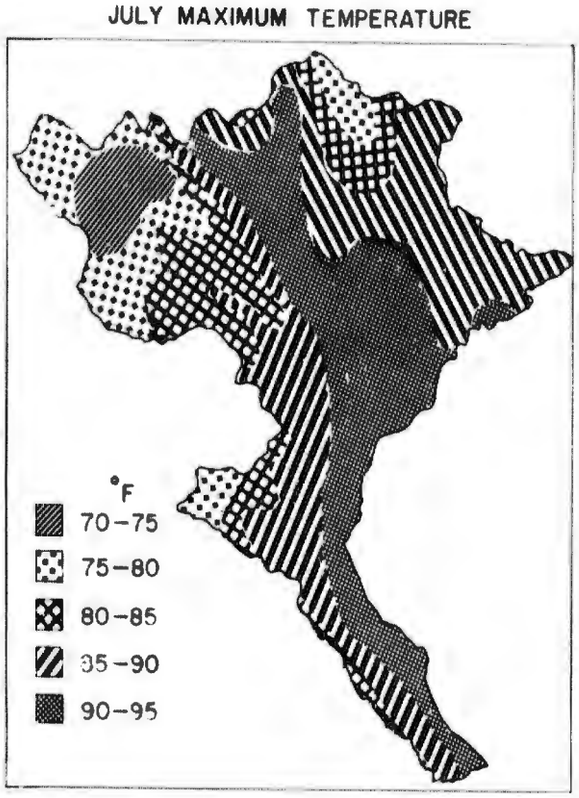


Fig. 31

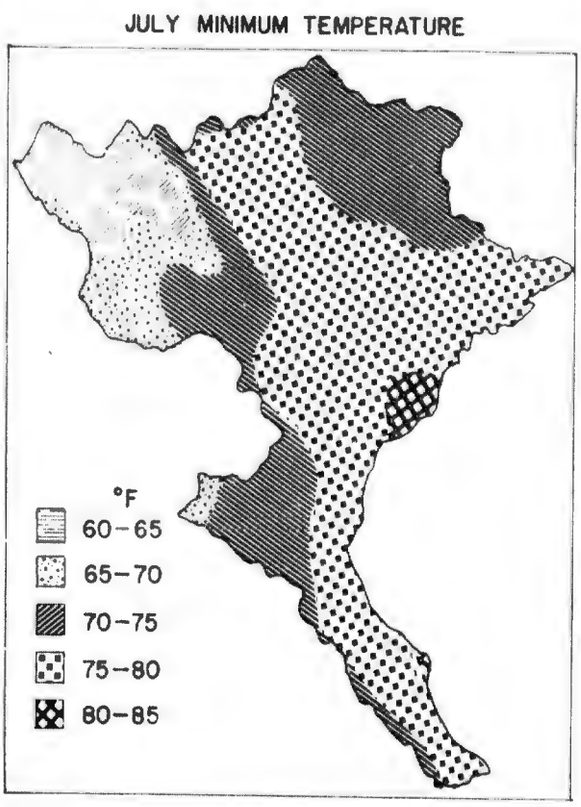


Fig. 32

3. Southwest Monsoon Season

a. Synoptic Pattern: The air-streams that comprise the southwest monsoon originate in the semipermanent highs over Australia and the Indian Ocean. Their flow results from the dynamic balance between the two southern Hemisphere high-pressure cells and the semi-permanent Asiatic low-pressure zone. The air originating in Australia is warm, stable, and very dry. It is rapidly modified in passage over warm equatorial waters, and by the time it merges over Sumatra and Malaya with the flow from the Indian Ocean it is very moist and unstable in the lower layers. Upon arriving over North Vietnam, the combined airflow is distinctly tropical maritime (mT) in nature, resulting in fairly homogeneous temperature and humidity conditions throughout the area. The southwest monsoon prevails from about mid-May to mid-September and is strongest in July and August when the Asiatic low reaches maximum development. The flow is strongest at 5,000 to 8,000 feet but may be traced as high as 15,000 feet. Above this altitude the mean winds become variable and, higher still, easterly.

b. Temperatures: During the southwest monsoon, mean temperatures everywhere reach their annual maximum. At stations below 1,000 feet, average afternoon temperatures are in the high 80's or low 90's

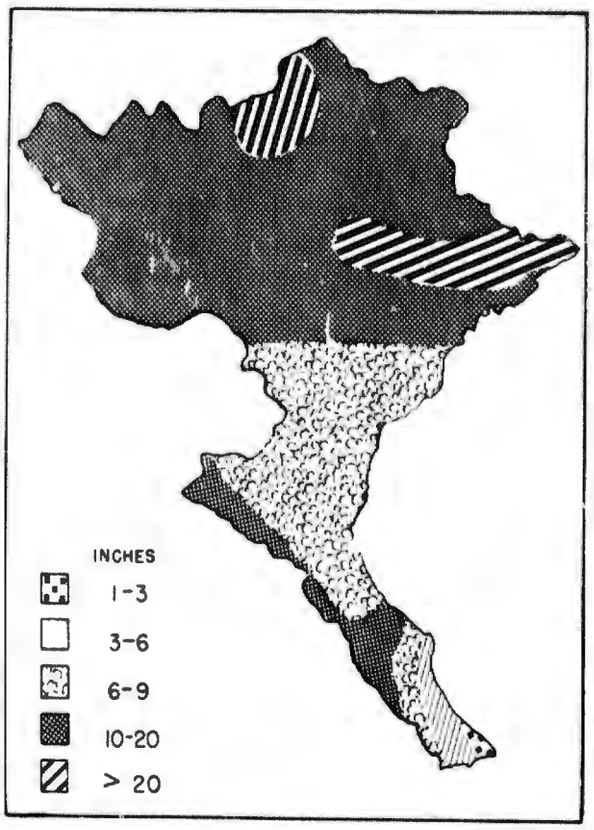


Fig. 33

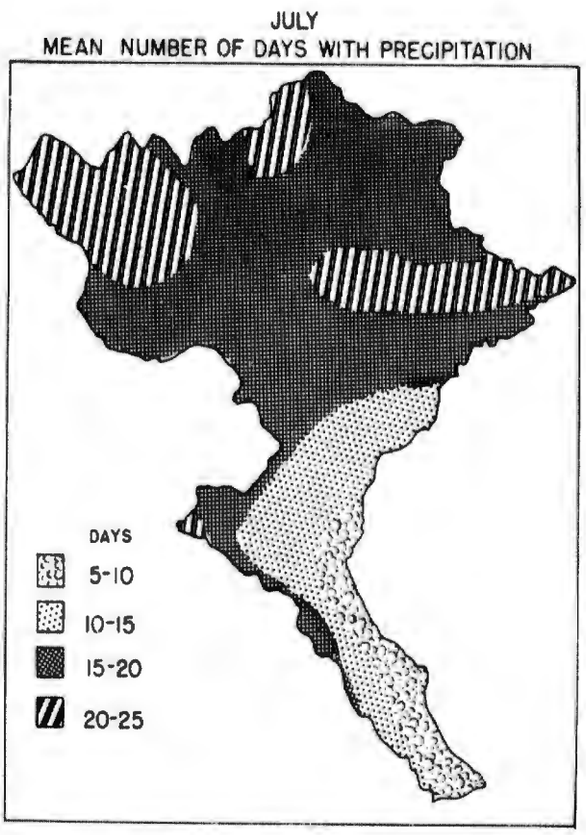


Fig. 34

except at locations just offshore or on the immediate coast where the effect of the water subdues the maximums somewhat. Nighttime minimums, except at stations with elevations above 1,000 feet, are in the high 70's; minimum temperatures are slightly higher near the coast than farther inland. Son La, at 1,975 feet, has maximum temperatures near 85°F and minimums in the low 70's. At elevations of 6,000 to 7,000 feet, temperatures probably range from average daily maximums in the high 60's to minimums in the low 50's.

c. Precipitation: Approximately 65% of the annual rainfall received in the Northern Region occurs during this season; in the Southern Region this figure is only 40%. Areal variation is substantial over very short distances, with the amount received depending chiefly on terrain influence. In general, stations located in the monsoonal air flow just upstream of sudden rises in the surface relief, as well as those locations on mountain slopes and plateaus exposed to the full impact of the southwesterly air-stream, receive the heaviest rainfall amounts. Cha Pa, Ha Giang, and Tom Dao illustrate such locations quite well. These stations average between 52 and 66 inches of rainfall for the period June through August as compared to a total of 30 to 40 inches for most of the remainder of the

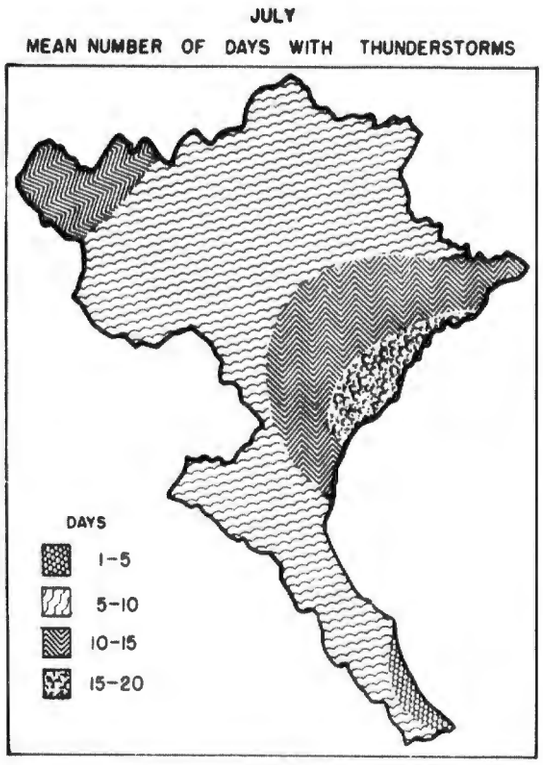


Fig. 35

stations in the Northern Region. The lightest rainfall experienced during this season occurs in the lee of mountain slopes and in deep sheltered valleys. The entire Southern Region is an excellent example of this, and stations such as Dong Hoi and Vinh average a total of only 12 to 17 inches for the same 3-month period.

The frequency of precipitation in this season closely parallels the rainfall amounts in that those stations receiving high amounts of precipitation also have precipitation on the greatest number of days. In general, rainfall occurs on an average of 55 to 65 days during the period June through August at the rainier stations, while most of the Northern Region has rainfall on 37 to 55 days. In the Southern Region, rainfall occurs during a total of only 20 to 55 days during the same period.

Rainfall amounts of 2 inches or more in the Northern Region occur on a total of 3 to 5 days during June through August at most places, although this figure may reach 9 to 10 days at rainier locations. Falls as heavy as this seldom occur in the Southern Region at this time of year. The maximum 24-hour

fall on record in June through August is 15.2 inches at Mon Cay; however, 4 to 7 inches in 24 hours is a more representative maximum and is probably attained during at least one 24-hour period each year at most locations.

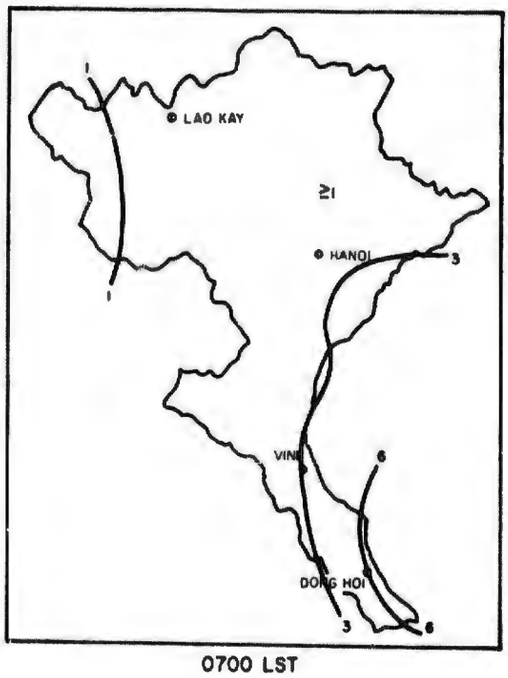
d. Thunderstorms and Turbulence: Thunderstorms of a somewhat less violent nature than in the spring are a common feature of the southwest monsoon season. They last, at most, only a few hours in any given locality and are the result of afternoon convective activity combined with orographic lifting. They are quite frequent and heavy along the windward slopes of mountains and generally occur during the late afternoon. Turbulence may be expected with all of these thunderstorms. Although perphaps not as violent as that found in spring transition thunderstorms, it nonetheless constitutes a definite hazard to flying. Clear-air turbulence should be expected in areas immediately surrounding thunderstorms and also in the shear zone separating the lower southwesterly flow from the easterly flow at higher levels. Light to moderate turbulence should always be anticipated for several thousand feet over and in the lee of both the Annam Range and the northern mountains during this season.

e. Cloudiness and Ceilings: The southwest monsoon, with its long trajectory over warm equatorial waters, brings much cloudiness to North Vietnam. A large part of the Northern Region presents mostly upslope terrain to this monsoonal airstream. The result is widespread mechanical lifting expected from normal convective processes, and consequently considerable cloudiness is observed over the Northern Region. The Southern Region, being the leeward side of the Annam Range under these flow conditions, experiences some drying out of the atmosphere because of the downslope motion of the airstream after it has crossed this mountain barrier. A general decrease in cloudiness results. At the height of the monsoon in June, July, and August, mean cloud amounts average 75% to 80% in the Northern Region and 10% lower in the Southern Region. Some stations, such as Lai Chau, depart considerably from these averages because of terrain effects.

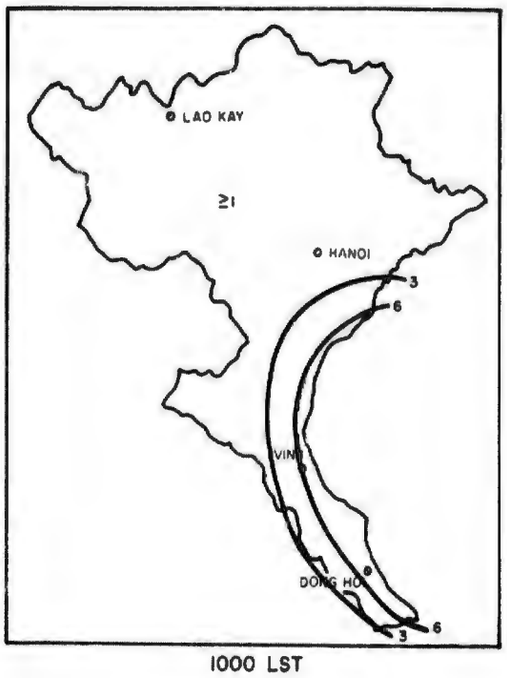
Although total cloud amounts increase slightly, there is actually a decrease from the preceeding season in the amount of low cloud observed with bases below 5,000 feet. Bases are generally higher, being reported more frequently in the 2,000 to 3,000 foot range and less frequently below 2,000 feet, in contrast to the larger frequencies of very low clouds associated with the crachin in the northeast monsoon and spring transition seasons. The daytime heating of the air results in partial or total dissipation of the stratified decks usually existing at sunrise. This results in smaller amounts of low cloud being observed in the afternoon. The spreading of tops of towering cumulus and cumulonimbus is responsible for the increase in overall cloud amount. There is a significant tendency over the delta regions

JULY

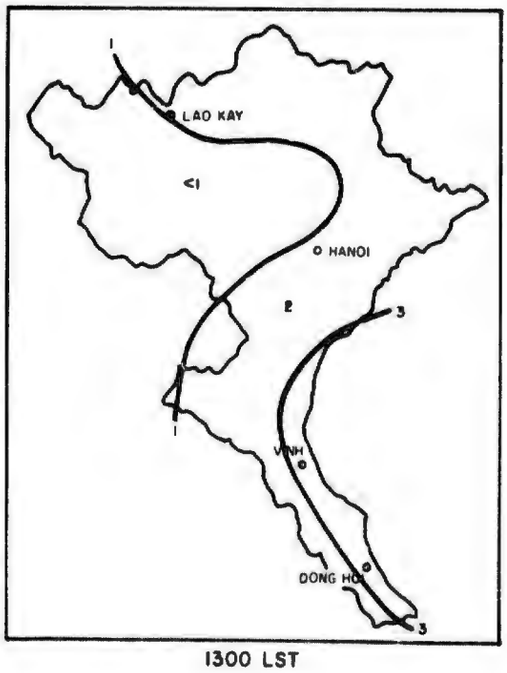
NUMBER OF DAYS WITH CLOUD COVER ≤3/10 AND VISIBILITY ≥2½ MILES



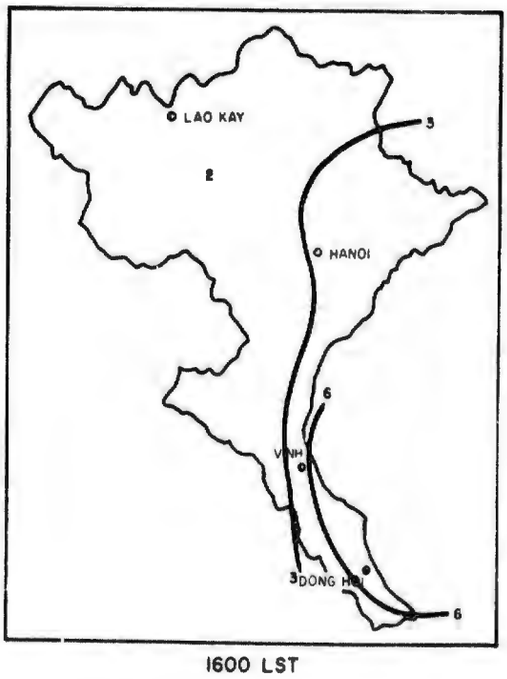
0700 LST



1000 LST



1300 LST



1600 LST

Fig. 36

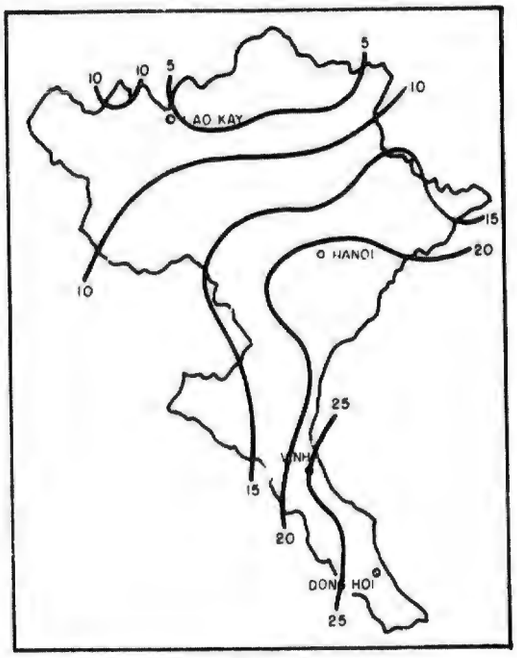
and eastern highlands for broken to overcast stratified decks exisiting in the early morning hours to become 5-tenths or less by midafternoon, with bases frequently below 2,000 feet. The same tendency exists over most of the Southern Region; however, bases are generally higher. An important consideration is that much of this low cloud isin the amount of 5-tenths; although this amount does not constitute a ceiling, it does very definitely hamper aircraft flying in the surface friction layer by considerably restricting horizontal and slant range visibility. Cloud bases below 1,000 feet are frequent in the morning hours except over the extreme southern part of the country but are relatively rare in the afternoons and evenings. Cloud bases may be expected to drop below 1,000 feet, however, in passing thunderstorms and showers, and frequently these bases will fall below 500 feet. This is normally a temporary condition associated with the passage of a shower and generally lasts no more than an hour or two at most. Completely clear afternoons over any part of the area are relatively rare during this season.

Cumulus and cumulonimbus are the predominant cloud types over North Vietnam during the southwest monsoon. The normal diurnal pattern is one of stratified clouds at 2,000 to 3,000 feet which become towering cumulus and cumulonimbus by midafternoon. These clouds frequently extend as high as 50,000 feet and are responsible for the heavy showers and thunderstorms of this season. Although extensive low stratus is normally associated with the crachin during the northeast monsoon, periods of such layer clouds occur occasionally when a typhoon enters the Gulf of Tonkin and approaches within 100 miles of the coastline.

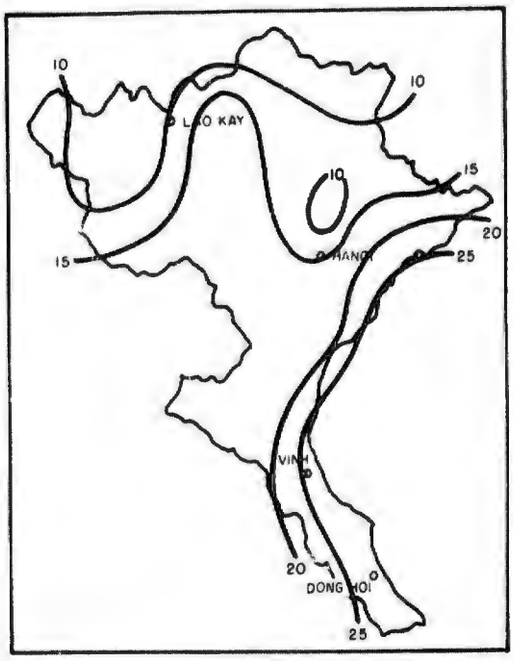
f. Visibility: Visibility is rarely excellent at any time during this season because of the hazy nature of the air mass. The tabular data on surface visibility in the Northern Region indicate a considerable improvement from morning to afternoon during this season, and, since low cloud amount has a tendency to decrease toward afternoon, air-to-ground visibility improves also. Over the Southern Region there is little change in surface visibilities through the day, visibilities being good at any time of day during this season. Low cloud amount in this region tends to increase from morning to midafternoon, and consequently a decrease in favorable air-to-ground visibility is noted. However, even at its worst in midafternoon, air-to-ground visibility is still frequently good and definitely better than in the Northern Region. Slant-range visibilities are lowered at times by afternoon cumulus and shower activity, particularly from about 1000 LST until about midnight. Low-level aircraft operations are dangerous in the area where these clouds and showers obscure mountain tops. At night, air-to-ground visibility in both regions should be good. Generally speaking, low-level air operations requiring good slant-range visibility would probably have their best chance of success in either region if performed between 0900 and 1100 LST, after morning fog and stratus have dissipated but prior to the normally expected shower activity.

JULY

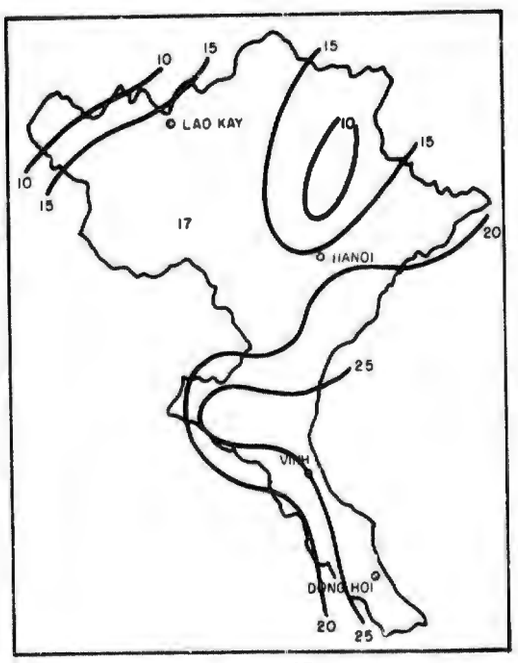
NUMBER OF DAYS WITH CEILINGS ≥5000FT AND VISIBILITY ≥5 MILES



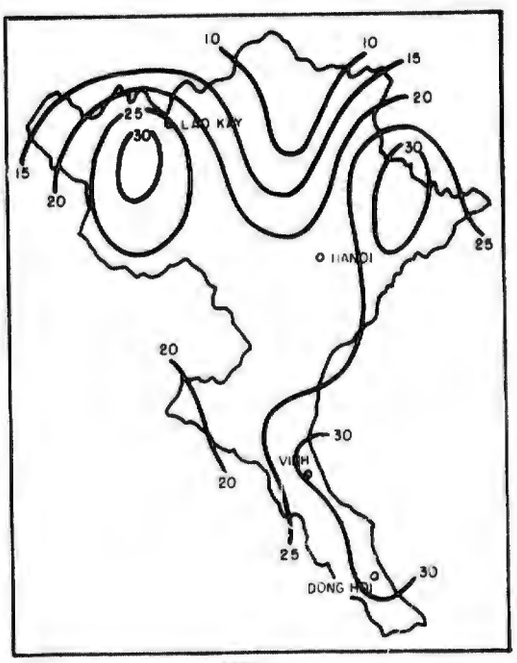
0700 LST



1000 LST



1300 LST

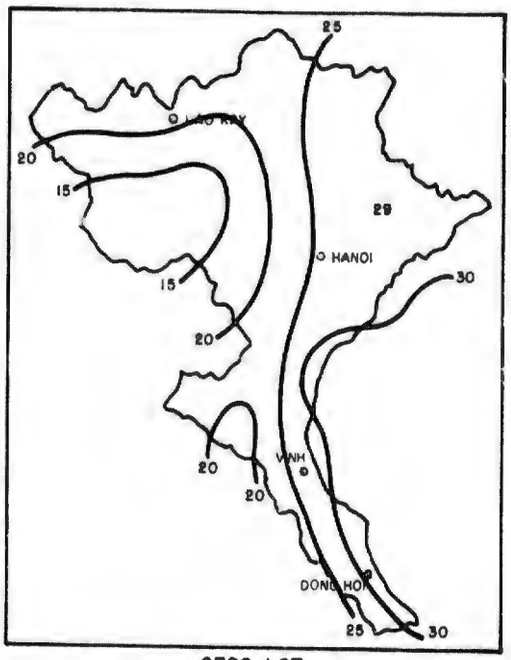


1600 LST

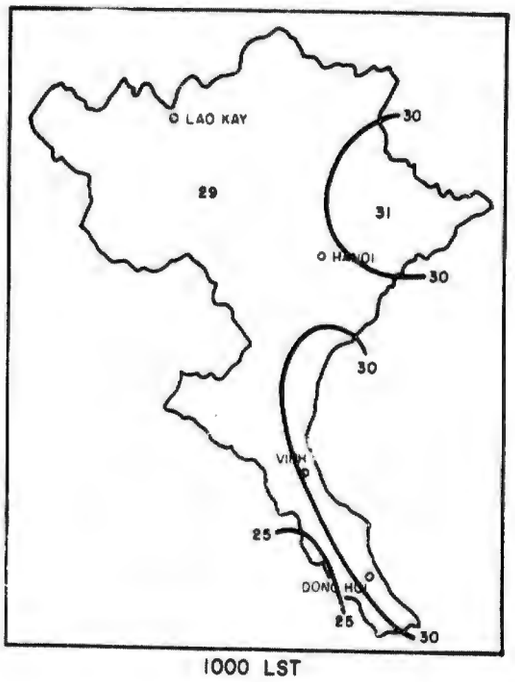
Fig. 37

JULY

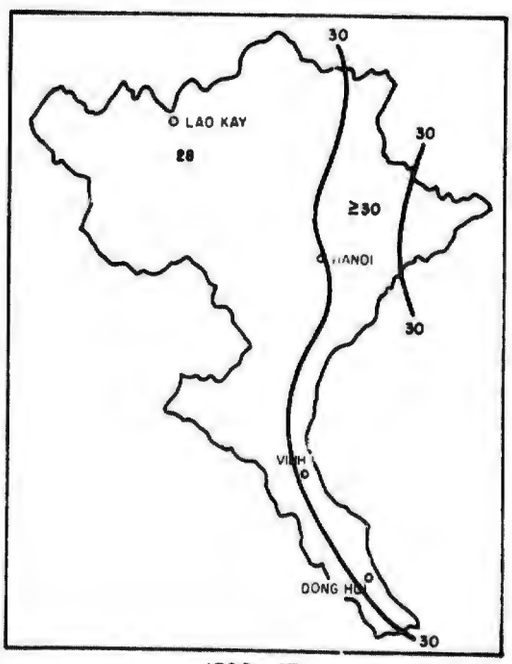
NUMBER OF DAYS WITH CEILINGS ≥1000FT AND VISIBILITY ≥2½ MILES



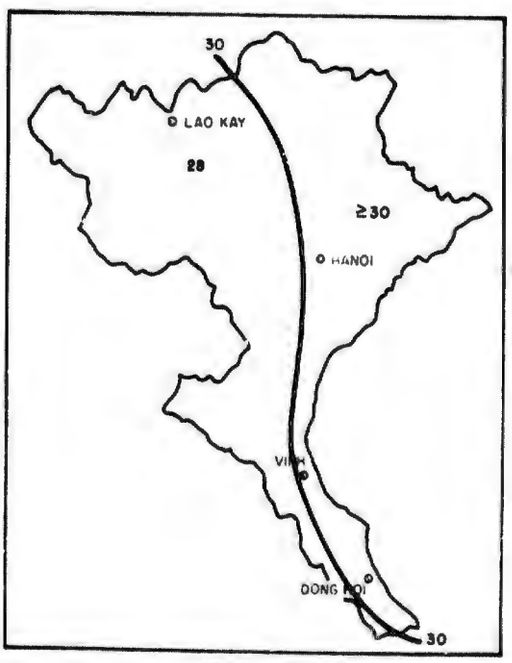
0700 LST



1000 LST



1300 LST



1600 LST

Fig. 38

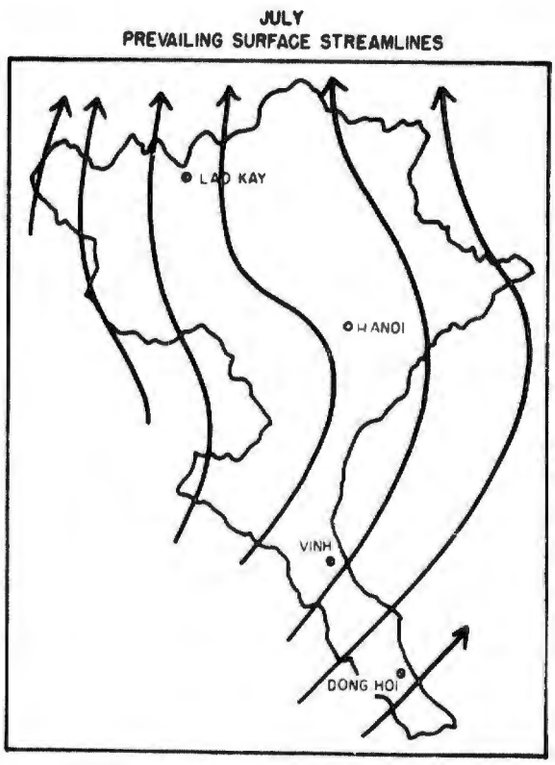


Fig. 39

g. Surface Winds: During the southwest monsoon the majority of reported wind speeds are below 7 knots and conditions are quite frequently calm. In the northern mountains and eastern highlands, wind speeds below 7 knots are reported approximately 80% to 95% of the time, in the delta and coastal regions about 60% to 80% of the time, and along the immediate coastline about 40% to 60% of the time. As would be expected, the higher wind speeds are, in most cases, from the south or southwest quadrant. In many instances, terrain has caused a shift in the wind pattern so that the southwesterly monsoon flow enters the locality from the southeast; winds at Cao Bang are excellent examples of this. This influence of terrain on the prevailing windflow should always be taken into consideration when planning or executing operations in areas having varying topography. Wind speeds above 6 knots occur most often between 1000 and 1800 LST. The remainder of the day has relatively light winds except for those which may occur with an occasional typhoon. Winds tend to be somewhat stronger on the windward mountain slopes and high plateaus and lower on the floor of dense forests; often the flow is channeled by the steeper valleys. The highest speeds observed during this season are in the Southern Region.

h. Upper Winds: The southerly surface flow veers slightly in the lower layers of the atmosphere, becoming more southwesterly at 6,000 to 10,000 feet. Southwesterly winds predominate to about 18,000 feet, where a zone of weak and variable winds is found. Above this, an easterly current prevails. This easterly current is stronger over the southern part of the country than over the northern part.

In the lower southwesterly stream, the highest speeds are observed between 6,000 and 9,000 feet where a large percentage of the speeds reported falls into the 15 to 20 knot category. Mean wind speeds below 10,000 feet generally average between 10 and 15 knots. At higher altitudes, wind speeds decrease somewhat, becoming rather light in the zone of variable winds around 18,000 feet. Speeds increase again in the easterly stream above this zone.

SOUTHWEST MONSOON

MEAN UPPER WINDS, TEMPERATURES AND "D" VALUES

	NORTHERN REGION			SOUTHERN REGION		
	dd/ff	TT	"D" Value	dd/ff	TT	"D" Value
850 MB	231/6	18	10	247/6	18	33
700 MB	201/7	12	348	231/6	12	354
500 MB	186/6	-4	923	162/5	-4	933
300 MB	158/10	-27	1753	056/10	-27	1770
200 MB	025/14	-49	2364	060/19	-49	2366
150 MB	027/17	-64	2092	052/22	-64	2074
100 MB	036/21	-77	1799	060/29	-77	1767
50 MB	116/35	-67	811	108/37	-66	758

Fig. 40

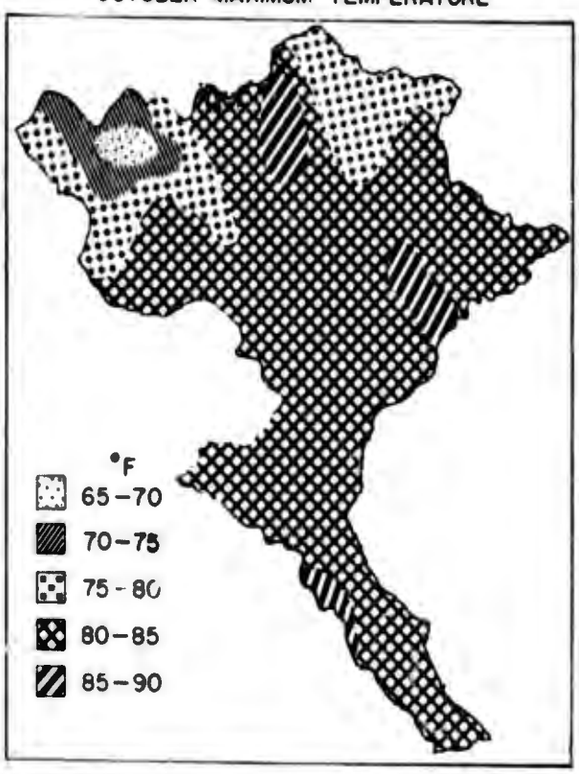


Fig. 41

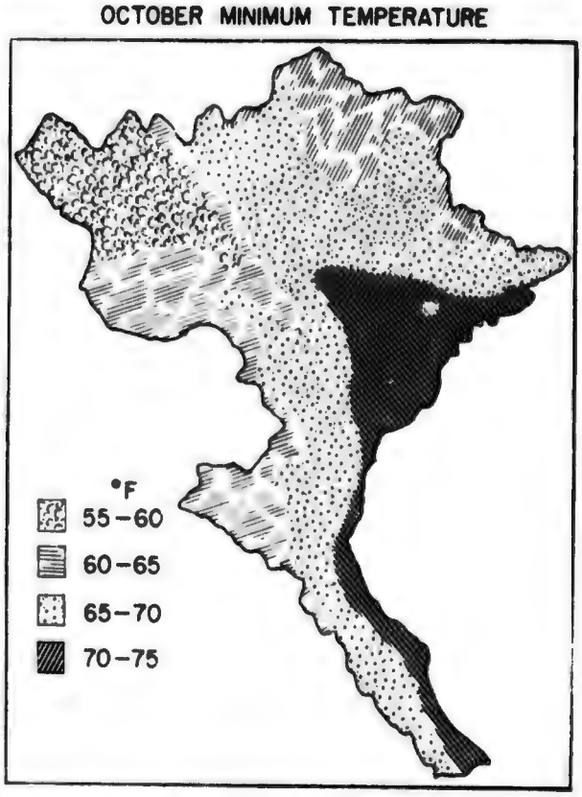


Fig. 42

4. Autumn Transition Season

a. Synoptic Pattern: The autumn transition, the shortest of the four seasons, occurs usually from mid-September to mid-October when the northeast monsoon, advancing across the area in a series of rather strong bursts, begins to affect North Vietnam. The transition is accompanied at some locations by an increase in squalls as the ICZ passes over. During the latter part of the season, conditions change rapidly to those of the northeast monsoon.

b. Temperatures: During this season, temperatures decrease rather uniformily reflecting the transition between the southwest monsoon and the northeast monsoon. In some locations, clearing skies affecting radiation result in more slowly decreasing maximums and more rapidly decreasing minimums. In consequence, many locations experience the largest diurnal ranges of the year during the latter part of this season.

c. Precipitation: The character of the precipitation region in the early part of the autumn transition is quite similar to that of the southwest monsoon. The retreat of the southwest monsoon is marked by the passage of the ICZ in the southweard migration; as it passes over most localities there is an increase in showers and thunderstorms.

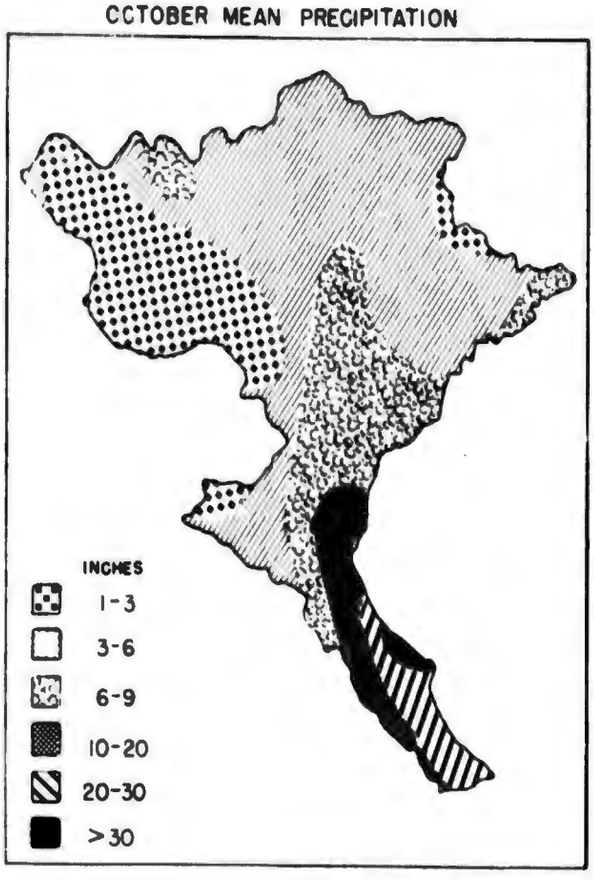


Fig. 43

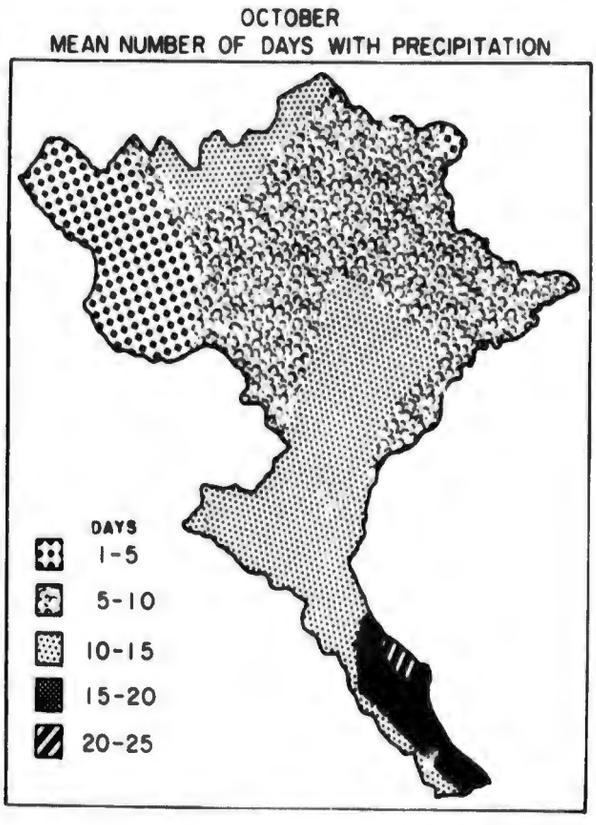


Fig. 44

On occasion, westward-moving disturbances add to this activity, resulting in additional heavy rainfalls and a disturbed wind pattern. The northeast monsoon enters the country usually in a series of strong bursts of cool air, generally marked by squalls at its leading edge. As the flow pattern is reversed the Southern Region receives its heaviest rainfall of the year. Rainfall accumulated in the two months of September and October in the Southern Region is 2 to 3 times as much as that accumulated in the previous three months. Over the Northern Region, rainfall, in general, decreases in amount and frequency during this season.

The influence of typhoons is greatest in this season and is also partially responsible for the large increase in rainfall received in the Southern Region. A typhoon moving into the Gulf of Tonkin would result in periods of extremely heavy precipitation over the entire country, particularly if the storm should move onshore while it is still of typhoon intensity.

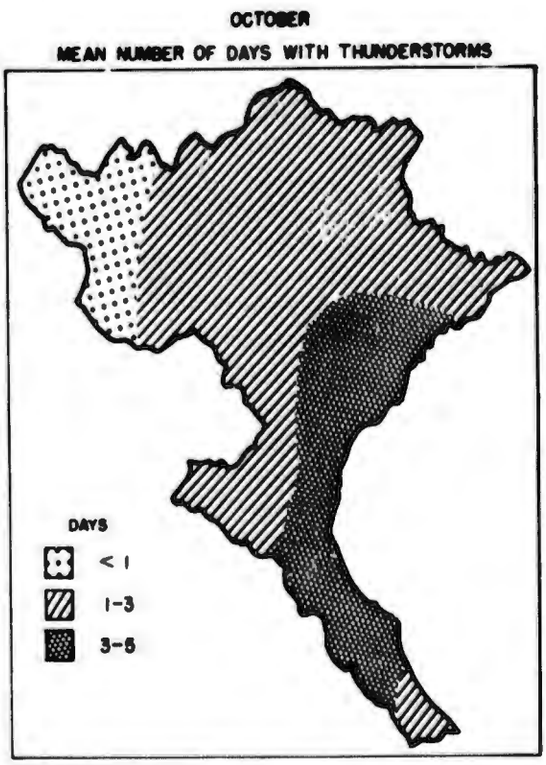


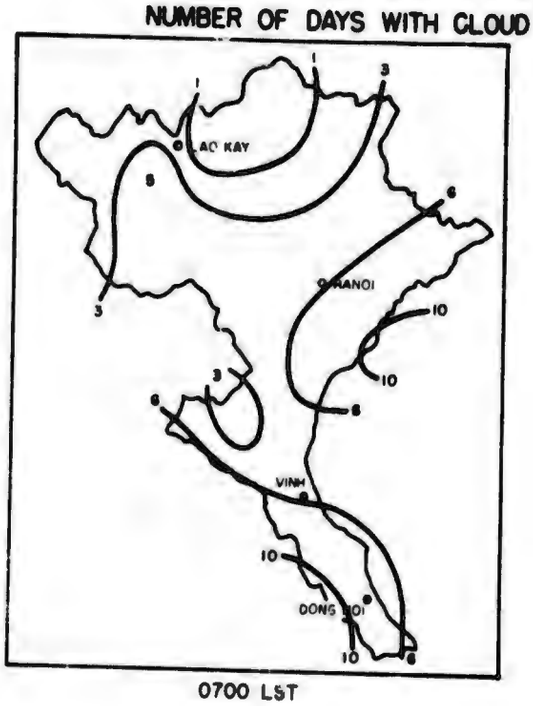
Fig. 45

d. Thunderstorms and Turbulence: Thunderstorm activity decreases rapidly during the autumn transition and reaches a minimum during the northeast monsoon. In late September and early October there may be an increase in convective activity and squalliness at any given locality as the ICZ passed in its southward migration, but after the passage, atmospheric conditions become relatively quiet and stable. During the autumn transition, turbulence may be expected in the afternoons at levels to 10,000 feet and in cumulus and cumulonimbus clouds. It may be severe and extend to much higher levels in the ICZ and especially in typhoons.

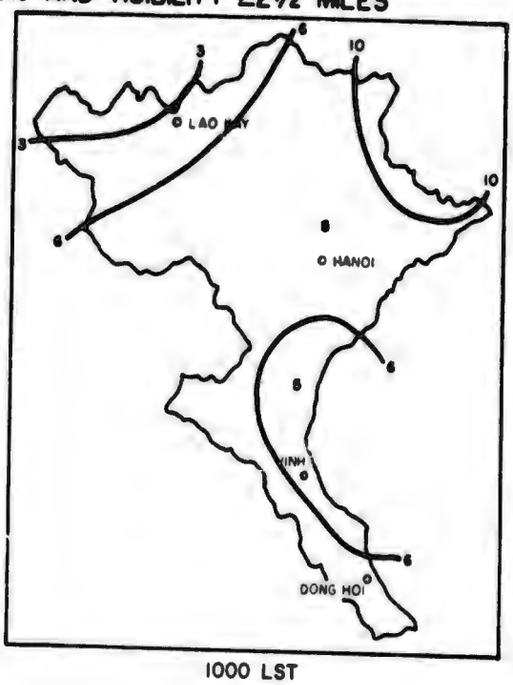
e. Cloudiness and Ceilings: During the autumn transition there is a decrease in total amounts of cloudiness reported and a corresponding increase in the frequency of clear conditions observed over most of the country. In the Southern Region, however, this situation changes and there is actually a slight increase in clouds and a subsequent increase in the frequency of cloud bases at low altitudes. Diurnally, there is a tendency for the low stratified decks present in the morning hours to dissipate somewhat during the day and for the bases to rise, so that by midafternoon low cloud bases are most frequently measured between 2,000 and 3,000 feet. In all of North Vietnam except the Southern Region, this is the beginning of a 3-month period (mid-September to mid-December) of the fairest weather enjoyed in North Vietnam, if the occasional intrusion of a typhoon is discounted.

OCTOBER

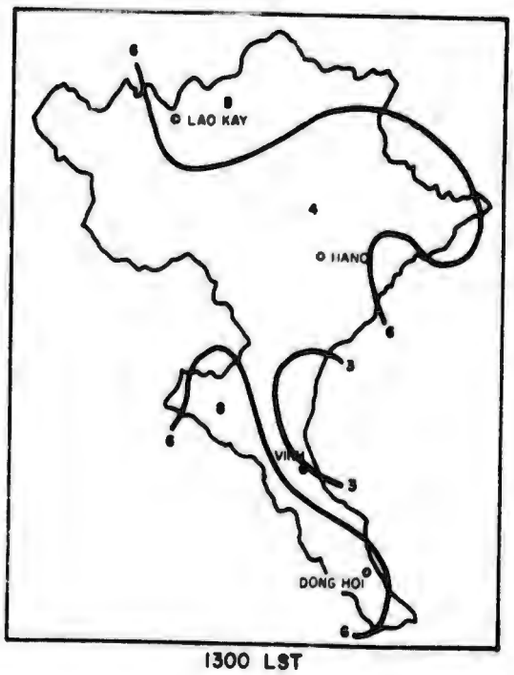
NUMBER OF DAYS WITH CLOUD COVER ≤3/10 AND VISIBILITY ≥2½ MILES



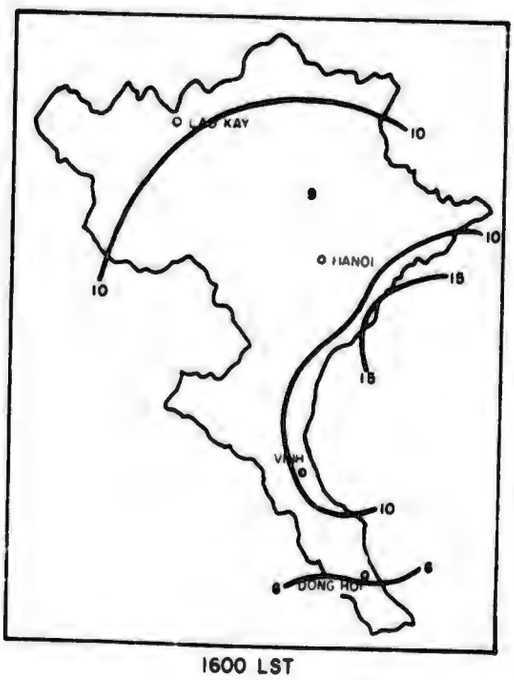
0700 LST



1000 LST



1300 LST

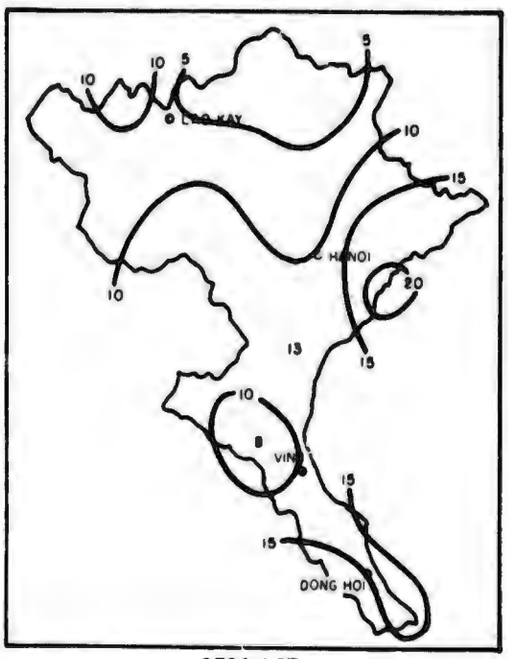


1600 LST

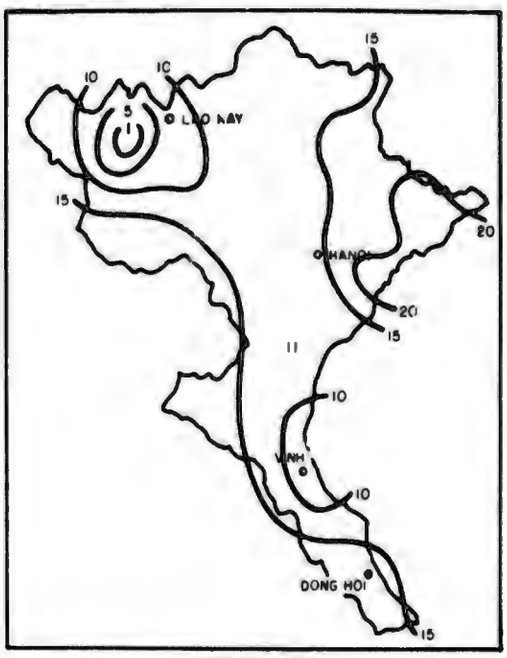
Fig. 46

OCTOBER

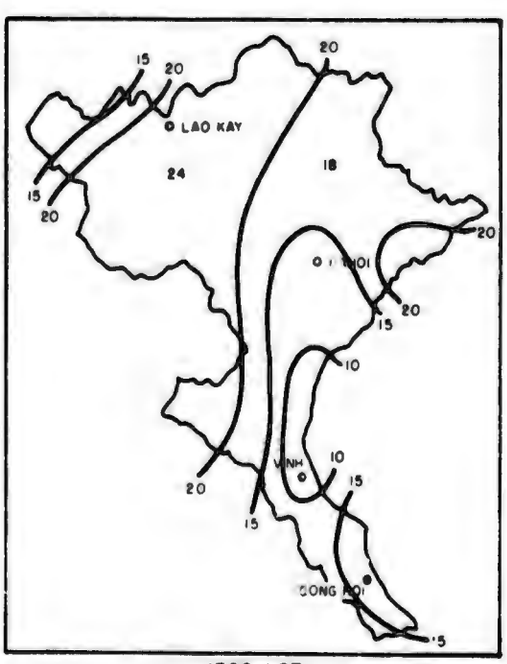
NUMBER OF DAYS WITH CEILINGS ≥5000 FT AND VISIBILITY ≥5 MILES



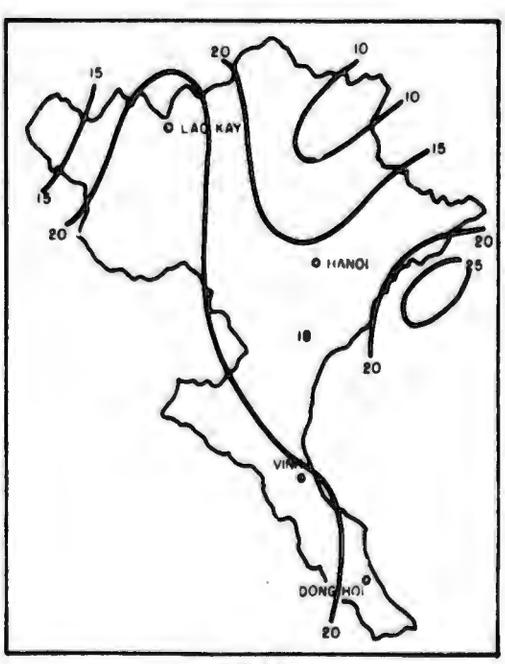
0700 LST



1000 LST



1300 LST

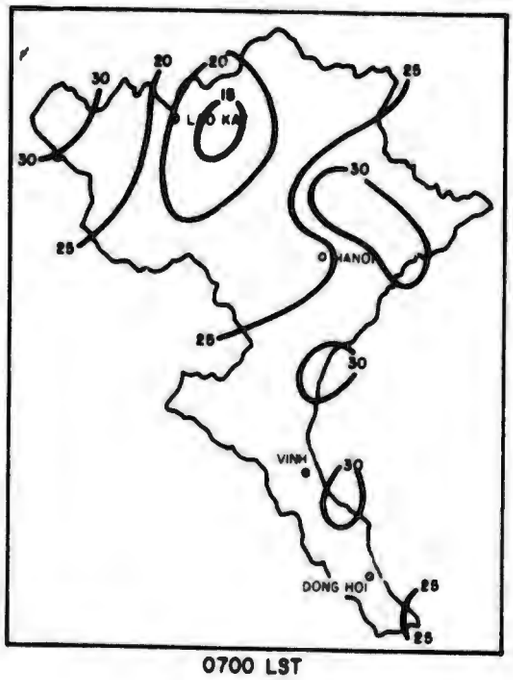


1600 LST

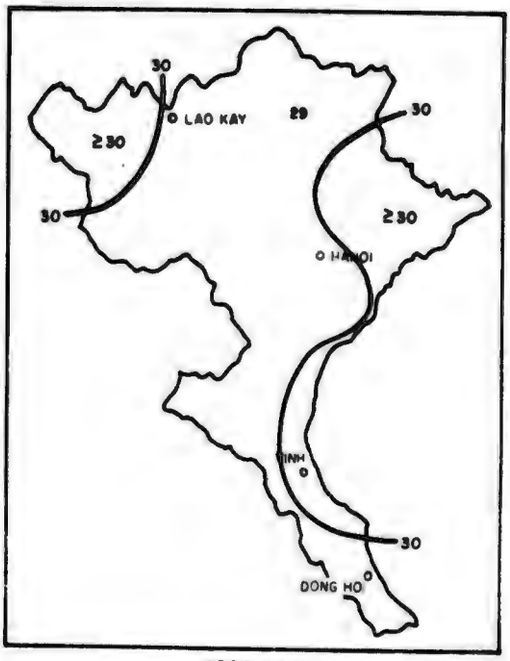
Fig. 47

OCTOBER

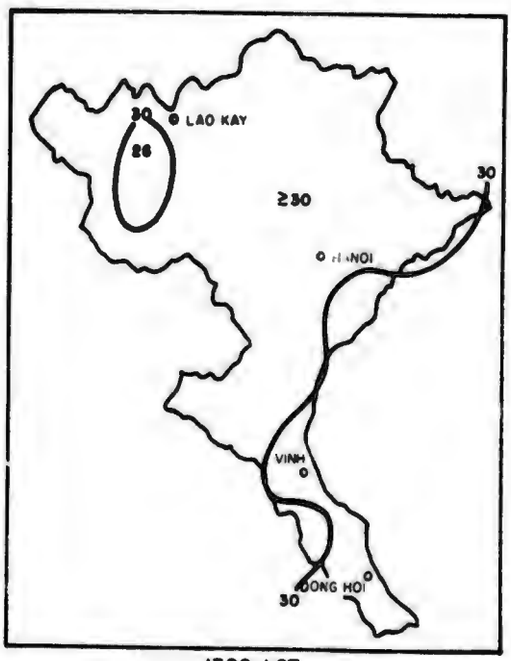
NUMBER OF DAYS WITH CEILINGS ≥1000FT AND VISIBILITY ≥2½ MILES



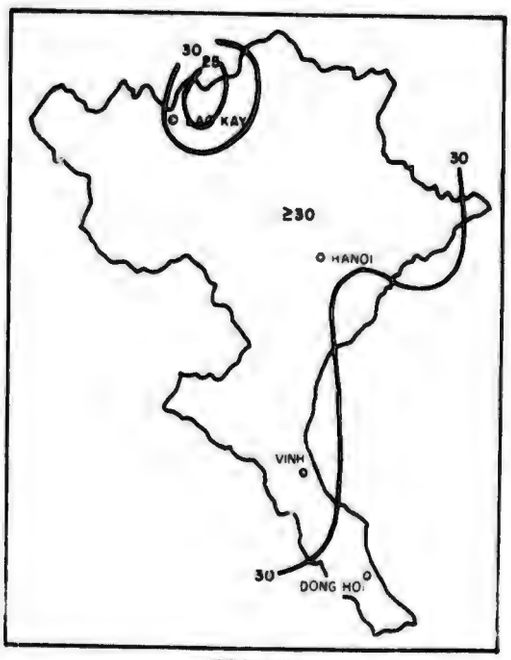
0700 LST



1000 LST



1300 LST



1600 LST

Fig. 48

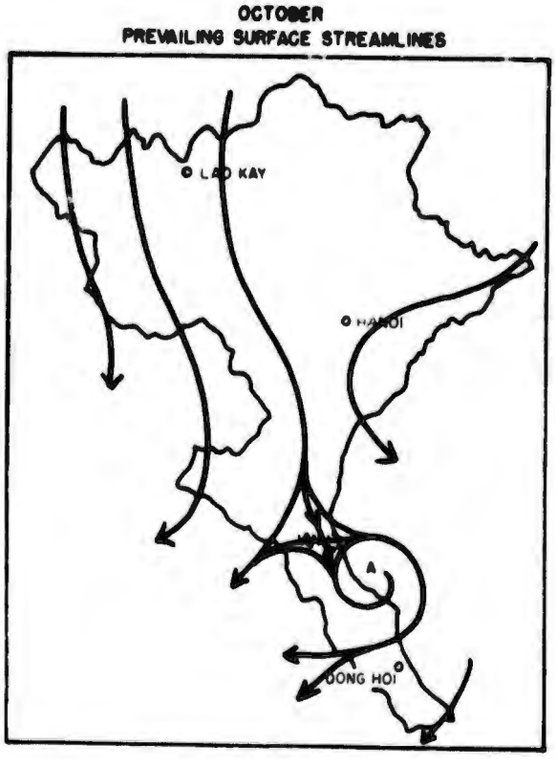


Fig. 49

f. Visibility: Surface visibilities deteriorate somewhat during the autumn transition. In the Northern Region, where the frequency of low cloudiness decreases rather rapidly, slant range visibilities probably improve, but in the Southern Region, where low cloudiness is increasing, slant range visibilities deteriorate proportionately. The increase in precipitation amounts and frequencies, low cloudiness amounts, and unfavorable surface visibilities make this one of the worst periods of the year for conducting air-to-ground operations in the Southern Region. In some of the deep northern valleys, morning ground fog drastically reduces surface visibilities between 0400 and 0900 LST, although it is possible that the mountainous features of the terrain, protruding above these fog layers, may permit adequate identification of localities.

Diurnally, the best slant visibilities at most locations, would be experienced between 0900 and 1100 LST. After 1100 LST, convective activity leads to low-level ceilings and a resultant decrease in slant-range visibility. Therefore, the poorest slant-range visibilities would be during midafternoon in and immediately around rainshowers and thunderstorms, especially in the ICZ. In the Northern Region, from about 1700 LST until darkness, there is a secondary period of good slant-range visibility, since in this season there are fewer thunderstorms and cumulonimbus clouds to prolong the general cloudiness. In the Southern Region, the widespread afternoon convective activity, combined with the orographic effects of the surface airflow, results in obstructing slant visibility by showers and clouds until well after sundown.

g. Surface Winds: During the autumn transition there is a shift in predominance of southerly winds to one of easterly and northerly winds. Winds during the early part of the season are similar to those of the southwest monsoon, while those of the latter part of this season resemble the pattern of the northeast monsoon. Some of the highest speeds recorded have occurred during this season and are probably associated with the squall lines which frequently mark the beginning of the northeast monsoon. Some high speeds are probably associated with an occasional typhoon, which may enter the country.

h. Upper Winds: This season shows a predominance of easterly winds below 20,000 feet particularly during October. Winds between 20,000 and 50,000 feet are westerly. Above 50,000 feet easterly winds are again encountered. Speeds during the autumn transition are generally lighter than those of the southwest monsoon, although speeds in excess of 30 knots are not rare, especially between 25,000 and 40,000 feet. The jet stream will occasionally be located over the Northern Region with wind up to 100 knots near 43,000 feet.

FALL TRANSITION

MEAN UPPER WINDS, TEMPERATURES AND "D" VALUE

	NORTHERN REGION			SOUTHERN REGION		
	dd/ff	TT	"D" Value	dd/ff	TT	"D" Value
850 MB	119/9	15	200	088/8	16	197
700 MB	345/3	8	439	045/5	10	438
500 MB	281/11	-6	930	341/7	-5	956
300 MB	258/20	-30	1703	201/6	-29	1761
200 MB	219/23	-51	2159	171/13	-51	2228
150 MB	284/22	-64	1888	348/9	-65	1933
100 MB	291/23	-77	1536	002/13	-78	1578
50 MB	117/12	-66	452	108/21	-66	439

Fig. 50

III. CLIMATIC BRIEFS AND TERRAIN MAPS

1. Climatic Briefs

a. General: On pages 61 thru 81 are climatic briefs for 25 locations in North Vietnam. Data included in these briefs have been gathered from all available sources.

An * indicates values less than 0.05 inches or values less than 0.5 days.

b. Index of Stations:

STATION NUMBER	NAME	LATITUDE	LONGITUDE	ELEVATION(FT)
48:800	Lai Chau	22°04'N	103°09'E	512
	Bao Ha	22°12'N	104°21'E	262
802	Cha Pa	22°21'N	103°49'E	5381
803	Lao Kay	22°30'N	103°57'E	338
805	Ha Ging	22°50'N	104°58'E	614
808	Cao Bang	22°40'N	106°31'E	1706
810	Bac Kan	22°09'N	105°50'E	433
813	Son La	21°20'N	103°54'E	1975
816	Tuyen Quang	21°49'N	105°12'E	213
	Phu Ho	21°27'N	105°14'E	80
819	Hanoi	21°03'N	105°52'E	32
823	Nam Dinh	20°25'N	106°10'E	21
825	Haiphong	20°49'N	106°43'E	16
826	Phu Lien	20°48'N	106°38'E	377
827	Norway Is.	20°37'N	107°09'E	361
830	Lang Son	21°50'N	106°46'E	850
831	Thai Nguyen	21°36'N	105°50'E	134
834	Gow Tow	20°59'N	107°45'E	230
838	Mon Cay	21°31'N	107°58'E	33
840	Thanh Hoa	19°48'N	105°47'E	16
844	Cau Rao	19°17'N	104°25'E	420
	Tien Tri	18°16'N	106°07'E	10
845	Vinh	18°40'N	105°40'E	20
846	Ha Tinh	18°21'N	105°54'E	15
848	Dong Hoi	17°29'N	106°36'E	23

2. Terrain Maps

a. General: Figures 51 thru 61 are terrain maps for the stations listed on the previous page. The map scale used is 1:500,000, with one inch equal to approximately 7 miles. Weather stations are not necessarily located in cities or towns, and where applicable are indicated at their correct position.

b. Map Legend:

Contours (reliable) (approximate)

500 ft intervals from . . . . . 0 - 1,000 ft

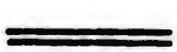
1,000 ft intervals from . . . . . 1000 - max

Spot Elevations

Reliable .569 Estimated .520±

Highest in general area 1027

Transportation

Dual lane roads . . . . . 

Primary roads . . . . . 

Secondary roads . . . . .

Trails . . . . .

Multiple track railroad . .

Single track railroad . . . 

CLIMATIC BRIEF

48800 LAI CHAU

22 04 N 103 09 E 512 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
MEAN MAX.		80	82	87	90	91	88	89	90	90	88	82	79	86	6
MEAN		65	69	72	78	79	81	80	80	79	76	70	63	74	6
MEAN MIN.		57	58	60	67	72	74	74	74	73	67	62	57	67	6
PRECIPITATION <IN.>															
MONTHLY MAX.		1.1	4.8	6.3	7.1	28.9	26.9	23.5	24.6	12.9	11.0	5.6	1.4	100.6	14
MONTHLY MEAN		.3	2.0	1.9	4.8	10.4	15.7	16.6	14.8	6.2	2.9	1.8	.4	77.8	14
MONTHLY MIN.		.0	.0	*	1.2	2.3	9.4	8.8	6.4	2.4	.0	.0	.0	57.4	14
24HR MAX.		.7	1.7	2.1	2.7	4.5	4.0	5.0	5.2	4.0	6.3	1.7	.9	6.3	14
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		2	5	4	9	14	21	23	18	9	4	5	2	116	14
RELATIVE HUMIDITY <%>															
MEAN		87	87	80	84	86	91	88	84	86	88	89	89	86	16
MEAN MIN.		25	25	13	25	33	42	47	35	40	28	32	28	13	6
MISCELLANEOUS															
MEAN CLOUDINESS<%>		60	50	52	51	60	59	66	61	56	53	49	62	57	6

CLIMATIC BRIEF

BAO HA

22 12 N 104 21 E 262 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
PRECIPITATION <IN.>															
MONTHLY MEAN		.7	2.2	2.4	7.1	7.0	8.2	10.7	8.6	12.1	5.0	1.3	.7	66.0	10
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		4	9	7	15	14	13	18	17	13	9	6	5	130	10
TOTAL CLOUD COVER	06	0	0	0	0	1	0	0	0	0	0	0	0		3
≤3/10 & VSBY≥2-1/2MI	07	0	0	0	0	1	P	1	0	0	0	0	0		2
	10	3	*	0	1	1	*	1	1	3	7	2	2		3
	13	15	3	7	4	10	1	0	1	4	8	1	11		1
	14	2	1	4	2	1	4	0	2	1	5	4	4		2
LOW CLOUD COVER	06	NA	NA	3	5	2	2	1	2	NA	1	1	NA		1
≤3/10 VSBY ≥2-1/2MI	07	NA	NA	1	NA	2	1	3	2	2	1	NA	NA		2
	10	7	5	8	9	17	16	19	18	13	18	12	11		3
	13	22	8	15	10	26	19	21	24	20	26	10	23		1
	14	12	18	17	22	21	24	14	22	19	20	21	23		1
	16	NA	7	3	10	25	18	NA	NA	NA	NA	NA	NA		<1
SFC WND ≥17KTS	06	1	0	0	0	0	0	0	0	0	1	0	0		2
& NO PRECIP	07	1	0	1	1	1	1	0	0	1	0	0	0		2
	10	*	1	1	1	0	0	1	1	0	*	*	0		4
	13	0	0	1	0	0	1	0	1	1	0	0	0		2
	14	0	0	0	0	0	0	0	2	0	0	0	0		2
	16	4	6	0	0	6	NA	NA	NA	NA	NA	NA	NA		<1
CIG ≥1000FT	06	0	0	4	8	15	14	8	4	4	1	1	0		2
VSBY ≥2-1/2MI	07	11	8	11	12	12	12	14	13	11	12	11	9		2
& WND ≤10KTS	10	13	14	19	20	24	23	26	24	25	23	23	21		4
	13	26	19	22	23	17	19	20	24	25	27	23	29		2
	14	14	17	18	25	30	29	30	24	25	27	26	24		2
	16	7	9	12	20	9	NA	NA	NA	NA	NA	NA	NA		<1
SFC WND 4-10KTS	06	5	6	11	6	7	4	2	3	2	3	5	4		2
TEMP 33-89°F	07	7	3	7	7	9	6	8	13	8	15	10	6		2
& NO PRECIP	10	11	12	16	12	16	9	18	17	16	21	16	12		4
	13	22	15	17	15	2	6	6	5	8	19	14	22		2
	14	17	16	20	14	11	6	3	3	6	14	19	16		2
	16	7	11	9	6	2	NA	NA	NA	NA	NA	NA	NA		<1
TERMINAL WEATHER <%>															
CEILING<700FT.A/O	07	53.3	55.8	40.0	39.0	45.5	50.8	48.6	52.5	47.5	62.5	52.5	52.0		2
VISIBILITY<1-1/4MI.	10	52.7	26.9	20.3	12.6	10.1	5.6	3.2	8.0	10.6	10.1	14.2	24.8		3
	13	.0	.0	8.7	.0	.0	.0	3.2	.0	4.1	.0	4.0	.0		2
CEILING≥1000FT. AND	07	43.3	34.6	48.0	44.1	43.2	40.7	45.9	41.0	40.7	37.5	42.4	30.0		2
VISIBILITY≥2-1/2MI.	10	45.1	62.8	70.9	78.2	87.0	85.4	92.1	88.5	89.4	85.3	84.1	70.8		3
	13	100.0	100.0	87.0	100.0	100.0	100.0	93.5	97.8	95.9	98.1	94.0	97.6		1
CEILING≥5000FT. AND	07	.0	.0	4.0	.0	4.6	.0	10.8	.0	.0	1.8	.0	.0		2
VISIBILITY >5MI.	10	18.7	12.9	20.5	19.4	60.7	44.1	62.0	64.7	58.4	69.5	44.3	35.4		3
	13	72.0	31.8	47.8	33.3	92.3	64.0	71.0	82.6	69.3	78.8	34.0	75.6		1

CLIMATIC BRIEF

48802 CHA PA

22 21 N 103 49 E 5331 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
PRECIPITATION <IN.>															
MONTHLY MAX.		7.9	7.2	14.2	14.3	20.1	23.5	32.4	34.4	37.6	17.8	11.0	7.5	137.7	16
MONTHLY MEAN		1.7	3.2	4.1	7.6	14.6	14.2	18.8	18.8	13.2	7.1	4.7	1.6	109.6	16
MONTHLY MIN.		.0	.1	.4	1.5	7.7	8.0	8.9	5.2	4.4	.9	.9	.0	85.9	16
24HR MAX.		1.4	2.9	2.6	4.0	13.8	4.6	9.8	9.5	5.9	7.1	4.1	5.4	13.8	16
PRECIPITATION		MEAN NUMBER OF DAYS WITH													
		10	12	11	14	19	21	21	22	18	13	13	8	182	16
TOTAL CLOUD COVER	01	8	5	10	6	5	5	4	5	6	7	9	8		2
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	5	11	0	7	7	3	NA	NA	NA	NA		<1
	07	5	5	7	5	1	2	2	3	5	5	9	7		3
	10	6	4	7	7	1	0	1	1	3	2	10	11		2
	13	7	4	9	9	2	1	*	*	2	1	4	8		2
	16	NA	NA	6	11	7	3	2	1	NA	NA	NA	NA		<1
	19	9	7	10	9	5	4	3	4	8	8	12	11		3
	22	8	7	8	10	8	9	5	9	7	9	13	12		2
LOW CLOUD COVER	01	19	10	11	7	15	6	12	6	11	10	14	14		3
≤3/10 VSBY ≥2-1/2MI	04	10	NA	4	12	NA	NA	NA	NA	4	21	NA	NA		<1
	07	15	16	11	8	6	7	9	6	8	10	18	14		2
	10	10	10	8	14	2	4	6	4	3	2	13	16		1
	13	16	12	14	16	7	2	NA	13	9	NA	3	20		1
	16	31	28	19	12	31	NA	31	NA	NA	NA	NA	NA		1
	19	15	16	21	22	16	11	8	12	16	14	22	23		2
	22	16	15	20	15	13	10	9	15	11	13	17	19		2
SFC WND ≥17KTS	01	2	1	5	2	4	2	2	2	*	*	2	2		3
& NO PRECIP	04	NA	NA	4	9	7	1	7	3	NA	NA	NA	NA		<1
	07	3	3	3	5	8	2	3	2	0	1	1	3		3
	10	2	4	5	10	7	3	6	4	0	0	4	5		2
	13	4	4	5	6	6	4	6	3	*	2	2	3		3
	16	NA	NA	7	5	9	3	6	4	NA	NA	NA	NA		<1
	19	2	4	7	2	4	6	7	2	1	0	2	5		3
	22	2	4	6	1	3	6	8	4	0	0	3	3		2
CIG ≥1000FT	01	25	15	21	21	23	24	25	28	27	26	23	24		2
VSBY ≥2-1/2MI	04	NA	NA	NA	11	NA	NA	NA	NA	NA	NA	NA	NA		<1
& WND ≤10KTS	07	23	10	22	19	20	24	26	26	27	28	24	21		2
	10	20	13	17	19	26	23	25	NA	29	31	23	21		1
	13	21	15	20	22	25	23	18	NA	27	25	20	24		1
	16														
	19	24	14	13	23	25	24	20	26	26	29	23	21		2
	22	21	NA	14	23	25	22	20	28	28	29	24	24		1
SFC WND 4-10KTS	01	4	1	5	4	6	3	4	1	1	*	2	3		3
TEMP 33-89°F	04	NA	NA	3	3	1	1	1	3	NA	NA	NA	NA		<1
& NO PRECIP	07	3	1	5	3	5	1	2	2	1	1	1	1		3
	10	4	2	2	3	2	2	3	0	2	1	4	4		2
	13	6	3	5	5	4	2	2	3	4	2	6	8		3
	16	NA	NA	2	2	2	2	0	0	NA	NA	NA	NA		<1
	22	1	2	2	4	3	1	3	0	2	1	1	5		2
TERMINAL WEATHER <%>															
CEILING<700FT.A/O	01	15.4	30.0	29.4	23.8	3.7	3.2	3.2	6.9	10.0	10.8	22.6	20.0		1
VISIBILITY<1-1/4MI.	07	4.8	15.8	8.7	11.5	3.3	2.9	2.7	8.3	3.1	5.4	8.8	7.5		2
	10	16.7	23.5	26.7	10.5	.0	4.0	.0	21.4	4.5	.0	7.7	5.4		2
	13	25.0	.0	23.1	9.1	.0	.0	.0	.0	7.7	.0	11.1	.0		2
	19	15.8	20.0	16.7	13.0	3.0	2.9	.0	.0	4.4	6.9	.0	3.3		3
	22	22.2	21.1	10.5	15.0	.0	2.6	.0	.0	5.7	.0	9.1	6.3		1
CEILING≥1000FT. AND	01	84.6	65.0	70.6	76.2	96.3	93.5	93.5	93.1	86.7	89.2	77.4	80.0		1
VISIBILITY≥2-1/2MI.	07	85.7	84.2	91.3	76.9	93.3	97.1	97.3	91.7	87.5	94.6	88.2	92.5		2
	10	77.8	76.5	66.7	89.5	100.0	88.0	100.0	71.4	95.5	100.0	92.3	91.9		1
	13	75.0	100.0	76.9	90.9	88.9	100.0	100.0	85.7	92.3	100.0	88.9	100.0		1
	19	84.2	80.0	79.2	87.0	97.0	97.1	100.0	97.1	88.9	93.1	96.6	96.7		3
	22	77.8	73.7	84.2	80.0	96.3	97.4	94.4	100.0	94.3	94.3	90.9	93.8		1
CEILING≥5000FT. AND	01	61.6	40.0	23.6	38.1	62.9	25.7	45.2	31.0	53.3	32.4	54.8	48.0		1
VISIBILITY >5MI.	07	47.7	63.2	47.8	38.4	30.0	29.3	29.7	22.3	28.1	32.4	64.7	47.5		2
	10	33.4	47.1	26.7	52.7	5.9	12.0	18.8	28.4	27.2	7.7	50.0	51.3		1
	13	37.5	41.6	38.5	45.5	22.2	16.8	50.1	28.6	30.8	.0	33.3	70.7		1
	19	58.0	60.0	50.1	78.2	60.6	48.7	34.4	51.5	57.8	58.6	75.7	73.3		2
	22	61.2	58.0	52.7	65.0	51.8	41.0	47.2	53.1	48.6	45.7	66.6	68.8		1

CLIMATIC BRIEF

48803 LAO KAY

22 30 N 103 57 E 338 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		88	93	99	102	109	103	103	101	99	98	95	91	109	34
MEAN MAX.		69	71	77	83	89	90	90	90	88	83	78	73	82	34
MEAN		60	64	68	75	80	82	82	82	80	75	69	64	73	33
MEAN MIN.		56	58	63	69	73	76	76	76	74	69	63	58	68	34
EXTREME MIN.		32	36	42	46	58	64	70	63	58	46	42	29	29	34
PRECIPITATION <IN.>															
MONTHLY MAX.		2.5	3.9	6.0	9.8	18.5	19.3	22.6	31.9	22.2	11.3	7.0	4.1	98.8	34
MONTHLY MEAN		.6	1.5	2.2	4.6	8.6	8.6	11.9	13.3	9.6	4.6	2.3	.9	68.7	34
MONTHLY MIN.		*	*	.3	1.1	3.0	1.7	5.2	5.5	3.8	.4	*	*	43.7	34
24HR MAX.		1.4	1.6	2.2	4.0	5.8	4.9	6.9	6.9	5.7	3.9	3.1	2.3	6.9	34
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		5	7	9	13	16	17	19	19	14	11	9	5	144	34
THUNDERSTORM		1	2	3	7	6	4	10	9	4	1	0	0	47	3
FOG	06	4	2	*	2	1	3	2	2	6	6	5	6	39	8
	13	*	*	*	*	0	*	0	*	0	0	1	*	2	9
TOTAL CLOUD COVER	01	4	1	5	3	3	5	3	5	6	5	5	4		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	2	3	1	6	8	1	NA	NA	NA	NA		<1
	07	*	*	*	1	*	*	0	1	2	1	*	1		4
	10	3	2	2	4	3	4	2	4	4	3	7	8		2
	13	4	4	7	10	6	3	2	3	5	6	8	10		4
	16	16	7	13	11	7	6	7	2	NA	NA	NA	NA		<1
	19	7	6	9	7	7	4	3	5	8	12	10	11		4
	22	6	5	4	5	8	11	8	6	13	9	8	12		2
LOW CLOUD COVER	01	3	1	4	3	6	6	6	7	10	8	6	7		4
≤3/10 VSBY ≥2-1/2MI	07	1	*	1	1	2	3	3	2	5	4	2	2		4
	10	3	2	2	6	8	8	10	12	13	7	11	12		2
	13	6	5	9	11	12	9	9	14	14	18	12	13		4
	16	NA	21	14	11	31	22	16	21	10	21	NA	10		<1
	19	6	9	8	11	11	13	10	13	17	16	14	13		4
	22	5	6	5	6	10	11	12	10	15	9	9	12		2
SFC WND ≥17KTS	01	*	0	0	0	1	0	0	0	0	*	1	1		3
& NO PRECIP	04	NA	NA	0	0	0	0	0	0	NA	NA	NA	NA		<1
	07	*	*	0	0	0	*	0	*	*	0	*	1		5
	10	0	0	0	0	0	0	0	0	0	0	0	1		2
	13	*	*	0	1	1	0	1	*	1	*	0	1		4
	16	NA	NA	1	0	0	0	0	0	NA	NA	NA	10		<1
	19	0	0	*	1	1	0	0	1	0	*	0	0		4
	22	1	0	0	0	0	0	0	0	1	0	0	0		2
CIG ≥1000FT	01	28	25	30	28	29	28	27	27	28	27	28	28		3
VSBY ≥2-1/2MI	04	NA	NA	NA	29	31	29	27	20	NA	NA	NA	NA		<1
& WND ≤10KTS	07	25	24	28	28	26	24	24	21	23	22	23	25		4
	10	29	27	29	30	30	28	29	29	28	29	29	29		2
	13	29	27	30	28	29	29	29	30	28	30	29	30		4
	16	NA	NA	30	29	30	29	29	29	NA	NA	NA	NA		<1
	19	31	28	30	29	29	29	30	28	29	30	30	31		4
	22	29	27	31	29	31	30	31	30	29	30	30	31		2
SFC WND 4-10KTS	01	1	1	2	1	1	1	1	*	*	*	2	1		3
TEMP 33-89°F	04	NA	NA	2	0	0	0	1	0	NA	NA	NA	NA		<1
& NO PRECIP	07	1	*	1	1	1	1	1	1	1	1	1	1		4
	10	3	2	3	2	1	1	3	3	1	2	1	0		2
	13	5	7	6	5	2	1	2	2	2	3	7	4		4
	16	NA	NA	13	10	6	4	1	0	NA	NA	NA	NA		<1
	19	2	1	7	5	4	1	1	1	1	1	2	2		4
	22	2	1	1	1	1	1	1	0	1	0	2	1		2
RELATIVE HUMIDITY <%>															
MEAN		90	89	88	89	87	89	90	88	88	88	89	88	89	10
MEAN MIN.		39	27	31	35	35	44	40	31	31	29	30	30	27	10
WIND <16PTS & KNOTS>															
PREVAILING DIRECTION		S	S	S	S	S	S	S	S	S	S	S	S	S	33
MEAN SPEED		7	8	8	8	6	5	5	5	10	10	15	7	8	NA
TERMINAL WEATHER <%>															
CEILING<700FT.A/O	01	4.2	3.9	6.9	3.0	1.5	3.3	3.3	4.4	3.1	13.4	6.2	8.9		3
VISIBILITY<1-1/4MI.	04	NA	NA	.0	.0	.0	.0	.0	33.3	NA	NA	NA	NA		<1
	07	12.4	4.3	3.6	1.0	7.6	8.8	10.8	6.4	14.1	18.2	15.4	13.2		6
	10	.0	1.9	1.9	2.4	2.1	1.9	2.0	3.9	2.1	.0	2.1	1.9		3
	13	1.1	.0	.0	2.4	1.0	2.6	.0	1.2	4.2	.0	2.1	2.8		5
	19	.0	.0	.0	2.2	1.0	.0	.0	1.0	1.9	.0	.0	1.0		6
	22	.0	.0	.0	1.8	.0	.0	.0	.0	.0	.0	.0	.0		2
CEILING≥1000FT. AND	01	93.7	92.2	93.1	93.9	93.8	91.7	86.7	85.3	93.8	86.6	93.8	89.3		3
VISIBILITY≥2-1/2MI.	07	79.0	90.2	90.9	94.8	82.2	78.4	76.3	70.2	74.7	70.7	77.9	82.5		4
	10	92.3	96.2	92.6	97.6	95.8	94.3	94.1	92.2	95.8	93.2	97.9	94.2		2
	13	93.3	100.0	96.6	97.6	95.9	96.2	95.3	97.6	92.6	98.9	96.9	96.3		4
	16	NA	75.0	100.0	100.0	100.0	100.0	100.0	66.7	100.0	66.7	100.0	98.8		1
	19	98.8	100.0	98.9	94.6	96.1	97.3	98.9	95.1	96.1	97.8	98.9	97.9		4
	22	95.8	100.0	98.2	96.4	98.0	100.0	100.0	96.1	100.0	100.0	100.0	100.0		2
CEILING≥5000FT. AND	01	8.4	7.9	10.3	16.6	21.4	26.7	21.6	28.0	27.6	17.9	23.1	12.5		3
VISIBILITY >5MI.	07	2.9	2.2	2.7	6.2	8.3	19.6	12.9	12.8	20.1	9.0	11.5	3.5		4
	10	5.7	13.5	11.2	33.3	48.0	43.4	52.9	54.9	48.0	42.4	44.6	48.0		2
	13	31.0	31.8	46.9	55.3	57.7	55.1	53.5	44.4	58.0	68.2	60.4	53.1		4
	19	21.3	36.1	31.2	47.3	43.6	56.2	59.6	54.9	64.1	56.1	48.1	46.3		4
	22	14.6	22.4	17.8	25.4	45.0	45.8	38.0	41.1	44.7	26.4	37.8	23.1		2
MISCELLANEOUS															
MEAN PRESS.-MSL<MBS>		1020	1017	1014	1010	1007	1004	1002	1003	1009	1015	1018	1019	1011	12
MEAN CLOUDINESS<%>		85	83	77	71	68	73	74	71	68	73	76	79	75	34

CLIMATIC BRIEF

48805 HA GING

22 50 N 104 58 E 614 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		84	90	92	98	99	101	104	102	100	100	91	85	104	6
MEAN MAX.		66	72	75	83	90	92	94	94	93	88	78	72	83	6
MEAN		62	64	70	76	81	83	84	83	82	76	68	64	74	7
MEAN MIN.		55	58	62	69	74	76	76	76	74	67	63	58	67	6
EXTREME MIN.		40	43	49	59	63		70	73	58	52	51	42	40	6
PRECIPITATION <IN.>															
MONTHLY MAX.		3.8	4.4	3.0	12.3	23.7	26.6	40.2	28.9	19.4	13.0	14.6	4.2	122.3	17
MONTHLY MEAN		1.2	2.0	1.3	5.1	12.1	18.1	20.5	17.2	9.6	4.5	4.3	1.2	97.3	17
MONTHLY MIN.		*	*	.1	1.3	3.6	9.2	11.0	6.6	3.6	.2	.4	*	75.0	17
24HR MAX.		1.5	1.8	2.1	2.6	7.8	9.2	8.1	7.0	3.8	6.9	3.9	3.4	9.2	17
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		7	8	6	12	16	19	22	20	14	10	8	6	148	17
RELATIVE HUMIDITY <%>															
MEAN		82	81	80	81	79	80	80	82	81	79	84	84	81	7
MEAN MIN.		28	23	31	36	37	41	37	43	25	15	30	20	15	7
MISCELLANEOUS															
MEAN CLOUDINESS<%>		79	66	70	70	65	70	66	67	58	55	71	73	68	7

CLIMATIC BRIEF

48808 CAO BANG

22 40 N 106 31 E 1706 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
						PRECIPITATION <IN.>									
MONTHLY MAX.		2.8	3.7	2.0	4.3	11.7	16.8	14.7	15.6	19.8	10.7	5.6	1.5	70.0	16
MONTHLY MEAN		.6	1.4	.9	2.4	7.2	10.9	10.0	10.6	6.5	3.9	1.5	.4	56.1	16
MONTHLY MIN.		.0	*	.0	.0	2.1	3.5	4.6	5.3	.0	.0	.0	.0	36.2	16
24HR MAX.		1.6	2.5	1.1	2.1	3.8	4.7	3.0	3.4	3.9	5.3	1.9	.6	5.3	16
						MEAN NUMBER OF DAYS WITH									
PRECIPITATION		3	6	4	8	12	15	16	14	10	6	4	3	101	16
TOTAL CLOUD COVER	01	9	4	4	2	5	4	4	6	5	9	5	6		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	2	3	3	10	3	3	NA	NA	NA	NA		<1
	07	3	2	1	2	1	2	1	1	1	1	1	2		3
	10	6	4	1	2	2	3	1	2	2	10	2	6		2
	13	7	6	4	4	1	2	1	1	3	6	5	8		3
	16	NA	NA	7	8	4	5	2	2	NA	NA	NA	NA		<1
	19	11	7	6	6	7	4	3	5	9	13	10	13		3
	22	11	8	5	7	7	5	7	7	10	14	10	13		2
LOW CLOUD COVER	01	5	4	2	3	5	3	6	8	8	11	6	8		3
≤3/10 VSBY ≥2-1/2MI	04	NA	NA	NA	4	8	13	5	8	4	NA	NA	NA		1
	07	2	2	1	2	3	3	4	1	3	4	2	4		3
	10	4	5	1	2	5	6	4	6	7	11	3	7		2
	13	6	10	3	5	4	3	4	5	5	12	9	10		3
	16	NA	NA	6	6	19	7	8	19	6	NA	NA	31		1
	19	11	9	5	8	12	10	9	10	11	14	11	16		3
	22	11	9	5	8	9	6	9	11	15	13	12	14		2
SFC WND ≥17KTS	01	*	1	0	0	1	1	*	0	*	0	1	0		2
& NO PRECIP	04	NA	NA	NA	0	0	0	0	0	NA	NA	NA	NA		<1
	07	0	0	0	0	1	*	0	0	*	1	*	0		3
	10	1	0	0	0	0	1	0	0	0	0	0	1		2
	13	*	1	1	*	1	1	0	*	1	*	0	1		3
	16	NA	NA	0	0	0	1	0	1	NA	NA	NA	NA		<1
	19	*	1	1	1	1	*	0	0	0	0	*	0		3
	22	0	0	0	0	1	0	0	0	1	0	1	0		2
CIG ≥1000FT	01	29	25	29	30	29	28	28	26	26	26	26	26		3
VSBY ≥2-1/2MI	04	NA	NA	NA	27	28	25	26	27	NA	NA	NA	NA		<1
& WND ≤10KTS	07	24	24	28	28	27	26	26	22	15	21	24	24		3
	10	29	25	30	30	30	27	28	31	28	29	29	27		2
	13	29	25	28	29	29	28	30	29	26	29	29	29		3
	16	NA	NA	31	30	30	28	28	30	NA	NA	NA	NA		<1
	19	30	26	29	28	30	29	30	29	30	30	29	31		3
	22	30	27	31	29	30	29	30	30	28	31	29	31		2
SFC WND 4-10KTS	01	3	3	6	9	10	2	3	0	0	1	3	3		3
TEMP 33-89°F	04	NA	NA	NA	9	2	2	3	NA	NA	NA	NA	NA		<1
& NO PRECIP	07	1	2	6	6	4	1	1	0	1	*	3	4		3
	10	6	3	7	11	7	2	3	2	4	2	4	3		2
	13	7	7	14	13	9	6	5	5	4	8	10	9		3
	16	NA	NA	15	15	10	9	6	2	NA	NA	NA	NA		<1
	19	5	6	15	12	9	4	5	2	3	3	4	3		3
	22	4	3	4	3	6	5	1	1	1	1	2	1		2
						TERMINAL WEATHER <%>									
CEILING<700FT.A/O	01	5.4	5.6	5.0	2.9	7.4	2.2	10.4	14.3	17.4	7.5	9.3	15.0		
VISIBILITY<1-1/4MI.	07	24.0	12.2	5.6	9.1	5.6	9.0	15.2	31.4	47.1	32.7	16.1	16.0		3
	10	2.1	6.7	4.1	.0	2.4	5.5	7.7	.0	7.5	6.0	2.2	8.3		4
	13	5.8	2.2	4.1	.0	1.8	2.2	.0	1.9	4.4	2.5	3.3	4.9		2
	19	3.1	3.8	1.2	.0	.0	2.8	3.2	1.4	1.4	1.5	1.6	1.7		5
	22	4.3	2.0	.0	1.8	.0	4.3	2.0	2.0	4.3	.0	.0	.0		5
CEILING≥1000FT. AND	01	91.9	94.4	92.5	94.3	90.7	97.8	97.5	83.7	82.6	90.6	90.7	82.5		2
VISIBILITY≥2-1/2MI.	07	76.0	88.8	91.7	90.9	88.9	85.4	81.8	67.1	50.0	67.3	78.6	76.0		3
	10	97.9	93.3	95.9	100.0	95.2	91.3	92.3	100.0	92.5	94.0	95.6	91.7		3
	13	94.2	97.8	93.9	100.0	98.2	97.8	100.0	98.1	88.9	92.5	96.7	95.1		2
	19	96.9	96.2	97.7	100.0	100.0	97.2	96.8	98.6	98.6	95.5	98.4	98.3		3
	22	95.7	98.0	100.0	96.4	98.0	95.7	98.0	98.0	93.6	100.0	100.0	100.0		3
CEILING≥5000FT. AND	01	18.9	13.9	5.0	11.5	18.6	15.2	29.2	42.9	26.1	35.9	24.3	25.0		2
VISIBILITY >5MI.	07	9.3	8.1	2.8	7.2	14.5	15.7	15.1	8.5	13.3	11.4	9.0	16.0		3
	10	12.5	13.3	8.1	15.8	26.2	21.7	20.5	30.0	35.0	42.0	17.8	29.2		3
	13	26.8	39.1	12.1	38.7	35.7	24.0	35.3	38.4	35.6	62.5	36.6	43.9		2
	19	32.9	34.7	17.6	34.6	51.7	40.2	38.7	47.3	48.5	58.3	39.3	57.7		3
	22	31.9	26.5	18.1	26.8	42.0	29.7	48.0	42.0	61.8	54.5	45.3	44.0		3
															2

CLIMATIC BRIEF 48810 BAC KAN

22 09 N 105 50 E 433 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
						PRECIPITATION <IN.>									
MONTHLY MEAN		.5	1.7	1.4	3.9	7.8	12.6	13.7	12.5	6.2	2.2	1.1	.8	64.4	23
						MEAN NUMBER OF DAYS WITH									
PRECIPITATION		5	8	7	9	12	16	17	18	10	5	5	4	116	23
TOTAL CLOUD COVER	01	3	3	2	1	4	5	3	5	3	4	3	1		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	NA	NA	1	6	4	3	NA	NA	NA	NA		<1
	07	1	0	*	*	1	1	1	0	*	1	1	1		3
	10	4	1	1	2	1	3	1	2	4	9	6	9		2
	13	6	3	2	3	*	1	1	1	4	6	5	7		3
	16	NA	NA	4	5	1	2	2	1	NA	NA	NA	NA		<1
	19	9	6	5	4	6	5	2	3	11	14	12	12		3
	22	7	4	3	5	6	8	7	6	12	13	7	9		2
LOW CLOUD COVER	01	NA	2	1	2	4	5	8	8	5	6	4	4		3
≤3/10 VSBY ≥2-1/2MI	04	NA	NA	NA	NA	6	NA	3	NA	NA	NA	NA	NA		<1
	07	NA	NA	NA	NA	3	5	3	2	2	2	2	1		3
	10	3	1	2	3	4	7	7	7	9	11	10	9		2
	13	3	7	3	4	6	2	6	5	7	13	7	12		3
	16	NA	NA	5	9	10	NA	8	31	NA	NA	15	31		1
	19	8	7	4	5	13	10	10	10	14	15	15	15		3
	22	7	4	3	6	8	10	9	10	14	14	9	10		2
SFC WND ≥17KTS	01	*	0	0	1	1	*	3	3	3	*	1	0		3
& NO PRECIP	04	NA	NA	0	0	0	1	0	0	NA	NA	NA	NA		<1
	07	*	0	*	0	*	0	0	0	0	0	*	1		3
	10	0	0	1	0	0	0	0	0	0	0	0	1		2
	13	*	0	1	*	*	*	0	1	*	1	*	*		3
	16	NA	NA	0	0	0	0	0	0	NA	NA	NA	NA		<1
	19	*	*	*	*	*	1	0	*	0	0	0	0		3
	22	0	0	0	0	0	0	0	0	0	1	0	1		2
CIG ≥1000FT	01	24	23	28	29	29	26	28	23	23	22	24	25		3
VSBY ≥2-1/2MI	04	NA	NA	27	28	30	25	28	16	NA	NA	NA	NA		<1
& WND ≤10KTS	07	23	24	25	27	29	24	25	21	19	22	23	20		3
	10	30	26	30	29	30	28	29	30	30	30	29	30		2
	13	30	26	27	30	29	29	28	28	28	30	28	29		3
	16	NA	NA	31	30	30	30	31	29	NA	NA	NA	NA		<1
	19	30	27	29	29	30	28	29	29	29	31	29	30		3
	22	29	26	31	30	31	29	30	28	29	30	29	29		2
SFC WND 4-10KTS	01	4	2	3	2	*	*	*	*	0	1	3	2		3
TEMP 33-89°F	04	NA	NA	3	2	1	0	1	0	NA	NA	NA	NA		<1
& NO PRECIP	07	3	3	2	1	1	*	0	1	*	1	2	3		3
	10	9	5	4	6	4	1	0	1	2	4	5	5		2
	13	7	6	4	4	6	4	1	1	4	5	7	5		3
	16	NA	NA	4	4	0	1	2	0	NA	NA	NA	NA		<1
	19	2	3	2	2	1	*	1	*	*	1	3	3		3
	22	4	2	2	0	2	1	1	0	0	1	2	2		2
						TERMINAL WEATHER <%>									
CEILING<700FT.A/O	01	12.5	13.9	9.8	.0	2.2	4.4	6.2	14.6	27.3	26.8	16.0	22.5		3
VISIBILITY<1-1/4MI.	07	13.2	15.4	12.3	8.0	4.2	12.7	21.0	17.6	19.7	21.6	23.0	24.4		4
	10	4.0	5.8	2.1	.0	2.1	2.2	2.2	.0	.0	3.6	.0	1.8		2
	13	2.6	6.9	.0	.0	4.3	.0	5.1	2.8	.0	2.9	3.0	.0		4
	19	1.8	1.7	3.5	.0	1.4	4.1	4.9	1.4	1.4	.0	1.5	1.6		4
	22	6.0	3.9	1.8	.0	.0	2.1	1.9	1.9	4.1	1.8	3.8	5.4		2
CEILING≥1000FT. AND	01	87.5	86.1	90.2	97.1	93.3	84.4	85.4	75.0	72.7	69.6	78.0	77.5		3
VISIBILITY≥2-1/2MI.	07	83.0	82.7	86.0	88.0	94.4	77.8	71.0	72.5	70.5	74.5	75.4	71.1		3
	10	96.0	94.2	97.9	95.0	95.8	93.5	93.5	100.0	100.0	94.5	97.9	98.2		2
	13	97.4	89.7	86.2	100.0	93.5	100.0	87.2	94.4	100.0	94.3	97.0	100.0		3
	16														
	19	98.2	98.3	96.5	98.1	98.6	95.9	91.5	95.9	97.3	100.0	98.5	98.4		3
	22	94.0	94.1	98.2	100.0	98.1	95.7	96.2	92.3	95.9	98.2	96.2	94.6		2
CEILING≥5000FT. AND	01	9.4	2.8	2.4	5.9	24.3	19.9	33.4	29.1	22.7	19.7	16.0	7.5		3
VISIBILITY >5MI.	07	9.4	5.7	3.5	4.0	19.6	14.3	17.7	9.9	13.1	15.7	6.5	4.4		3
	10	28.0	17.2	12.7	17.5	29.2	34.7	39.1	33.4	46.2	47.3	41.7	39.4		2
	13	34.2	30.9	13.7	20.0	37.0	17.0	38.5	47.3	65.3	60.0	33.3	42.2		3
	19	53.6	42.4	22.9	24.6	65.3	48.0	47.6	46.6	54.8	54.9	53.8	49.9		3
	22	28.0	25.5	17.7	24.1	37.3	40.5	32.1	38.5	55.1	52.6	38.4	26.8		2

CLIMATIC BRIEF

48813 SON LA

21 20 N 103 54 E 1975 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		85	89	94	94	94	92	90	93	92	90	90	83	94	4
MEAN MAX.		70	75	83	83	86	85	85	84	84	83	78	71	80	4
MEAN		58	62	68	72	76	77	76	77	75	71	69	59	70	4
MEAN MIN.		50	53	56	63	68	71	71	72	70	63	58	49	62	4
EXTREME MIN.		34	43	46	50	62	63	66	66	59	51	42	31	34	4
PRECIPITATION <IN.>															
MONTHLY MAX.		3.1	3.0	2.7	7.5	11.3	16.9	23.5	15.7	13.3	3.8	9.8	1.5	72.0	16
MONTHLY MEAN		.5	1.3	1.3	4.9	7.0	10.3	11.6	11.0	5.8	1.7	1.3	.4	57.1	16
MONTHLY MIN.		.0	.0	.4	2.4	2.7	3.9	2.6	4.4	.6	.0	.0	.0	41.0	16
24HR MAX.		1.3	1.2	2.2	2.8	3.6	3.9	4.9	4.3	5.1	3.0	3.2	.7	5.1	16
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		1	4	4	9	14	15	19	18	12	5	3	2	106	16
THUNDERSTORM	06	0	0	*	1	*	*	*	*	*	0	0	0	2	7
	13	0	*	0	1	2	1	2	0	*	*	0	0	6	8
FOG	06	4	2	3	3	2	1	3	2	2	7	3	5	38	7
	13	0	0	*	1	*	0	*	*	*	0	*	0	2	9
TOTAL CLOUD	06	8.7	6.3	8.9	7.1	4.2	.9	1.7	1.6	3.2	7.4	6.3	8.9	65.2	7
COVER ≤3/10	13	12.9	8.6	13.6	12.8	7.8	1.6	1.8	2.5	5.0	10.9	7.1	13.6	98.2	8
LOW CLOUD	06	10.2	7.1	11.1	10.6	8.1	5.4	7.5	5.4	5.5	10.5	8.3	12.6	102.3	7
COVER ≤3/10	13	15.1	10.3	16.0	15.0	10.2	5.7	4.6	6.4	7.5	12.5	8.8	15.5	127.5	8
TOTAL CLOUD	06	19.3	20.7	20.8	20.9	23.4	27.6	26.9	27.8	25.0	19.2	21.1	18.2	270.9	7
COVER ≥7/10	13	9.8	15.3	12.9	11.2	17.1	22.7	25.6	24.4	18.4	12.8	16.5	12.0	198.7	8
LOW CLOUD	06	17.8	19.9	18.6	17.2	18.4	21.6	19.2	24.4	22.5	16.7	18.9	15.7	230.9	7
COVER ≥7/10	13	8.3	14.1	10.6	8.5	14.0	10.0	13.7	16.2	10.6	10.3	13.3	8.9	138.5	8
TOTAL CLOUD COVER	06	7.5	4.5	7.0	5.1	4.2	.9	1.7	1.2	2.8	6.2	6.0	7.6	54.7	5
≤3/10 & VSBY≥2-1/2MI	13	12.7	8.4	13.3	11.8	7.8	1.6	1.8	2.5	5.0	10.9	7.1	13.4	96.3	5
RELATIVE HUMIDITY <%>															
MEAN		89	88	79	81	85	86	90	92	89	86	86	85	86	4
MEAN MIN.		22	20	6	24	34	42	45	41	34	30	25	12	6	4
WIND <16PTS & KNOTS>															
MEAN SPEED		8	10	13	13	11	7	7	7	8	8	8	7	9	NA
TERMINAL WEATHER <%>															
CEILING≥1000FT. AND	06	69.7	70.6	78.1	69.0	78.4	65.3	61.3	49.7	56.7	64.2	59.0	71.3	66.1	5
VISIBILITY≥2-1/2MI.	13	99.4	98.6	98.4	92.3	90.0	87.3	81.6	89.7	97.7	95.5	96.0	98.4	93.7	5
≥1000FT.≥2-1/2MI.AND	06	21.5	19.4	24.4	20.3	24.3	19.6	19.0	15.2	17.0	19.9	17.5	21.7	239.8	5
WIND SPEED≤10KNOTS.	13	29.0	24.4	28.3	25.7	27.2	25.9	24.0	27.6	28.2	28.7	27.0	28.6	324.6	5
MISCELLANEOUS															
MEAN CLOUDINESS<%>		60	64	48	59	66	78	85	89	74	48	68	54	66	4

CLIMATIC BRIEF

48816 TUYEN QUANG

21 49 N 105 12 E 213 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		83	90	93	98	100	98	100	100	97	94	92	91	100	13
MEAN MAX.		64	68	72	80	88	90	90	90	88	84	77	72	80	13
MEAN MIN.		55	58	62	68	74	76	76	76	74	67	62	58	67	13
EXTREME MIN.		40	41	47	55	64	69	72	68	61	51	47	39	39	13
PRECIPITATION <IN.>															
MONTHLY MAX.		3.3	3.5	5.3	9.2	18.5	15.1	20.0	18.4	15.9	11.6	9.7	4.3	86.0	31
MONTHLY MEAN		.7	1.5	1.4	3.5	8.7	9.6	11.7	11.5	7.9	3.9	1.4	.8	62.6	31
MONTHLY MIN.		*	.1	.2	.3	3.5	4.6	4.7	4.8	1.5	.3	.0	.0	44.3	31
24HR MAX.		1.5	2.9	2.3	4.6	7.0	7.9	10.0	7.1	7.6	7.2	5.3	2.6	10.0	31
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		7	11	11	12	13	14	18	17	12	7	6	5	133	31
RELATIVE HUMIDITY <%>															
MEAN		88	88	87	88	85	85	85	87	85	83	85	85	86	7
MEAN MIN.		22	28	33	30	36	33	44	29	25	26	36	15	15	7
MISCELLANEOUS															
MEAN CLOUDINESS<%>		91	89	87	81	74	77	78	78	74	71	79	84	80	13

CLIMATIC BRIEF

48819 HANOI

21 03 N 105 52 E 32 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		92	95	98	101	109	105	104	101	99	96	94	89	109	48
MEAN MAX.		69	69	74	81	89	92	91	90	88	84	78	72	81	48
MEAN		62	63	68	75	82	85	84	83	82	77	71	65	75	33
MEAN MIN.		57	58	63	69	75	78	78	78	76	71	65	59	69	48
EXTREME MIN.		42	43	47	50	60	69	71	70	63	54	44	41	41	48
PRECIPITATION <IN.>															
MONTHLY MAX.		2.8	3.1	3.7	11.3	19.4	16.0	27.0	19.1	22.8	16.9	5.8	2.2	88.1	23
MONTHLY MEAN		.7	1.1	1.5	3.2	7.7	9.4	12.7	13.5	10.0	3.9	1.7	.8	66.2	31
MONTHLY MIN.		*	*	.2	.6	3.1	4.3	2.9	5.0	.9	.2	.1	.0	51.1	23
24HR MAX.		1.0	1.6	2.4	5.9	3.9	6.1	8.8	8.0	6.7	5.9	2.6	1.2	8.8	23
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		10	13	17	15	15	16	18	19	15	10	8	8	164	23
THUNDERSTORM		0	1	3	5	8	8	13	11	10	4	1	0	64	3
FOG	06	7	7	9	7	1	1	*	1	2	6	6	7	54	9
	13	1	*	1	*	0	*	*	0	0	0	*	*	3	9
TOTAL CLOUD	06	3.2	1.2	1.2	2.2	2.0	2.0	1.7	1.9	4.7	9.6	4.6	6.0	40.3	8
COVER ≤3/10	13	5.3	3.5	3.8	3.6	2.8	2.1	1.9	1.8	4.0	9.1	5.9	9.7	53.5	9
LOW CLOUD	06	4.8	2.1	2.3	5.2	11.0	17.1	17.5	16.3	15.3	17.9	9.7	9.7	129.5	8
COVER ≤3/10	13	8.5	4.0	4.7	9.7	15.1	20.1	21.3	18.7	19.5	20.5	15.5	15.2	175.5	9
TOTAL CLOUD	06	26.9	26.2	29.4	26.5	25.9	25.7	26.7	26.0	22.0	17.6	24.2	23.7	300.8	8
COVER ≥7/10	13	22.9	23.2	25.5	22.2	21.9	25.2	25.4	25.8	19.7	14.9	18.5	18.8	264.0	9
LOW CLOUD	06	25.0	25.4	28.3	23.6	15.5	9.2	8.2	9.0	10.5	8.9	17.1	19.1	199.8	8
COVER ≥7/10	13	19.0	21.5	20.0	13.8	4.8	1.6	2.6	4.5	3.0	4.1	7.9	13.6	116.4	9
TOTAL CLOUD COVER	06	1.3	.3	.3	.7	1.6	1.7	1.7	1.9	4.2	7.0	2.2	3.2	26.1	7
≤3/10 & VSBY≥2-1/2MI	13	5.2	2.6	3.5	3.5	2.8	2.1	1.9	1.8	4.0	9.1	5.8	9.7	52.0	7
RELATIVE HUMIDITY <%>															
MEAN		83	87	87	88	84	83	85	86	86	82	81	82	85	14
MEAN MIN.		16	20	29	24	28	31	45	28	32	17	24	17	16	14
WIND <16PTS & KNOTS>															
PREVAILING DIRECTION		NE	N	SE	SE	SE	SE	SE	NA	N	N	N	N	NA	33
PREVAILING SPEED	06	7	7	4	4	5	5	5	3	5	4	7	8	5	33
	13	7	8	6	7	8	6	4	6	7	6	7	6	7	33
MEAN SPEED		12	12	15	15	15	14	14	14	11	11	11	12	13	NA
TERMINAL WEATHER <%>															
CEILING≥1000FT. AND	06	44.8	35.1	29.4	43.7	75.8	86.0	86.1	83.5	81.0	72.9	67.7	59.7	63.8	8
VISIBILITY≥2-1/2MI.	13	84.8	86.9	88.7	91.7	97.1	95.7	94.5	92.6	96.7	97.1	96.0	90.3	92.7	8
≥1000FT.≥2-1/2MI.AND	06	12.0	7.9	8.7	12.5	23.0	26.7	26.2	25.5	23.9	21.5	19.1	16.5	222.8	7
WIND SPEED≤10KNOTS.	13	23.2	21.1	24.8	24.5	26.6	27.2	28.7	27.9	27.0	27.7	25.6	25.5	309.8	7
MISCELLANEOUS															
MEAN PRESS.-MSL<MBS>		1019	1016	1014	1010	1006	1003	1002	1003	1008	1014	1017	1018	1011	12
MEAN CLOUDINESS<%>		77	84	87	82	75	78	78	77	68	60	67	68	75	34

CLIMATIC BRIEF

PHU HO

21 27 N 105 14 E 80 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		88	93	95	99	105	105	102	100	97	97	95	90	105	NA
MEAN MAX.		65	68	72	81	89	91	91	90	88	84	78	71	81	NA
MEAN		58	63	66	75	81	83	82	82	80	75	70	64	73	NA
MEAN MIN.		55	58	62	70	74	76	76	76	74	68	63	62	68	NA
EXTREME MIN.		40	43	47	57	64	69	71	70	60	51	46	38	38	NA
PRECIPITATION <IN.>															
MONTHLY MEAN		1.2	1.9	2.1	3.9	7.1	9.0	13.3	13.0	9.2	5.0	1.5	1.3	68.5	21
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		14	15	15	16	14	14	19	18	14	8	7	8	162	21
THUNDERSTORM		*	0	3	7	13	14	15	11	8	2	0	0	73	3
RELATIVE HUMIDITY <%>															
MEAN		89	89	89	90	86	86	87	89	89	85	86	88	88	NA
MEAN MIN.		28	27	30	18	34	37	35	44	39	32	29	31	18	NA

CLIMATIC BRIEF

48823 NAM DINH

20 25 N 106 10 E 21 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		90	95	98	101	103	104	102	100	96	98	94	86	104	22
MEAN MAX.		69	69	73	81	88	92	92	90	88	84	79	72	81	22
MEAN MIN.		59	60	64	70	76	79	80	79	77	73	67	61	71	22
EXTREME MIN.		45	46	48	54	65	68	72	74	63	58	52	46	45	22
PRECIPITATION <IN.>															
MONTHLY MAX.		5.6	5.4	4.6	7.4	21.1	26.5	20.0	24.2	25.0	24.9	7.2	4.0	108.4	40
MONTHLY MIN.		.0	.0	.4	.3	.1	1.2	.6	1.0	1.9	.4	*	.0	38.6	40
24HR MAX.		2.8	2.7	3.0	5.0	5.7	7.7	7.6	7.3	13.8	12.4	4.1	1.9	13.8	40
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		8	10	14	11	12	12	13	15	14	9	7	6	131	40
THUNDERSTORM		0	0	0	0	*	0	0	*	NA	0	0	0	*	NA
TOTAL CLOUD COVER	01	10	4	3	3	14	12	13	13	11	17	11	10		3
≤3/10 & VSBY≥2-1/2MI	04	5	3	3	3	7	9	9	7	4	16	7	7		2
	07	3	1	*	2	4	3	6	2	4	7	4	4		6
	10	3	2	*	2	2	3	5	2	3	6	4	8		3
	13	5	3	1	2	3	2	2	2	3	5	5	6		7
	16	3	2	2	5	3	3	4	1	6	7	10	11		3
	19	13	9	4	5	9	4	4	2	8	18	15	14		3
	22	12	6	3	7	16	10	15	17	13	20	16	17		2
LOW CLOUD COVER	01	6	4	1	4	15	15	15	18	15	17	13	12		3
≤3/10 VSBY ≥2-1/2MI	04	3	3	2	2	19	17	13	12	9	19	7	8		2
	07	1	1	1	3	11	13	18	15	10	12	7	6		6
	10	3	3	NA	3	8	10	13	11	10	9	7	10		3
	13	5	4	2	3	8	13	13	10	8	10	8	9		7
	16	3	4	4	7	12	13	20	16	16	16	15	14		3
	19	15	10	4	8	19	15	18	15	15	20	16	16		3
	22	12	7	3	6	20	16	19	24	20	12	17	18		2
SFC WND ≥17KTS	01	*	0	0	*	*	*	1	*	*	1	1	*		3
& NO PRECIP	04	0	1	1	1	0	0	0	0	0	1	1	1		2
	07	1	1	*	*	0	0	*	*	1	*	1	*		5
	10	*	0	0	1	0	1	*	*	1	1	1	0		3
	13	*	*	*	*	1	1	1	*	*	1	1	*		5
	16	0	1	1	*	0	0	0	1	1	1	1	1		3
	19	*	*	*	0	1	0	1	1	0	*	0	*		3
	22	0	0	0	0	0	0	0	0	0	0	0	0		2
CIG ≥1000FT	01	30	26	29	27	30	29	29	30	28	29	28	30		3
VSBY ≥2-1/2MI	04	13	14	17	19	28	29	30	27	23	24	24	17		2
& WND ≤10KTS	07	16	15	16	17	26	27	28	27	24	25	21	17		6
	10	22	19	20	23	28	25	27	28	25	26	26	23		3
	13	23	20	22	24	28	25	28	27	26	26	24	26		5
	16	19	14	14	20	28	28	25	28	25	24	24	26		3
	19	30	25	27	27	30	29	30	28	30	30	28	29		3
	22	31	26	30	29	31	30	31	31	29	31	29	29		2
SFC WND 4-10KTS	01	5	4	2	4	4	4	5	3	4	4	3	3		3
TEMP 33-89°F	04	9	9	7	5	7	7	7	7	14	16	11	14		2
& NO PRECIP	07	9	6	7	6	9	10	8	7	9	10	11	9		6
	10	16	12	10	11	13	7	6	9	11	15	17	15		3
	13	16	13	14	14	13	5	6	4	12	14	16	14		6
	16	21	17	16	17	13	6	2	5	12	20	23	21		3
	19	9	8	7	10	10	7	9	7	6	6	7	6		3
	22	8	3	1	4	4	6	2	2	1	3	3	4		3
RELATIVE HUMIDITY <%>															
MEAN		86	88	89	87	85	80	83	84	84	79	81	81	84	7
MEAN MIN.		34	31	33	37	39	33	39	38	30	24	28	20	20	7
WIND <16PTS & KNOTS>															
MEAN SPEED		12	15	10	12	8	8	10	8	8	9	12	12	10	NA
TERMINAL WEATHER <%>															
CEILING<700FT.A/O	01	2.6	2.7	2.3	2.8	3.3	3.5	6.2	.0	4.3	3.3	5.3	2.3		3
VISIBILITY<1-1/4MI.	04	51.5	48.8	43.1	41.0	16.0	8.3	.0	16.1	15.4	5.9	14.3	20.0		5
	07	41.8	43.8	42.8	33.3	11.6	6.7	5.8	9.5	6.2	9.0	16.8	28.3		9
	10	23.5	23.7	21.8	15.4	7.9	4.6	3.6	5.5	3.8	5.3	4.3	11.4		7
	13	22.0	23.9	20.6	11.3	3.7	4.9	3.4	9.0	5.2	5.2	6.2	7.5		9
	16	35.0	41.3	36.4	20.3	1.8	6.6	4.5	10.2	7.4	10.6	10.5	9.8		5
	19	1.5	2.4	8.2	.0	1.0	1.0	1.3	2.3	1.2	.0	1.6	1.4		8
	22	.0	2.0	1.8	1.8	.0	.0	1.8	.0	.0	.0	.0	1.8		2
CEILING≥1000FT. AND	01	97.4	97.3	90.9	94.4	96.7	96.5	93.8	100.0	93.6	96.7	89.5	97.7		3
VISIBILITY≥2-1/2MI.	04	39.4	48.8	50.0	43.6	84.0	91.7	95.2	77.4	73.1	88.2	81.0	65.0		2
	07	44.5	47.3	45.9	49.6	80.0	88.6	92.0	86.1	86.2	83.9	70.5	54.6		6
	10	69.6	67.0	66.3	73.1	90.8	92.0	94.0	90.1	93.6	89.4	91.4	75.2		3
	13	70.1	69.2	65.6	73.6	93.6	92.6	94.0	86.5	90.6	88.7	83.2	84.0		7
	16	62.5	50.0	48.1	68.8	94.6	93.4	93.2	89.8	90.7	89.4	84.2	85.4		3
	19	98.5	95.2	85.9	95.3	98.0	96.0	97.3	93.1	98.8	98.7	90.5	93.2		3
	22	100.0	94.0	98.2	96.4	100.0	100.0	98.2	100.0	98.0	100.0	98.2	94.5		2
CEILING≥5000FT. AND	01	23.7	18.9	18.3	13.9	58.9	54.4	59.9	72.9	55.3	60.6	51.1	41.9		3
VISIBILITY >5MI.	04	9.1	7.3	8.6	7.7	64.0	83.3	71.4	48.4	38.4	61.6	19.1	27.5		3
	07	9.7	4.2	4.9	9.6	40.1	49.7	70.7	54.6	37.3	39.8	20.8	18.5		2
	10	15.7	16.5	6.0	22.9	45.9	42.4	61.3	59.4	44.8	42.5	43.1	28.6		6
	13	26.8	19.0	13.1	19.7	44.9	58.0	71.6	57.6	47.8	46.1	38.1	32.1		3
	16	25.0	17.4	19.5	25.0	69.6	77.0	79.5	74.6	66.8	61.6	55.2	34.0		7
	19	53.8	32.1	16.5	30.7	70.7	65.6	73.2	67.6	60.4	71.9	65.1	58.2		3
	22	47.1	30.0	10.9	26.8	73.5	61.5	75.0	78.1	75.4	71.5	68.0	63.6		2
MISCELLANEOUS															
MEAN CLOUDINESS<%>		82	86	90	81	78	74	79	76	73	61	66	68	76	10

CLIMATIC BRIEF

48825 HAIPHONG

20 49 N 106 43 E 16 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		87	94	95	94	107	102	100	100	99	98	92	86	107	31
MEAN MAX.		69	69	72	80	88	90	90	89	88	84	78	72	81	31
MEAN MIN.		59	60	64	70	77	79	79	79	77	72	66	61	70	31
EXTREME MIN.		44	45	49	52	62	71	72	71	63	55	46	46	44	31
PRECIPITATION <IN.>															
MONTHLY MAX.		4.8	6.0	5.6	7.4	14.4	19.4	22.0	42.0	26.3	18.3	5.9	4.0	102.6	31
MONTHLY MEAN		.9	1.5	1.9	3.1	7.3	10.1	10.7	14.1	11.5	3.7	1.8	.9	67.5	31
MONTHLY MIN.		*	*	.3	.5	2.5	2.8	1.6	3.0	3.1	.1	.0	.0	47.8	31
24HR MAX.		1.7	1.9	3.1	4.1	5.2	10.1	6.5	8.1	9.8	4.9	3.9	2.8	10.1	31
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		7	12	15	13	14	15	16	18	16	8	7	8	149	31
THUNDERSTORM		0	1	3	4	7	10	11	12	9	2	1	0	60	NA
WIND <16PTS & KNOTS>															
MEAN SPEED		13	10	10	8	10	12	12	18	9	10	8	9	11	NA
MISCELLANEOUS															
MEAN CLOUDINESS<%>		77	87	89	83	73	71	74	74	65	57	62	67	73	NA

CLIMATIC BRIEF 48826 PHU LIEN

20 48 N 106 38 E 377 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		88	94	96	98	107	101	101	103	99	98	92	86	107	34
MEAN MAX.		68	68	71	79	86	89	89	89	87	86	78	72	80	34
MEAN		62	62	66	72	79	82	83	82	80	76	70	65	73	33
MEAN MIN.		57	58	62	69	75	78	78	77	75	71	65	60	69	34
EXTREME MIN.		43	45	48	51	62	68	70	69	61	59	48	44	43	34
PRECIPITATION <IN.>															
MONTHLY MAX.		5.0	5.3	5.3	6.7	18.7	23.4	22.3	38.7	47.0	21.7	8.1	3.4	101.9	34
MONTHLY MEAN		1.1	1.7	1.9	3.2	7.9	9.4	11.6	13.0	12.1	4.8	2.2	1.1	69.9	34
MONTHLY MIN.		*	.2	.4	1.1	2.2	4.2	4.2	3.3	2.4	.2	*	.0	53.4	34
24HR MAX.		2.0	1.9	4.6	4.1	6.5	7.1	6.5	7.5	19.3	6.2	5.9	1.5	19.3	34
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		10	15	16	14	14	15	17	18	16	10	8	8	161	34
THUNDERSTORM		*	1	3	4	7	10	15	15	12	3	0	0	70	3
FOG	06	6	5	10	6	3	1	2	3	2	3	4	6	51	8
	13	2	2	3	1	*	*	0	*	0	*	*	1	9	9
TOTAL CLOUD COVER	01	10	6	2	4	7	4	6	6	6	14	10	11		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	NA	4	8	6	4	7	NA	NA	NA	NA		<1
	07	7	3	1	1	2	1	1	1	2	7	6	5		4
	10	7	2	1	0	0	2	0	1	2	7	2	8		2
	13	8	3	1	2	1	1	1	1	1	6	4	6		3
	16	NA	NA	NA	6	1	2	1	0	NA	NA	NA	NA		<1
	19	11	6	4	5	3	2	1	2	6	14	13	16		3
	22	11	6	3	3	5	5	5	7	7	17	15	17		2
LOW CLOUD COVER	01	5	7	3	4	11	10	17	16	16	17	15	15		3
≤3/10 VSBY ≥2-1/2MI	04	31	NA	NA	3	NA	10	31	16	NA	NA	NA	NA		<1
	07	5	3	1	4	8	11	13	11	9	15	10	8		4
	10	6	2	2	NA	7	7	13	10	9	11	6	12		2
	13	8	4	2	3	7	9	10	7	9	16	8	11		3
	16	31	NA	12	2	16	8	NA	31	10	NA	NA	16		<1
	19	12	7	6	10	15	15	16	17	18	20	17	19		3
	22	11	6	4	5	17	16	20	19	18	21	16	18		2
SFC WND ≥17KTS	01	0	*	*	1	1	0	0	*	2	0	*	0		3
& NO PRECIP	04	NA	NA	NA	0	0	0	3	0	NA	NA	NA	NA		<1
	07	*	*	*	1	1	1	*	1	1	1	*	1		4
	10	0	0	0	1	0	0	0	0	0	1	0	0		2
	13	0	0	0	*	0	*	*	0	0	*	0	*		3
	16	NA	NA	NA	1	0	0	0	0	NA	NA	NA	NA		<1
	19	0	1	0	*	0	0	1	*	*	0	1	*		3
	22	1	0	0	0	0	0	0	0	1	0	1	0		2
CIG ≥1000FT	01	29	24	26	25	29	28	30	29	27	30	28	30		3
VSBY ≥2-1/2MI	04	NA	NA	NA	24	29	27	28	31	NA	NA	NA	NA		<1
& WND ≤10KTS	07	29	22	24	22	29	28	29	28	26	29	28	28		4
	10	30	26	28	26	31	30	31	30	30	31	30	29		2
	13	28	26	27	26	31	29	30	30	27	29	28	29		3
	16	NA	NA	NA	27	31	29	31	30	NA	NA	NA	NA		<1
	19	29	24	28	28	30	29	28	29	29	30	28	29		4
	22	30	25	27	28	31	29	31	29	28	31	29	30		2
SFC WND 4-10KTS	01	12	7	6	6	12	10	13	12	11	15	16	12		3
TEMP 33-89°F	04	NA	NA	NA	8	15	11	12	12	NA	NA	NA	NA		<1
& NO PRECIP	07	16	6	7	6	11	8	10	9	11	15	16	14		4
	10	13	6	5	7	11	7	9	14	12	12	15	14		2
	13	6	4	9	13	17	6	9	8	10	16	12	9		3
	16	NA	NA	NA	13	20	13	9	14	NA	NA	NA	NA		<1
	19	11	11	12	13	21	28	20	15	16	19	20	15		4
	22	15	9	11	8	18	16	18	17	9	14	19	19		2
RELATIVE HUMIDITY <%>															
MEAN		82	88	90	90	86	86	86	87	84	79	77	78	84	31
MEAN MIN.		17	22	31	33	27	38	41	44	34	22	15	19	15	34
WIND <16PTS & KNOTS>															
PREVAILING DIRECTION		E	E	E	SE	S	S	S	S	E	E	E	NE	E	33
PREVAILING SPEED	06	10	12	10	10	10	12	10	9	8	10	10	9	10	33
	13	6	8	11	10	11	11	10	7	10	9	9	7	9	33
TERMINAL WEATHER <%>															
CEILING<700FT.A/O	01	4.3	6.5	11.7	9.8	6.7	1.4	1.5	1.4	3.6	2.9	1.5	1.8		3
VISIBILITY<1-1/4MI.	07	2.4	13.8	16.0	18.7	2.1	3.1	4.5	3.3	5.2	2.1	3.1	6.2		4
	10	3.6	4.0	9.4	14.6	.0	.0	.0	.0	.0	.0	1.9	3.6		2
	13	6.0	3.8	6.9	9.4	.0	.0	1.4	1.3	1.3	2.5	4.1	6.1		4
	19	9.4	7.3	4.5	4.2	.0	3.1	3.2	3.2	.0	1.0	4.4	2.8		4
	22	2.0	6.0	9.1	8.8	.0	.0	.0	1.9	4.1	.0	3.6	3.6		2
CEILING≥1000FT. AND	01	95.7	89.1	83.3	86.9	91.7	97.1	98.5	98.6	96.4	95.7	98.5	94.5		3
VISIBILITY≥2-1/2MI.	07	92.9	75.9	79.8	70.8	92.8	95.8	95.5	95.6	91.7	97.9	96.9	92.0		4
	10	96.4	96.0	88.7	85.4	100.0	100.0	100.0	97.9	100.0	100.0	98.1	94.6		2
	13	92.9	92.3	84.7	84.7	97.7	98.6	98.6	96.1	96.0	97.5	94.6	92.9		3
	19	88.5	85.4	91.0	95.8	98.9	94.8	95.7	93.5	100.0	97.9	94.4	95.4		3
	22	98.0	90.0	85.5	91.2	100.0	98.0	100.0	94.2	95.9	100.0	96.4	96.4		2
CEILING≥5000FT. AND	01	26.1	32.6	11.7	31.0	51.7	52.1	72.0	71.3	57.1	66.5	60.0	50.9		3
VISIBILITY >5MI.	07	15.4	13.6	6.4	12.5	36.1	50.8	61.3	57.7	44.8	60.5	38.4	35.5		4
	10	19.6	16.0	9.5	7.2	33.4	38.7	63.2	58.3	48.9	53.7	39.7	44.8		2
	13	29.8	24.5	14.0	21.3	40.9	50.7	60.2	50.7	58.6	63.4	50.1	47.4		3
	19	45.8	31.6	29.1	37.3	67.2	66.6	75.4	79.6	76.4	82.4	68.9	66.9		3
	22	38.8	22.0	21.8	26.5	72.3	72.0	88.7	82.7	71.3	73.7	64.3	59.9		2
MISCELLANEOUS															
MEAN CLOUDINESS<%>		77	87	89	83	73	71	74	74	65	57	62	67	73	34

CLIMATIC BRIEF 48827 NORWAYS

20 37 N 107 09 E

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
							MEAN NUMBER OF DAYS WITH								
TOTAL CLOUD COVER	07	3	1	2	3	2	2	5	1	4	11	4	6		2
≤3/10 & VSBY≥2-1/2MI	10	3	2	1	3	4	1	6	3	4	6	4	5		1
	13	4	2	3	3	5	2	5	0	5	7	8	9		2
	16	3	1	1	1	5	3	6	0	3	19	8	16		1
LOW CLOUD COVER	07	7	4	5	3	10	13	16	7	7	22	18	13		2
≤3/10 VSBY ≥2-1/2MI	10	8	5	3	4	16	15	19	14	16	18	22	12		1
	13	8	5	6	4	12	16	20	10	13	18	19	16		2
	16	7	4	1	4	14	16	22	4	8	27	24	14		1
SFC WND ≥17KTS	07	1	3	2	2	0	4	12	5	4	0	3	1		2
& NO PRECIP	10	3	3	3	4	3	5	7	6	8	2	3	3		2
	13	1	1	1	3	3	3	8	6	4	1	2	1		2
	16	NA	NA	4	3	5	4	3	6	3	0	NA	NA		<1
CIG ≥1000FT	07	17	15	15	11	22	21	11	20	15	21	22	20		2
VSBY ≥2-1/2MI	10	18	16	14	8	21	16	12	21	14	19	23	20		2
& WND ≤10KTS	13	20	16	15	13	17	16	8	22	21	20	22	24		2
	16	NA	15	10	10	17	18	13	19	24	24	NA	NA		<1
SFC WND 4-10KTS	07	15	15	16	21	21	19	10	14	12	17	16	19		2
TEMP 33-89°F	10	16	15	14	15	20	10	10	18	15	19	21	19		2
& NO PRECIP	13	18	16	15	18	19	11	6	15	16	17	19	20		2
	16	NA	17	15	17	18	10	13	18	21	20	NA	NA		<1
							TERMINAL WEATHER <%>								
CEILING<700FT.A/O	07	10.0	16.3	21.2	33.3	8.3	.0	.0	2.3	4.9	.0	.0	6.0		3
VISIBILITY<1-1/4MI.	10	8.1	15.6	15.9	34.4	8.0	9.8	3.4	5.0	4.8	.0	.0	.0		3
	13	4.2	25.7	10.0	22.4	8.8	3.4	7.3	.0	3.4	.0	.0	5.6		3
	16	22.2	4.8	19.4	25.0	9.7	.0	.0	.0	.0	.0	6.7	.0		3
CEILING≥1000FT. AND	07	88.0	75.5	73.1	59.5	91.7	100.0	96.2	90.7	87.8	100.0	98.0	92.0		2
VISIBILITY≥2-1/2MI.	10	89.2	78.1	75.0	53.1	92.0	90.2	93.1	95.0	85.7	100.0	100.0	95.0		1
	13	93.7	71.4	80.0	65.3	88.2	94.8	92.7	94.1	93.1	97.9	100.0	94.4		2
	16	77.8	81.0	77.4	69.4	90.3	100.0	93.3	100.0	100.0	100.0	93.3	100.0		1
CEILING≥5000FT. AND	07	44.0	16.2	17.3	7.2	47.3	71.0	71.8	46.5	51.2	77.1	84.4	66.0		3
VISIBILITY >5MI.	10	40.5	28.1	13.6	9.4	60.0	65.8	75.8	65.0	57.1	81.8	86.3	40.0		3
	13	41.6	14.4	23.4	12.2	55.7	68.9	75.6	58.9	61.9	80.7	77.5	75.0		3
	16	44.4	23.9	6.4	16.7	64.6	77.5	80.0	60.0	72.7	92.8	73.3	44.4		2

CLIMATIC BRIEF

48830 LANG SON

21 50 N 106 46 E 850 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		89	98	98	101	104	97	99	99	97	94	91	88	104	34
MEAN MAX.		64	65	71	79	87	88	89	89	86	82	75	68	79	34
MEAN		54	60	63	73	78	81	81	80	78	73	66	61	71	33
MEAN MIN.		50	53	58	66	72	74	74	74	71	65	58	52	64	34
EXTREME MIN.		30	33	42	44	52	61	67	66	56	46	36	33	30	34
PRECIPITATION <IN.>															
MONTHLY MAX.		4.1	6.9	5.7	8.7	12.8	20.4	20.9	23.9	15.2	11.1	4.4	3.9	79.1	34
MONTHLY MEAN		1.0	2.1	1.9	3.3	6.4	8.1	11.1	11.0	6.3	3.0	1.3	.9	56.5	34
MONTHLY MIN.		.0	.2	*	.6	1.5	2.3	3.7	2.2	.9	.0	.0	.0	29.8	34
24HR MAX.		2.1	4.5	2.5	3.0	6.5	6.4	6.9	5.8	6.3	5.4	2.8	1.8	6.9	34
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		7	10	9	10	13	14	16	17	12	8	6	5	127	34
THUNDERSTORM		*	1	3	4	6	4	9	10	5	2	0	0	40	3
FOG	06	4	1	2	2	0	1	2	3	5	3	4	6	33	8
	13	1	1	*	1	0	0	*	0	0	*	*	1	4	9
TOTAL CLOUD COVER	01	10	6	3	6	8	9	12	12	11	13	11	8		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	3	6	8	13	13	14	NA	NA	NA	NA		<1
	07	3	3	1	2	2	3	1	2	4	7	5	4		4
	10	6	2	4	3	4	3	2	3	3	11	6	8		2
	13	8	5	4	4	2	1	1	0	2	4	6	8		4
	16	16	11	9	6	3	4	4	2	6	0	0	31		1
	19	10	9	5	7	8	5	3	3	7	15	15	15		4
	22	11	8	5	7	16	9	13	11	12	16	12	14		2
LOW CLOUD COVER	01	6	8	3	7	12	12	21	19	19	15	14	9		3
≤3/10 VSBY ≥2-1/2MI	04	NA	14	NA	5	NA	15	NA	31	15	NA	NA	NA		<1
	07	3	3	3	5	7	13	14	10	8	11	8	6		4
	10	6	3	5	3	8	6	6	7	8	13	9	10		2
	13	8	7	6	5	7	4	7	4	7	9	9	10		4
	16	NA	28	12	9	NA	NA	16	8	30	NA	NA	31		<1
	19	10	10	4	8	17	15	18	16	15	19	18	16		5
	19	12	9	6	8	18	14	19	18	17	16	14	16		2
SFC WND ≥17KTS	01	1	0	*	1	0	1	1	0	*	0	0	0		3
& NO PRECIP	04	NA	NA	0	1	0	0	1	0	NA	NA	NA	NA		<1
	07	*	*	0	*	*	0	*	1	1	*	1	*		5
	10	1	0	0	0	0	0	0	0	0	1	1	0		2
	13	1	1	0	1	1	0	*	0	1	1	1	*		5
	16	NA	NA	0	1	0	0	1	0	NA	NA	NA	NA		<1
	19	*	1	0	1	*	*	0	0	1	1	*	1		4
	22	0	0	0	1	0	0	0	0	0	0	0	0		2
CIG ≥1000FT	01	28	26	28	28	29	29	29	28	28	28	30	30		3
VSBY ≥2-1/2MI	04	NA	NA	28	28	29	30	30	29	NA	NA	NA	NA		<1
& WND ≤10KTS	07	27	23	24	26	28	28	28	25	22	27	24	24		5
	10	31	27	26	27	30	29	31	30	29	29	29	29		2
	13	28	24	27	28	29	29	30	29	27	29	28	29		4
	16	NA	NA	31	28	31	29	30	30	NA	NA	NA	NA		<1
	19	29	25	26	27	29	28	30	29	28	30	29	29		4
	22	31	26	29	28	31	29	31	30	29	31	30	29		2
SFC WND 4-10KTS	01	5	5	3	3	4	1	1	1	2	3	5	3		3
TEMP 33-89°F	04	NA	NA	5	6	3	0	0	0	NA	NA	NA	NA		<1
& NO PRECIP	07	7	4	3	4	3	2	1	1	2	2	5	4		5
	10	14	5	10	8	11	4	4	4	9	10	12	9		2
	13	12	14	9	11	9	7	5	6	7	11	10	11		5
	16	NA	NA	10	11	7	3	3	8	NA	NA	NA	NA		<1
	19	8	5	6	6	8	4	3	2	2	2	4	4		4
	22	8	5	4	3	5	1	1	1	1	3	4	5		2
RELATIVE HUMIDITY <%>															
MEAN		82	84	84	85	85	84	86	86	84	79	80	80	83	10
MEAN MIN.		17	20	22	21	37	29	43	38	32	17	18	25	17	10
WIND <16PTS & KNOTS>															
PREVAILING DIRECTION		N	NE	N	NE	NE	S	S	NE	NE	N	N	N	NE	33
MEAN SPEED		8	8	8	8	6	10	10	10	8	10	15	8	9	NA
TERMINAL WEATHER <%>															
CEILING<700FT.A/O	01	8.5	.0	4.8	1.5	5.7	.0	1.6	4.4	6.2	12.2	.0	1.7		3
VISIBILITY<1-1/4MI.	07	12.1	8.8	14.0	4.9	7.0	3.4	4.1	11.4	13.1	9.7	10.1	13.0		6
	10	.0	2.0	9.1	5.3	2.1	1.9	2.0	2.3	2.1	1.9	.0	1.8		2
	13	6.9	1.8	8.0	3.0	2.8	2.2	.0	2.1	5.3	1.0	1.2	.9		6
	19	4.1	1.6	8.8	2.7	4.5	1.7	1.1	6.2	2.7	.0	.9	.8		6
	22	.0	.0	5.4	3.7	.0	.0	.0	1.8	.0	.0	1.8	.0		2
CEILING≥1000FT. AND	01	89.8	98.1	95.2	97.1	91.4	98.7	95.2	92.6	92.3	87.8	100.0	96.6		3
VISIBILITY≥2-1/2MI.	07	85.3	86.7	76.0	88.2	91.3	92.2	94.9	83.8	77.6	87.6	87.2	78.9		4
	10	100.0	98.0	91.8	99.5	95.8	98.1	98.0	97.7	97.9	96.2	100.0	94.7		2
	13	93.7	95.5	85.7	95.0	95.4	95.7	100.0	94.7	92.1	96.9	97.7	94.7		4
	19	94.2	97.6	80.8	94.7	95.5	95.8	97.8	92.9	95.5	99.0	98.2	95.8		4
	22	100.0	96.2	92.9	94.4	100.0	98.0	98.1	96.4	100.0	100.0	98.2	92.9		2
CEILING≥5000FT. AND	01	55.9	57.4	39.7	48.5	49.9	63.0	77.8	79.8	72.1	66.3	65.7	51.7		3
VISIBILITY >5MI.	07	46.7	38.2	23.0	25.5	39.1	50.9	58.1	54.4	39.1	56.6	43.1	34.9		6
	10	61.2	33.4	34.5	21.0	31.3	35.9	42.0	45.5	45.9	61.5	35.5	42.2		2
	13	45.9	40.5	26.0	26.9	40.7	33.8	45.7	57.9	51.8	54.5	50.1	51.4		6
	19	61.1	56.1	28.8	49.5	70.8	70.7	73.3	69.9	61.6	82.4	72.6	60.5		6
	22	76.6	61.5	44.8	55.7	72.4	56.9	81.7	74.5	74.0	81.1	82.1	60.8		2
MISCELLANEOUS															
MEAN PRESS.-MSL<MBS>		1021	1018	1015	1011	1007	1004	1002	1003	1009	1015	1018	1020	1011	11
MEAN CLOUDINESS<%>		79	83	84	82	77	80	80	80	71	64	68	68	76	34

CLIMATIC BRIEF

48831 THAI NGUYEN

21 36 N 105 50 E 134 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
						PRECIPITATION <IN.>									
MONTHLY MEAN		.7	1.8	2.5	4.1	10.5	14.0	17.4	17.1	8.3	4.0	1.7	.9	83.0	19
						MEAN NUMBER OF DAYS WITH									
PRECIPITATION		6	10	15	14	14	16	19	19	13	8	5	6	145	19
TOTAL CLOUD COVER	01	10	5	2	2	5	4	7	6	8	10	7	7		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	3	3	3	6	5	12	NA	NA	NA	NA		<1
	07	5	2	1	1	1	2	1	2	5	7	5	5		3
	10	6	2	1	2	1	2	2	1	3	8	4	8		2
	13	7	4	3	2	1	1	*	1	4	4	3	5		2
	16	NA	NA	4	4	1	6	6	1	NA	NA	NA	NA		<1
	19	10	7	4	4	4	4	4	2	8	14	12	12		3
	22	10	4	1	4	5	6	6	7	12	14	10	10		2
LOW CLOUD COVER	01	8	8	2	3	9	5	13	16	12	12	10	11		3
≤3/10 VSBY ≥2-1/2MI	04	NA	NA	NA	7	NA	10	NA	21	15	NA	30	NA		<1
	07	5	3	1	3	7	9	9	9	10	10	7	9		3
	10	7	4	2	1	7	8	6	9	10	10	9	10		2
	13	4	7	5	2	8	10	6	9	14	11	8	11		2
	16	NA	NA	9	5	NA	15	NA	31	15	31	30	NA		<1
	19	7	8	4	6	14	13	17	14	15	16	14	16		3
	22	10	5	1	5	9	11	15	19	16	17	11	11		2
SFC WND ≥17KTS	01	1	*	1	1	*	1	0	1	0	1	0	*		3
& NO PRECIP	04	NA	NA	0	0	0	0	0	0	NA	NA	NA	NA		<1
	07	*	0	*	0	0	*	0	0	*	0	*	*		4
	10	0	0	0	0	0	0	0	0	0	0	0	1		2
	13	0	0	*	*	1	0	1	*	0	0	*	*		3
	16	NA	NA	0	0	0	1	0	0	NA	NA	NA	NA		<1
	19	0	0	*	0	*	0	*	*	*	*	0	*		3
	22	0	0	0	0	0	0	0	0	0	0	0	0		2
CIG ≥1000FT	01	30	27	28	28	30	29	29	30	29	29	30	31		3
VSBY ≥2-1/2MI	04	NA	NA	28	26	30	29	31	29	NA	NA	NA	NA		<1
& WND ≤10KTS	07	27	26	26	27	30	29	29	30	28	30	28	29		4
	10	30	27	28	28	31	30	31	30	29	30	30	29		2
	13	30	27	29	28	30	29	30	31	30	30	29	30		3
	16	NA	NA	28	29	31	29	31	30	NA	NA	NA	NA		<1
	19	30	28	30	30	30	30	31	30	29	31	30	30		3
	22	31	27	31	27	30	30	30	31	30	31	30	30		2
SFC WND 4-10KTS	01	2	1	2	2	6	1	1	1	2	2	2	3		3
TEMP 33-89°F	04	NA	NA	4	2	3	4	2	2	NA	NA	NA	NA		<1
& NO PRECIP	07	1	*	1	1	1	2	2	1	1	1	1	2		4
	10	6	3	3	4	7	3	2	2	3	4	7	2		2
	13	5	3	5	8	5	2	4	2	3	6	5	6		3
	16	NA	NA	3	7	8	2	1	3	NA	NA	NA	NA		<1
	19	3	3	4	6	8	3	2	2	1	2	2	2		3
	22	5	2	4	4	7	4	2	1	2	1	2	2		2
						TERMINAL WEATHER <%>									
CEILING<700FT.A/O	01	.0	.0	.0	2.9	.0	.0	2.0	1.9	5.8	3.9	.0	.0		3
VISIBILITY<1-1/4MI.	07	7.0	3.7	1.8	1.8	1.4	.0	6.0	1.8	4.9	.0	1.8	3.6		3
	10	2.0	.0	3.5	4.4	.0	.0	.0	2.4	.0	.0	.0	.0		2
	13	3.3	.0	.0	4.2	.0	.0	.0	.0	.0	.0	.0	.0		2
	19	.0	.0	.0	.0	.0	.0	.0	1.7	1.8	.0	.0	.0		3
	22	.0	.0	.0	.0	1.8	.0	.0	.0	.0	.0	.0	1.8		2
CEILING≥1000FT. AND	01	97.0	97.1	90.0	94.3	100.0	97.8	92.2	98.1	94.2	96.1	100.0	100.0		3
VISIBILITY≥2-1/2MI.	07	86.0	92.6	84.2	90.9	97.1	98.5	92.5	94.6	93.4	96.7	98.2	94.6		3
	10	96.1	96.0	89.5	93.3	100.0	100.0	100.0	97.6	97.9	98.1	100.0	98.1		2
	13	96.7	100.0	95.8	91.7	100.0	100.0	100.0	100.0	100.0	95.0	100.0	96.4		2
	19	100.0	98.1	98.2	98.2	100.0	100.0	100.0	96.6	98.2	100.0	100.0	100.0		3
	22	100.0	96.2	98.2	92.9	96.4	100.0	98.1	100.0	100.0	100.0	100.0	98.2		2
CEILING≥5000FT. AND	01	33.5	32.2	20.0	17.3	35.8	28.2	51.1	63.4	48.0	51.1	40.7	40.5		3
VISIBILITY >5MI.	07	29.9	24.3	17.6	14.5	30.2	38.8	44.7	43.0	40.9	31.1	27.3	35.8		3
	10	47.1	30.0	19.4	13.3	55.3	42.0	31.5	38.1	42.5	48.0	31.1	39.0		2
	13	40.0	39.3	33.4	16.7	50.0	49.9	29.2	48.2	52.7	50.0	39.0	39.3		2
	19	43.6	52.9	33.4	35.9	64.2	58.3	73.3	55.9	61.9	66.2	53.8	53.8		2
	22	44.0	30.7	19.7	26.9	38.2	47.1	64.8	70.9	64.0	58.6	47.3	39.4		2

CLIMATIC BRIEF 48834 GOW TOW

20 59 N 107 45 E 230 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE (°F)															
EXTREME MAX.		80	84	84	88	93	96	95	95	95	91	87	84	96	10
MEAN MAX.		65	65	68	75	83	87	87	86	86	82	75	67	77	10
MEAN MIN.		57	58	61	67	75	79	80	78	78	75	68	60	70	10
EXTREME MIN.		44	41	46	55	59	67	72	68	67	58	52	47	41	10
PRECIPITATION (IN.)															
MONTHLY MAX.		3.0	3.1	4.0	8.3	10.7	22.1	25.9	25.6	15.2	14.4	7.5	1.7	74.9	11
MONTHLY MEAN		1.1	.9	1.8	2.5	5.9	8.7	12.2	10.4	10.5	6.1	1.9	.6	68.0	11
MONTHLY MIN.		*	.0	.3	.2	2.5	3.8	6.4	11.6	2.4	.5	*	.0	53.5	11
24HR MAX.		1.6	2.5	2.6	3.1	4.0	5.2	13.5	6.5	9.5	7.4	2.9	.6	13.5	11
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		5	5	7	7	8	10	12	16	12	9	7	6	104	11
TOTAL CLOUD COVER	04	2	NA	4	NA	NA	NA	7	4	11	14	13	10		1
≤3/10 & VSBY≥2-1/2MI	07	1	2	4	2	0	0	3	5	5	5	5	10		1
	10	4	3	3	4	1	2	4	3	0	6	9	11		1
	13	6	4	3	5	3	2	4	3	2	3	10	10		1
LOW CLOUD COVER	04	2	NA	4	NA	6	NA	14	10	18	19	16	14		1
≤3/10 VSBY ≥2-1/2MI	07	2	2	4	5	2	17	15	13	13	12	13	11		1
	10	6	3	6	5	10	16	17	7	16	15	14	17		1
	13	8	5	4	9	7	19	20	13	19	14	12	16		1
SFC WND ≥17KTS	04	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2		<1
& NO PRECIP	07	5	3	9	2	0	1	4	1	7	4	5	9		1
	10	8	4	4	6	0	0	1	1	6	6	4	8		1
	13	3	5	5	3	1	3	1	2	3	1	1	4		1
CIG ≥1000FT	04	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11		<1
VSBY ≥2-1/2MI	07	8	9	13	13	20	NA	16	17	15	15	18	9		1
& WND ≤10KTS	10	8	9	12	10	27	23	23	18	13	13	21	10		1
	13	18	12	13	17	26	17	23	21	16	21	22	16		1
SFC WND 4-10KTS	04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7		<1
TEMP 33-89°F	07	14	13	12	17	14	18	13	8	11	10	10	10		1
& NO PRECIP	10	13	10	11	10	21	16	12	14	10	11	15	9		1
	13	13	14	7	12	15	10	2	7	6	14	16	16		1
TERMINAL WEATHER (%)															
CEILING<700FT.A/O	04														
VISIBILITY<1-1/4MI.	07	37.8	41.7	18.9	32.1	25.9	5.0	5.4	7.4	3.6	8.0	5.9	17.8		3
	10	27.8	25.9	27.8	45.5	4.0	7.1	.0	8.7	16.0	5.6	3.8	10.3		3
	13	8.6	12.5	14.0	18.5	2.9	2.8	2.4	9.5	.0	7.4	7.4	14.3		3
CEILING≥1000FT. AND	04														
VISIBILITY≥2-1/2MI.	07	53.3	50.0	78.4	60.7	63.0	90.0	94.6	88.9	85.7	84.0	94.1	80.0		1
	10	63.9	55.6	72.2	90.0	96.0	99.3	100.0	87.0	76.0	98.9	92.3	86.2		1
	13	80.0	75.0	81.4	77.8	94.1	94.4	95.1	90.5	88.9	92.6	88.9	82.9		1
CEILING≥5000FT. AND	04														
VISIBILITY >5MI.	07	13.3	13.9	16.2	14.3	22.2	60.0	72.9	74.0	71.4	60.0	70.5	44.3		1
	10	12.3	14.8	22.3	22.7	44.0	64.3	79.4	52.1	64.0	77.8	73.1	58.5		1
	13	40.0	18.7	21.0	29.6	52.8	83.4	87.7	71.4	70.3	81.4	59.2	54.4		1

CLIMATIC BRIEF

48838 MON CAY

21 31 N 107 58 E 33 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE (°F)															
EXTREME MAX.		82	86	95	93	100	99	102	100	102	98	92	89	102	45
MEAN MAX.		67	67	71	78	86	89	89	89	89	85	78	71	80	45
MEAN		60	61	66	73	81	83	84	83	82	77	70	64	74	33
MEAN MIN.		54	56	61	68	74	77	77	77	75	69	62	56	67	45
EXTREME MIN.		36	41	44	49	58	66	68	69	61	51	37	38	36	45
PRECIPITATION (IN.)															
MONTHLY MAX.		5.7	6.5	10.6	13.9	26.7	39.2	46.9	47.9	29.3	19.8	18.7	5.2	162.2	42
MONTHLY MEAN		1.5	2.3	3.0	3.8	12.0	18.7	23.6	22.5	13.1	7.2	3.2	1.6	112.6	42
MONTHLY MIN.		.0	.1	.3	.2	1.1	6.1	3.1	4.1	1.1	*	.0	.0	68.2	42
24HR MAX.		2.2	3.5	3.0	3.0	13.7	11.9	15.2	8.1	10.7	10.9	8.8	4.4	15.2	42
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		10	12	14	13	16	18	20	20	14	9	8	8	162	42
THUNDERSTORM		0	*	2	4	11	8	11	16	10	2	0	0	64	3
FOG	06	3	3	5	4	1	1	*	*	*	1	1	2	21	8
	13	1	*	1	1	0	*	*	0	0	0	*	*	4	9
TOTAL CLOUD COVER	01	9	5	5	7	11	5	7	10	8	15	9	8		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	3	6	8	10	5	8	NA	NA	NA	NA		<1
	07	5	2	3	3	2	2	2	4	6	8	6	8		6
	10	4	2	3	3	1	2	1	1	5	10	7	10		3
	13	9	4	3	5	2	2	2	3	4	9	9	10		7
	16	5	4	4	4	3	3	2	3	4	9	11	9		2
	19	11	8	5	8	9	3	2	2	8	18	13	12		4
	22	12	8	8	7	13	6	8	11	10	18	14	14		2
LOW CLOUD COVER	01	6	5	5	6	10	9	12	13	12	18	12	11		3
≤3/10 VSBY ≥2-1/2MI	04	8	NA	2	9	NA	NA	NA	10	NA	21	10	6		<1
	07	5	2	2	5	5	8	7	11	9	9	7	9		6
	10	4	2	4	4	5	5	8	7	10	13	9	13		3
	13	8	6	3	6	8	7	7	10	11	16	11	11		7
	16	4	5	5	7	10	11	12	11	11	16	13	15		2
	19	9	8	7	11	16	14	14	13	13	20	16	15		4
	22	13	9	8	10	16	12	15	18	13	18	16	15		2
SFC WND ≥17KTS	01	*	0	*	*	1	*	*	*	0	*	1	1		3
& NO PRECIP	04	NA	NA	0	0	0	0	1	0	NA	NA	NA	NA		<1
	07	1	*	0	*	1	*	*	0	*	*	*	1		6
	10	0	0	*	0	1	*	2	1	*	*	*	0		3
	13	*	0	0	1	1	*	1	1	1	*	0	*		6
	16	NA	2	1	1	1	1	1	1	1	0	NA	NA		1
	19	0	0	*	1	0	1	*	0	1	0	*	0		4
	22	0	0	0	0	0	0	1	0	0	0	0	0		2
CIG ≥1000FT	01	28	26	28	29	29	28	30	30	29	30	29	29		3
VSBY ≥2-1/2MI	04	NA	NA	30	28	31	29	30	30	NA	NA	NA	NA		<1
& WND ≤10KTS	07	24	23	24	23	27	27	28	29	28	28	27	27		6
	10	25	22	24	23	27	26	26	26	26	28	28	29		3
	13	27	25	26	25	26	26	25	27	28	27	28	27		6
	16	NA	20	25	23	27	26	26	27	26	23	NA	NA		1
	19	29	27	29	29	31	29	30	30	28	30	29	30		4
	22	30	28	31	29	31	30	31	31	29	31	30	29		2
SFC WND 4-10KTS	01	6	5	3	3	2	3	2	3	3	2	7	5		3
TEMP 33-89°F	04	NA	NA	6	5	2	4	3	6	NA	NA	NA	NA		<1
& NO PRECIP	07	5	5	4	3	5	6	5	3	5	5	8	6		6
	10	13	11	9	9	13	9	10	7	11	18	16	16		3
	13	16	14	14	13	18	12	10	8	13	16	21	17		6
	16	NA	12	16	13	18	11	12	8	11	18	NA	NA		1
	19	7	3	5	6	6	4	6	5	4	2	4	5		4
	22	7	6	4	3	6	5	2	3	2	3	5	3		2
RELATIVE HUMIDITY (%)															
MEAN		80	85	84	86	85	85	86	85	81	75	76	78	82	11
MEAN MIN.		11	27	19	27	31	38	38	37	24	21	11	7	7	11
WIND (16PTS & KNOTS)															
PREVAILING DIRECTION		NE	NE	NE	NE	SE	SE	SE	NE	NE	NE	NE	NE	NE	33
MEAN SPEED		7	7	10	10	8	7	7	7	9	9	13	7	8	NA
TERMINAL WEATHER (%)															
CEILING<700FT.A/O	01	10.0	4.0	6.9	1.5	1.7	5.2	.0	.0	.0	1.4	1.6	4.0		3
VISIBILITY<1-1/4MI.	07	11.5	10.3	17.5	12.2	4.4	4.3	2.3	2.9	2.3	5.3	2.0	5.5		9
	10	9.3	12.5	9.6	9.8	3.9	7.0	1.2	7.2	3.0	4.1	1.2	1.0		6
	13	4.2	4.3	9.8	7.7	4.5	2.1	5.0	5.6	3.0	3.7	2.5	4.0		9
	16	37.5	7.1	7.9	8.2	7.0	.0	.0	3.4	9.4	4.8	14.3	5.9		5
	19	5.0	1.1	3.0	.0	.0	.9	2.2	1.1	2.0	3.0	1.0	2.9		6
	22	3.8	1.9	.0	.0	.0	1.9	.0	.0	.0	.0	.0	7.8		2
CEILING≥1000FT. AND	01	86.8	94.0	93.1	94.0	98.3	94.8	98.4	98.4	100.0	97.1	98.4	96.0		3
VISIBILITY≥2-1/2MI.	07	75.2	80.0	74.7	74.8	89.7	92.9	93.0	92.8	95.3	91.0	92.6	89.7		6
	10	79.6	78.1	79.8	79.3	93.4	90.7	97.7	91.3	97.0	94.9	94.0	95.0		3
	13	90.2	89.6	81.4	86.7	93.9	94.3	90.7	89.6	95.6	94.1	95.8	91.9		7
	16	56.3	75.0	81.6	79.6	83.7	97.4	91.4	86.2	90.6	90.5	85.7	88.2		2
	19	94.1	97.9	94.1	100.0	98.1	99.1	97.8	98.9	97.1	97.0	98.0	97.1		4
	22	96.2	98.1	100.0	96.2	100.0	98.1	100.0	100.0	100.0	100.0	100.0	92.2		2
CEILING≥5000FT. AND	01	22.0	16.0	15.5	23.9	48.4	41.3	50.6	59.0	54.7	62.2	50.0	36.0		3
VISIBILITY >5MI.	07	16.4	10.3	10.2	17.3	22.7	33.5	39.6	43.4	41.1	49.8	31.6	25.4		6
	10	16.7	8.3	17.6	19.4	26.2	37.2	50.1	44.8	46.9	52.0	45.3	47.0		3
	13	27.3	29.5	13.6	22.4	44.8	49.2	54.2	52.0	54.8	60.6	44.1	47.0		7
	16	25.2	21.3	26.4	22.4	58.2	71.0	77.2	61.9	62.7	61.9	57.1	52.9		2
	19	28.7	31.6	23.8	42.2	60.1	62.3	65.6	66.7	62.8	69.6	61.2	47.1		4
	22	38.4	30.8	31.6	37.8	71.9	53.9	73.6	70.4	53.1	62.6	60.0	53.0		2
MISCELLANEOUS															
MEAN PRESS.-MSL(MBS)		1020	1017	1014	1011	1007	1004	1002	1003	1008	1014	1018	1019	1012	12
MEAN CLOUDINESS(%)		77	87	87	83	75	79	76	74	65	56	60	65	73	34

CLIMATIC BRIEF

48840 THANH HOA

19 48 N 105 47 E 16 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE (°F)															
EXTREME MAX.		91	96	102	107	107	106	108	107	101	99	95	89	108	34
MEAN MAX.		70	70	74	82	90	93	92	91	88	84	78	73	82	34
MEAN		64	64	68	75	82	85	85	84	82	77	71	66	75	33
MEAN MIN.		58	59	63	69	75	78	78	77	75	70	65	60	69	34
EXTREME MIN.		42	46	48	53	59	67	68	66	61	56	44	44	42	34
PRECIPITATION (IN.)															
MONTHLY MAX.		5.6	4.1	4.8	5.3	23.4	16.6	19.7	17.8	35.0	36.0	11.0	2.8	109.4	34
MONTHLY MEAN		1.1	1.3	1.6	2.0	6.6	6.6	8.7	10.1	15.2	9.0	2.9	1.1	66.1	34
MONTHLY MIN.		*	.3	.5	.2	2.2	.7	2.1	.9	2.7	*	.1	*	41.9	34
24HR MAX.		3.3	1.5	3.8	2.4	8.5	6.8	8.2	6.6	7.7	13.1	7.2	1.0	13.1	34
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		8	12	13	11	11	10	13	14	15	10	8	7	132	34
THUNDERSTORM		0	1	2	5	12	12	15	16	11	3	M	M	77	3
FOG	06	5	5	6	3	1	*	0	*	1	3	4	2	30	8
	13	0	*	1	0	0	0	*	0	0	0	0	*	1	9
TOTAL CLOUD COVER	01	7	5	4	6	10	6	10	8	8	16	9	10		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	3	4	12	10	7	9	NA	NA	NA	NA		<1
	07	5	2	1	2	2	2	2	2	2	6	5	7		4
	10	7	3	0	4	4	3	3	2	1	5	5	8		2
	13	7	5	3	4	5	2	3	2	2	2	4	5		4
	16	NA	NA	2	6	4	5	3	0	NA	NA	NA	NA		<1
	19	12	8	4	6	7	5	4	3	7	18	15	15		4
	22	9	4	4	8	13	10	16	12	10	19	12	16		2
LOW CLOUD COVER	01	5	4	3	6	12	13	16	13	12	15	11	13		3
≤3/10 VSBY ≥2-1/2MI	04	NA	NA	NA	NA	31	15	21	NA	NA	NA	NA	16		<1
	07	4	2	1	4	10	10	14	10	7	10	7	9		4
	10	6	4	1	4	12	11	15	9	5	8	7	10		2
	13	7	6	3	6	14	12	13	12	6	7	6	7		4
	16	NA	NA	4	2	NA	NA	NA	16	10	NA	31	NA		<1
	19	10	9	4	8	12	16	16	14	12	19	16	16		4
	22	8	5	4	8	18	15	23	17	14	20	14	16		2
SFC WND ≥17KTS	01	0	0	*	*	1	1	*	0	*	0	1	*		3
& NO PRECIP	04	NA	NA	NA	0	0	0	0	0	NA	NA	NA	NA		<1
	07	0	*	1	1	0	1	*	0	0	0	1	1		4
	10	0	0	0	1	1	1	0	0	1	1	0	0		2
	13	*	1	0	1	*	1	0	1	*	1	1	0		4
	16	NA	NA	NA	1	0	0	0	0	NA	NA	NA	NA		<1
	19	1	0	1	*	0	0	1	*	1	0	*	*		4
	22	0	0	0	0	1	0	0	0	1	1	1	0		2
CIG ≥1000FT	01	31	26	27	29	28	28	29	30	29	30	28	30		3
VSBY ≥2-1/2MI	04	NA	NA	NA	29	29	30	30	31	NA	NA	NA	NA		<1
& WND ≤10KTS	07	31	24	22	27	30	29	30	30	28	30	28	27		4
	10	31	27	29	29	31	30	31	30	27	31	29	31		2
	13	30	26	29	29	30	28	30	30	29	30	28	30		4
	16	NA	NA	NA	27	31	30	31	31	NA	NA	NA	NA		<1
	19	31	27	27	29	30	29	30	30	29	30	30	30		4
	22	31	27	29	30	30	29	31	31	28	31	30	31		2
SFC WND 4-10KTS	01	2	1	1	2	2	4	2	2	2	2	1	4		3
TEMP 33-89°F	04	NA	NA	NA	3	1	4	1	0	NA	NA	NA	NA		<1
& NO PRECIP	07	3	1	1	2	1	2	1	2	2	1	4	3		4
	10	5	1	0	3	3	3	1	1	3	4	7	3		2
	13	6	4	3	9	9	4	4	1	7	6	7	6		4
	16	NA	NA	NA	8	7	9	0	2	NA	NA	NA	NA		<1
	19	2	4	4	5	6	5	4	2	2	1	2	2		4
	22	2	1	1	4	5	4	3	1	2	1	1	1		2
RELATIVE HUMIDITY (%)															
MEAN		85	89	89	88	86	81	82	84	87	83	84	84	85	11
MEAN MIN.		20	15	27	9	27	33	34	35	34	25	25	22	9	11
WIND (16PTS & KNOTS)															
PREVAILING DIRECTION		NE	NE	NE	SE	SE	S	SW	NW	NNW	NW	NE	NE	NE	33
MEAN SPEED		12	15	8	8	7	8	10	8	4	6	11	12	9	NA
TERMINAL WEATHER (%)															
CEILING<700FT.A/O	01	.0	1.8	1.6	4.2	.0	.0	4.3	3.9	.0	2.9	1.4	1.6		3
VISIBILITY<1-1/4MI.	07	.0	6.3	9.5	1.1	1.1	2.2	.0	.0	1.1	2.9	.0	7.4		4
	10	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.8		2
	13	3.4	.0	1.2	.0	.0	1.3	.0	.0	.0	.0	1.2	.0		4
	19	.0	.0	2.1	.0	2.1	1.0	.0	1.1	.0	2.0	.0	.9		4
	22	.0	.0	.0	1.8	.0	1.9	.0	.0	.0	.0	.0	.0		2
CEILING≥1000FT. AND	01	100.0	94.7	87.5	95.8	98.4	97.4	95.7	96.1	100.0	95.7	95.8	96.7		3
VISIBILITY≥2-1/2MI.	07	100.0	84.2	70.5	95.5	95.7	97.8	96.8	97.8	92.0	95.1	96.0	90.9		4
	10	100.0	94.4	94.5	97.6	100.0	100.0	100.0	98.0	94.0	100.0	98.0	98.2		2
	13	96.6	95.4	91.6	98.9	98.9	96.1	98.8	100.0	100.0	100.0	98.8	100.0		4
	19	100.0	94.3	91.8	97.8	96.9	97.0	99.0	96.8	98.9	98.0	100.0	99.1		4
	22	100.0	94.4	93.0	98.2	98.2	96.2	100.0	100.0	96.2	100.0	100.0	98.1		2
CEILING≥5000FT. AND	01	22.3	19.4	10.9	35.2	50.2	51.3	72.8	56.5	46.5	55.7	47.8	44.1		3
VISIBILITY >5MI.	07	13.4	8.5	4.4	13.6	40.4	46.2	60.3	42.6	33.2	41.2	24.8	31.3		4
	10	23.0	16.8	7.2	19.0	48.0	44.7	64.6	44.0	34.0	34.0	31.4	34.5		2
	13	29.1	29.7	19.2	27.0	57.6	61.1	66.6	55.2	35.2	26.5	30.5	37.5		4
	19	33.2	36.4	17.6	36.3	46.8	64.6	66.4	65.3	57.1	67.0	59.0	59.4		4
	22	28.0	18.6	14.1	30.4	60.8	56.6	80.0	72.3	58.5	73.5	53.4	53.8		2
MISCELLANEOUS															
MEAN PRESS.-MSL(MBS)		1019	1016	1014	1012	1006	1003	1001	1003	1007	1013	1016	1017	1011	12
MEAN CLOUDINESS(%)		77	86	85	74	69	71	73	75	69	62	70	72	74	34

CLIMATIC BRIEF

48844 CUA RAO

19 17 N 104 25 E 420 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
PRECIPITATION <IN.>															
MONTHLY MAX.		.9	4.8	3.4	7.0	17.4	10.3	24.3	19.3	22.6	11.4	9.6	2.1	108.9	12
MONTHLY MEAN		.2	1.4	1.8	4.0	8.2	5.5	9.9	7.9	13.0	4.3	2.0	.7	58.8	12
MONTHLY MIN.		.0	*	.2	.5	2.6	1.2	5.6	1.8	3.8	.1	.2	.0	38.5	12
24HR MAX.		.5	1.7	2.4	2.1	3.0	3.3	2.8	3.3	5.0	3.5	3.0	1.7	5.0	12
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		2	4	5	9	13	10	15	12	16	10	5	2	103	12
TOTAL CLOUD COVER	05	NA	0	1	4	4	1	2	1	2	1	1	0		1
≤3/10 & VSBY≥2-1/2MI	07	0	1	1	3	2	0	1	1	2	*	2	*		2
	13	4	6	10	9	3	3	2	1	4	8	5	5		2
LOW CLOUD COVER	05	NA	NA	1	4	6	6	5	4	3	3	7	NA		1
≤3/10 VSBY ≥2-1/2MI	07	NA	1	*	6	8	11	9	5	4	2	4	5		2
	13	5	6	14	18	18	21	21	15	21	20	10	12		2
SFC WND ≥17KTS	05	NA	0	0	1	0	0	0	0	0	0	0	0		1
& NO PRECIP	07	0	0	1	0	0	0	0	0	0	0	0	0		2
	13	1	0	0	0	0	0	0	0	0	0	0	0		2
CIG ≥1000FT	05	NA	7	11	14	20	20	18	16	7	12	10	3		1
VSBY ≥2-1/2MI	07	4	10	12	17	16	21	22	16	12	8	8	11		2
& WND ≤10KTS	13	28	25	28	27	29	29	28	26	27	27	25	28		2
SFC WND 4-10KTS	05	3	3	2	7	4	2	3	2	2	1	1	0		1
TEMP 33-89°F	07	5	3	2	1	2	2	1	1	2	5	1	3		2
& NO PRECIP	13	22	14	11	9	8	1	4	2	4	12	15	14		2
TERMINAL WEATHER <%>															
CEILING<700FT.A/O	05	NA	16.7	18.6	10.9	7.0	6.5	7.0	16.0	24.3	14.9	9.4	4.2		2
VISIBILITY<1-1/4MI.	07	16.1	14.3	21.3	15.5	3.3	6.7	1.7	6.9	17.8	14.6	26.8	18.2		2
	13	.0	.0	.0	5.0	1.7	1.8	1.7	.0	2.8	.0	1.4	.0		2
CEILING≥1000FT. AND	05	NA	26.2	34.9	49.1	64.9	67.4	67.9	52.0	21.6	38.3	34.4	8.3		1
VISIBILITY≥2-1/2MI.	07	11.3	37.5	41.0	55.2	52.5	68.3	71.2	56.9	41.1	24.4	26.8	37.7		2
	13	98.4	96.4	96.7	91.7	94.9	98.2	93.3	86.4	90.1	93.9	85.7	96.1		2
CEILING≥5000FT. AND	05	NA	2.4	2.3	12.7	15.9	37.0	21.1	14.0	10.8	.0	6.3	.0		1
VISIBILITY >5MI.	07	1.6	.0	1.6	17.3	21.3	38.3	32.2	22.4	16.5	2.4	7.0	2.6		2
	13	28.2	26.8	45.9	68.3	72.9	78.1	81.6	72.9	77.5	74.4	40.0	48.6		2

CLIMATIC BRIEF

TIEN TRI

18 16 N 106 07 E 10 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
PRECIPITATION <IN.>															
MONTHLY MAX.		2.6	5.0	5.1	5.0	12.7	18.8	24.6	17.0	8.8	8.3	3.7	4.0	91.1	10
MONTHLY MEAN		7.2	4.4	2.3	2.9	3.4	3.6	7.8	5.6	27.5	21.7	17.0	8.8	112.2	14
MONTHLY MIN.		*	*	.0	.1	4.6	5.7	7.2	3.3	1.5	.0	.0	.0	35.9	10
24HR MAX.		.9	1.3	1.2	2.2	5.6	6.9	6.4	4.6	3.3	2.4	1.6	1.3	6.9	10
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		15	13	11	8	8	5	9	7	15	14	16	13	134	14
RELATIVE HUMIDITY <%>															
MEAN		82	82	81	81	82	84	86	85	85	75	82	76	82	3
MEAN MIN.		31	28	28	33	26	49	50	34	26	17	24	18	17	3
MISCELLANEOUS															
MEAN CLOUDINESS<%>		81	85	78	86	73	73	75	71	64	51	74	59	73	4

CLIMATIC BRIEF

48845 VINH

18 40 N 105 40 E 20 F

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE <°F>															
EXTREME MAX.		95	96	102	104	106	108	106	103	103	99	97	89	108	34
MEAN MAX.		70	70	74	83	90	94	94	93	87	83	77	72	81	34
MEAN		64	65	69	77	83	86	86	85	81	77	71	67	76	33
MEAN MIN.		59	61	64	70	75	78	78	78	75	71	66	62	70	34
EXTREME MIN.		39	45	50	53	59	69	72	66	63	59	40	40	39	34
PRECIPITATION <IN.>															
MONTHLY MAX.		5.5	4.3	4.6	4.8	16.4	12.3	21.7	16.3	43.1	37.0	18.2	7.9	105.2	34
MONTHLY MEAN		2.2	1.8	1.9	2.4	5.1	4.7	6.1	6.0	16.5	13.7	7.5	3.1	71.0	34
MONTHLY MIN.		.4	.2	.2	.4	.8	.2	.2	.7	3.8	1.9	.4	.1	38.9	34
24HR MAX.		2.3	2.1	3.5	3.0	7.6	6.1	10.4	6.1	19.1	15.7	8.0	4.7	19.1	34
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		12	12	12	9	10	7	9	9	14	14	13	12	133	34
THUNDERSTORM		1	4	9	5	14	7	6	11	10	4	0	0	71	3
FOG	06	5	4	6	4	*	0	*	1	1	1	3	3	28	8
	13	*	*	1	*	0	0	0	0	0	0	*	*	2	9
TOTAL CLOUD COVER	01	8	4	4	7	12	5	9	5	3	9	6	11		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	4	6	12	7	13	2	NA	NA	NA	NA		<1
	07	3	1	1	3	2	2	4	5	2	4	2	4		3
	10	4	2	2	3	2	3	6	4	2	5	2	6		2
	13	6	3	4	7	6	3	4	3	2	3	2	5		3
	16	NA	NA	4	8	2	4	6	0	NA	NA	NA	NA		<1
	19	8	6	6	8	4	2	4	1	3	9	9	10		3
	22	7	6	4	9	10	4	8	5	5	16	9	10		2
LOW CLOUD COVER	01	4	3	3	12	19	16	21	19	8	9	8	16		3
≤3/10 VSBY ≥2-1/2MI	04	NA	NA	NA	3	NA	15	21	23	NA	NA	NA	NA		<1
	07	1	1	2	4	15	17	22	17	7	6	4	8		3
	10	6	4	2	3	17	17	23	20	10	6	5	7		2
	13	4	8	4	11	18	17	16	15	8	9	6	13		3
	16	NA	NA	16	12	31	20	31	NA	NA	31	NA	NA		<1
	19	7	7	5	13	18	20	21	18	10	18	11	13		3
	22	7	6	5	10	22	19	22	18	11	16	12	12		2
SFC WND ≥17KTS	01	*	*	*	*	0	*	*	1	0	*	*	*		3
& NO PRECIP	04	NA	NA	0	0	0	0	0	0	NA	NA	NA	NA		<1
	07	0	1	0	1	*	0	1	1	0	0	0	*		4
	10	NA	NA	NA	1	0	0	1	0	0	0	0	0		2
	13	1	0	*	0	0	0	*	1	0	0	0	*		3
	16	NA	NA	0	2	0	0	0	0	NA	NA	NA	NA		<1
	19	0	*	*	0	*	0	1	0	0	0	0	0		3
	22	0	0	0	0	0	0	0	0	1	0	0	0		2
CIG ≥1000FT	01	29	24	27	27	30	29	30	30	28	30	28	28		3
VSBY ≥2-1/2MI	04	NA	NA	30	28	31	30	31	31	NA	NA	NA	NA		<1
& WND ≤10KTS	07	26	17	18	20	30	29	29	29	26	28	26	25		4
	10	28	22	26	28	30	29	30	30	29	31	29	28		2
	13	29	25	28	28	31	29	30	30	28	28	27	28		3
	16	NA	NA	30	27	29	29	31	30	NA	NA	NA	NA		<1
	19	29	24	27	29	30	30	27	29	27	30	28	29		3
	22	28	23	25	28	30	30	31	31	29	31	30	30		2
SFC WND 4-10KTS	01	1	1	1	1	1	4	5	1	2	2	3	2		3
TEMP 33-89°F	04	NA	NA	0	0	1	3	11	3	NA	NA	NA	NA		<1
& NO PRECIP	07	2	1	1	1	*	2	6	2	1	2	0	2		4
	10	5	1	2	3	1	3	5	2	1	6	3	4		2
	13	8	5	6	10	7	4	2	3	4	9	8	8		3
	16	NA	NA	10	7	15	6	2	5	NA	NA	NA	NA		<1
	19	4	2	5	6	8	6	9	5	1	3	*	4		3
	22	3	1	1	2	1	2	8	2	1	2	1	2		2
RELATIVE HUMIDITY <%>															
MEAN		90	91	91	88	83	74	75	78	86	86	87	87	85	10
MEAN MIN.		20	17	31	28	21	23	27	19	33	15	27	32	15	10
WIND <16PTS & KNOTS>															
PREVAILING DIRECTION		NE	NE	N	NE	E	SW	SW	SW	SW	SW	NW	NE	SW	33
PREVAILING SPEED	06	5	7	10	5	4	5	5	3	3	3	5	3	5	33
	13	7	10	7	8	8	12	14	12	8	8	8	7	9	33
MEAN SPEED		16	16	6	6	5	8	10	8	4	8	11	15	9	NA
TERMINAL WEATHER <%>															
CEILING<700FT.A/O	01	.0	8.3	.0	8.0	.0	2.2	4.3	.0	.0	.0	3.0	4.8		3
VISIBILITY<1-1/4MI.	07	6.6	20.0	22.8	13.2	.0	.0	.0	.0	7.0	6.8	10.7	13.2		3
	10	1.9	7.7	3.8	.0	.0	1.9	2.1	.0	4.0	.0	.0	3.6		2
	13	.0	.0	.0	.0	.0	.0	.0	2.9	.0	.0	.0	2.6		3
	19	.0	9.3	3.2	1.5	.0	.0	3.3	3.3	1.8	.0	1.7	3.3		3
	22	.0	7.4	5.6	1.8	3.6	.0	.0	.0	2.0	.0	.0	.0		2
CEILING≥1000FT. AND	01	95.1	88.9	95.0	92.0	96.4	95.6	93.5	100.0	96.2	100.0	90.9	95.2		3
VISIBILITY≥2-1/2MI.	07	85.5	62.7	49.4	77.6	98.7	96.3	97.4	98.2	87.7	88.1	87.5	81.6		3
	10	90.6	76.9	84.9	95.3	98.0	98.1	97.9	98.1	96.0	100.0	98.0	89.3		2
	13	97.1	97.3	92.1	97.8	100.0	100.0	96.9	97.1	90.9	95.0	95.8	94.9		3
	19	93.8	86.0	84.1	96.9	100.0	98.6	93.4	95.1	90.9	98.3	98.3	95.1		3
	22	92.0	83.3	79.6	94.6	94.6	100.0	98.1	100.0	98.0	100.0	100.0	98.2		2
CEILING≥5000FT. AND	01	7.3	11.2	15.0	50.0	75.0	68.8	73.9	76.5	53.7	55.7	36.2	52.4		3
VISIBILITY >5MI.	07	13.1	4.0	6.4	19.6	70.9	70.4	79.5	65.4	42.2	25.2	21.6	30.2		3
	10	24.5	11.4	18.9	21.0	66.0	75.5	79.2	75.5	48.0	29.7	23.6	39.3		2
	13	34.3	37.8	18.5	44.4	75.5	73.7	68.7	55.9	54.6	30.0	33.3	43.6		3
	19	28.7	31.7	22.3	49.2	72.4	76.1	75.4	75.2	52.7	72.9	56.0	62.2		3
	22	30.0	24.3	22.3	39.3	78.6	76.0	87.1	78.6	46.9	68.9	51.9	57.2		2
MISCELLANEOUS															
MEAN PRESS.-MSL<MBS>		1019	1016	1014	1010	1007	1004	1002	1004	1008	1014	1017	1018	1011	12
MEAN CLOUDINESS<%>		84	87	84	74	71	70	73	74	77	76	83	83	78	34

CLIMATIC BRIEF

48846 HA TINH

18 21 N 105 54 E 15 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
						PRECIPITATION <IN.>									
MONTHLY MEAN		3.9	3.0	2.1	1.6	4.3	4.3	8.0	5.7	21.3	24.3	15.5	8.2	102.2	12
						MEAN NUMBER OF DAYS WITH									
PRECIPITATION		10	10	9	6	8	5	8	7	13	14	15	12	117	12
TOTAL CLOUD COVER	01	11	5	5	9	14	9	11	8	5	12	9	7		3
≤3/10 & VSBY≥2-1/2MI	04	NA	NA	3	6	13	9	15	5	NA	NA	NA	NA		<1
	07	3	2	1	2	3	2	5	3	1	6	3	4		3
	10	4	3	2	4	3	2	6	3	2	4	3	6		2
	13	5	3	3	8	6	2	5	3	2	3	1	4		3
	16	NA	NA	9	8	5	2	6	NA	NA	NA	NA	NA		<1
	19	8	7	7	8	8	3	6	2	3	13	9	9		3
	22	8	7	6	10	12	7	13	9	4	12	9	10		2
LOW CLOUD COVER	01	7	4	6	5	18	15	19	16	9	14	16	7		3
≤3/10 VSBY ≥2-1/2MI	04	NA	NA	NA	3	19	10	8	8	NA	10	NA	NA		<1
	07	1	3	2	5	12	14	17	13	5	9	2	6		3
	10	4	3	2	6	14	12	20	12	6	5	4	6		2
	13	4	4	4	8	14	15	19	11	7	6	6	6		3
	16	NA	NA	8	4	8	12	25	NA	NA	NA	NA	NA		<1
	19	5	6	5	12	15	15	18	13	6	16	10	9		3
	22	8	8	6	9	18	18	21	18	11	13	11	12		2
SFC WND ≥17KTS	01	1	0	0	*	0	0	0	*	1	*	*	*		3
& NO PRECIP	04	NA	NA	0	0	0	0	0	0	NA	NA	NA	NA		<1
	07	0	0	0	0	*	0	1	*	0	0	*	1		3
	10	1	0	0	0	0	0	0	0	0	0	2	1		2
	13	1	*	0	0	*	0	0	*	0	2	0	2		3
	16	NA	NA	0	0	1	0	0	0	NA	NA	NA	NA		<1
	19	0	*	*	0	*	*	0	0	0	0	*	0		3
	22	0	0	0	0	0	0	1	0	0	0	1	1		2
CIG ≥1000FT	01	30	27	30	29	29	29	31	28	28	29	28	29		3
VSBY ≥2-1/2MI	04	NA	NA	28	30	31	30	31	31	NA	NA	NA	NA		<1
& WND ≤10KTS	07	28	25	27	27	31	30	30	31	29	30	26	28		3
	10	29	25	31	29	31	29	31	30	29	30	27	30		2
	13	30	26	30	30	30	30	31	31	29	29	28	28		3
	16	NA	NA	31	30	30	29	31	31	NA	NA	NA	NA		<1
	19	30	27	29	30	30	29	31	30	30	30	29	30		3
	22	30	27	31	30	31	29	31	30	30	28	30	31		2
SFC WND 4-10KTS	01	4	3	2	2	2	2	3	2	1	2	3	5		3
TEMP 33-89°F	04	NA	NA	3	1	1	6	5	0	NA	NA	NA	NA		<1
& NO PRECIP	07	7	1	1	*	1	1	1	1	2	2	3	4		3
	10	9	3	3	1	1	2	2	2	4	6	5	9		2
	13	10	7	6	8	7	3	4	3	6	9	8	8		3
	16	NA	NA	10	9	13	6	1	5	NA	NA	NA	NA		<1
	19	3	1	2	3	3	2	4	4	3	2	2	3		3
	22	1	1	0	2	1	2	3	1	1	1	1	2		2
						TERMINAL WEATHER <%>									
CEILING<700FT.A/O	01	.0	.0	3.3	2.9	3.6	.0	.0	6.8	.0	2.5	.0	2.7		3
VISIBILITY<1-1/4MI.	07	5.6	6.9	12.1	9.1	.0	.0	.0	.0	.0	1.7	5.2	3.5		4
	10	3.7	.0	.0	.0	.0	3.7	.0	.0	2.2	.0	1.9	.0		2
	13	2.9	3.7	.0	.0	2.3	.0	.0	.0	.0	.0	.0	7.4		3
	19	3.6	.0	1.8	.0	1.4	1.4	.0	.0	.0	1.7	.0	1.7		3
	22	3.8	1.9	.0	.0	.0	.0	.0	1.7	.0	1.9	.0	.0		2
CEILING≥1000FT. AND	01	100.0	100.0	96.7	97.1	96.4	98.0	100.0	91.5	93.3	97.5	100.0	91.9		3
VISIBILITY≥2-1/2MI.	07	94.4	89.7	82.8	90.9	98.6	100.0	100.0	100.0	98.3	96.6	89.7	96.5		3
	10	92.6	88.5	100.0	97.7	100.0	96.3	100.0	100.0	97.8	96.5	96.2	100.0		2
	13	97.1	92.6	100.0	100.0	97.7	100.0	100.0	100.0	100.0	100.0	89.5	92.6		3
	19	96.4	100.0	96.4	100.0	98.6	98.6	98.4	98.2	98.1	93.2	100.0	98.7		3
	22	96.2	96.2	100.0	100.0	100.0	98.1	100.0	96.6	100.0	92.6	100.0	100.0		2
CEILING≥5000FT. AND	01	24.1	21.7	13.3	23.5	69.1	64.7	66.1	62.7	40.0	45.0	53.2	27.0		3
VISIBILITY >5MI.	07	7.4	12.0	6.8	18.2	48.7	59.8	76.6	59.0	27.1	35.6	12.1	28.1		3
	10	16.8	13.4	10.0	25.6	54.2	55.6	86.0	50.0	30.5	31.6	19.2	27.3		2
	13	14.6	22.2	15.3	33.3	62.1	72.7	84.0	56.7	44.4	38.1	31.7	22.2		3
	19	20.0	24.1	17.9	50.1	56.9	71.8	69.8	59.0	42.6	61.1	41.1	36.7		3
	22	30.8	28.8	22.4	40.4	74.1	71.6	80.0	69.0	49.9	55.5	41.1	43.6		2

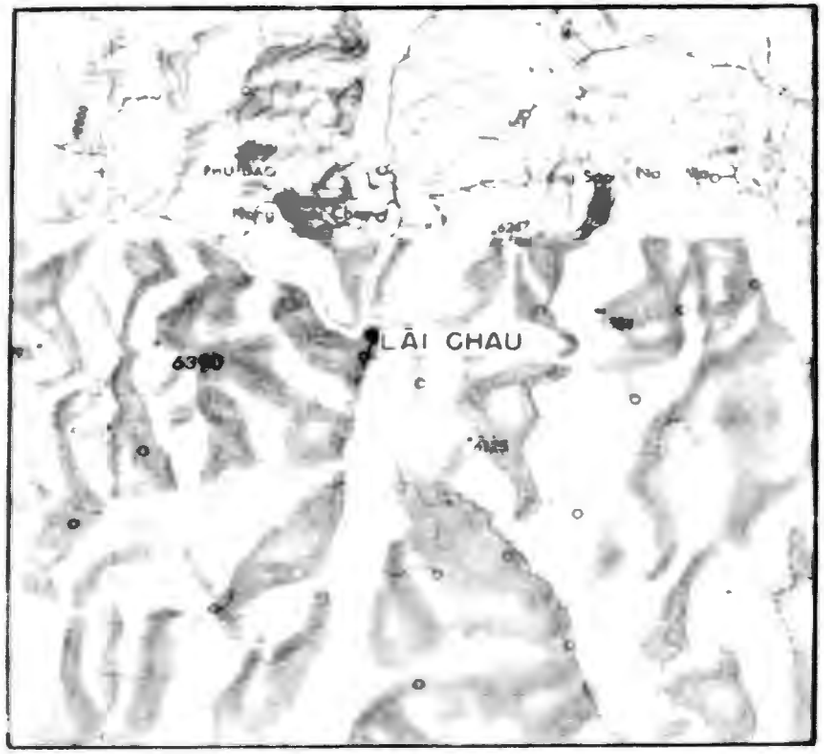
CLIMATIC BRIEF

48848 DONG HOI

17 29 N 106 36 E 23 FT

ELEMENT	HR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	YR
TEMPERATURE (°F)															
EXTREME MAX.		94	99	103	106	108	107	106	107	106	99	95	85	108	46
MEAN MAX.		72	73	77	84	91	94	94	93	88	83	78	73	83	46
MEAN		67	68	71	78	83	87	87	87	82	78	73	69	78	33
MEAN MIN.		63	64	67	72	77	80	80	79	76	72	68	64	72	46
EXTREME MIN.		46	46	51	53	59	69	69	72	65	61	54	50	46	46
PRECIPITATION (IN.)															
MONTHLY MAX.		5.8	4.8	10.2	7.9	13.5	9.1	15.7	21.3	44.3	57.2	27.5	14.2	118.1	47
MONTHLY MEAN		2.5	1.5	1.7	2.0	3.9	3.0	4.1	4.5	17.3	20.1	14.0	5.3	79.9	34
MONTHLY MIN.		.2	.2	.1	.2	.5	.0	*	*	3.2	1.8	2.6	.4	59.2	47
24HR MAX.		3.5	2.8	3.6	3.4	5.7	6.4	10.4	8.7	12.4	13.4	12.4	6.0	13.4	47
MEAN NUMBER OF DAYS WITH															
PRECIPITATION		11	9	9	7	8	6	6	9	15	16	16	13	125	47
THUNDERSTORM		0	1	6	4	15	5	4	6	9	3	*	0	53	3
FOG	06	4	5	9	5	1	*	0	*	*	*	1	1	26	9
	13	*	*	1	*	*	0	0	*	*	*	*	*	3	9
TOTAL CLOUD COVER	01	7	7	5	10	8	4	8	5	3	10	7	8		3
≤3/10 & VSBY≥2-1/2MI	04	4	3	4	7	9	2	11	7	2	8	6	2		1
	07	2	1	2	2	3	3	6	4	4	6	4	3		6
	10	3	2	2	8	2	5	8	6	3	6	5	3		3
	13	5	6	7	10	5	3	4	4	4	7	7	5		6
	16	7	8	8	10	6	5	7	4	6	6	9	3		3
	19	6	5	4	8	5	3	6	3	3	9	8	6		5
	22	6	5	3	8	5	4	12	11	4	11	9	6		2
LOW CLOUD COVER	01	8	6	4	14	20	17	22	20	13	13	10	11		3
≤3/10 VSBY ≥2-1/2MI	04	3	4	4	9	22	16	21	21	15	12	9	2		1
	07	3	2	4	8	20	17	22	18	16	11	8	6		6
	10	4	4	5	14	23	18	24	20	16	11	9	6		3
	13	8	8	11	17	20	20	21	19	14	15	11	10		6
	16	11	10	10	15	23	25	25	21	18	12	13	6		3
	19	6	5	7	13	19	21	24	20	17	15	9	8		5
	22	5	5	7	12	18	18	21	23	14	14	11	8		2
SFC WND ≥17KTS	01	1	*	*	0	*	*	1	*	0	0	*	1		3
& NO PRECIP	04	1	1	*	*	0	1	4	1	0	2	3	4		2
	07	1	1	*	*	1	1	1	1	1	1	1	1		6
	10	1	1	1	*	0	2	3	1	*	1	2	2		3
	13	1	1	1	*	1	2	1	1	1	1	1	1		6
	16	1	1	1	1	*	2	4	1	2	2	2	7		2
	19	1	1	2	1	2	1	1	1	*	*	1	2		6
CIG ≥1000FT	01	29	25	26	28	30	29	29	30	28	29	27	27		3
VSBY ≥2-1/2MI	04	23	15	19	23	31	28	26	30	27	19	21	19		2
& WND ≤10KTS	07	24	20	20	22	28	28	29	29	28	26	24	25		6
	10	24	20	20	24	29	27	27	28	28	27	23	23		3
	13	25	23	26	27	28	26	27	28	26	25	25	24		6
	16	25	21	20	25	27	25	24	25	25	21	23	12		2
	19	26	24	23	25	28	28	28	29	26	27	24	24		6
	22	30	23	26	26	31	30	28	31	28	29	28	29		2
SFC WND 4-10KTS	01	11	5	4	2	1	5	8	4	4	5	9	6		3
TEMP 33-89°F	04	9	6	5	4	4	5	10	5	3	5	8	10		2
& NO PRECIP	07	8	5	4	3	5	6	9	6	3	5	7	7		6
	10	12	10	11	10	7	6	8	6	6	10	9	13		3
	13	17	14	17	16	12	7	6	6	11	14	16	16		6
	16	16	12	15	16	9	9	5	4	8	8	10	10		2
	19	12	10	9	9	8	8	10	7	6	9	9	11		6
	22	13	5	11	6	3	5	10	4	2	8	8	6		2
RELATIVE HUMIDITY (%)															
MEAN		90	90	90	87	83	73	74	75	86	86	88	75	83	11
MEAN MIN.		38	27	26	28	36	33	27	30	37	34	31	45	26	11
WIND (16PTS & KNOTS)															
PREVAILING DIRECTION		NW	NW	NW	N	NE	SW	SW	SW	NE	NW	NW	NW	NW	33
MEAN SPEED		12	15	4	8	6	8	8	8	3	10	12	13	9	NA
TERMINAL WEATHER (%)															
CEILING<700FT.A/O	01	.0	3.7	8.9	4.5	.0	1.9	3.3	2.8	.0	2.9	3.2	7.0		3
VISIBILITY<1-1/4MI.	04	12.9	27.3	21.4	20.0	.0	.0	.0	3.6	.0	10.0	.0	12.5		4
	07	8.6	17.8	22.0	15.8	3.8	1.4	1.2	.6	1.9	3.6	4.1	6.6		9
	10	6.0	13.0	9.8	9.4	1.3	2.0	.0	2.3	2.6	3.4	3.1	11.1		6
	13	9.1	5.3	5.4	2.9	1.3	1.4	.8	2.2	2.8	5.4	2.2	5.1		9
	16	2.1	7.7	7.2	5.9	1.8	.0	.0	.0	.0	10.5	2.8	7.9		7
	19	4.3	4.3	7.9	5.5	.7	.7	.0	.0	3.4	2.8	1.9	5.3		9
	22	.0	6.0	7.3	5.7	.0	.0	.0	1.7	.0	.0	.0	1.9		2
CEILING≥1000FT. AND	01	96.2	88.9	73.2	93.9	100.0	98.1	96.7	97.2	94.7	97.1	90.5	87.7		3
VISIBILITY≥2-1/2MI.	04	75.8	59.1	66.1	72.7	100.0	100.0	100.0	96.4	100.0	89.3	87.5	77.1		1
	07	83.8	70.4	63.6	74.8	93.7	97.9	97.6	99.4	96.3	90.3	90.1	91.5		6
	10	82.0	78.0	73.9	83.5	97.4	97.0	100.0	97.7	96.1	93.3	91.8	83.8		3
	13	83.1	87.1	87.8	92.6	96.6	97.9	98.5	96.3	92.4	88.5	93.4	89.7		6
	16	97.9	90.4	84.3	91.2	96.4	98.5	98.4	98.6	98.3	82.5	88.9	92.1		3
	19	87.0	89.2	83.6	92.1	99.3	98.6	100.0	100.0	92.2	92.3	86.8	89.5		5
	22	98.0	94.0	85.5	88.7	100.0	100.0	98.2	98.3	96.1	98.3	96.4	96.3		2
CEILING≥5000FT. AND	01	24.5	26.0	19.7	49.9	80.0	68.5	75.0	81.7	65.1	53.1	44.5	47.4		3
	04	8.0	15.9	5.4	12.8	12.0	53.9	72.3	85.7	70.0	49.8	40.0	8.4		1
VISIBILITY >5MI.	07	15.2	11.9	12.8	25.1	73.0	73.9	83.5	81.3	68.3	49.6	37.3	25.0		6
	10	24.0	21.0	21.8	55.4	80.2	82.8	87.1	84.9	68.3	52.7	36.0	23.2		3
	13	38.7	34.9	44.1	59.5	85.3	81.7	85.6	81.8	65.3	60.5	44.8	39.6		6
	16	51.1	40.3	46.9	61.6	92.7	89.8	98.4	94.3	77.5	59.8	55.5	50.0		3
	19	25.0	20.9	27.2	47.8	73.0	83.8	84.4	79.3	69.8	58.1	41.5	36.2		5
	22	21.6	16.0	27.2	47.1	71.9	73.6	82.4	84.8	64.7	56.9	45.5	33.3		2
MISCELLANEOUS															
MEAN PRESS.-MSL(MBS)		1018	1016	1013	1010	1007	1005	1003	1004	1008	1013	1016	1017	1011	12
MEAN CLOUDINESS(%)		78	78	77	64	57	60	66	65	70	70	79	81	70	34

LAI CHAU TERRAIN MAP



HA GING TERRAIN MAP

Fig. 51

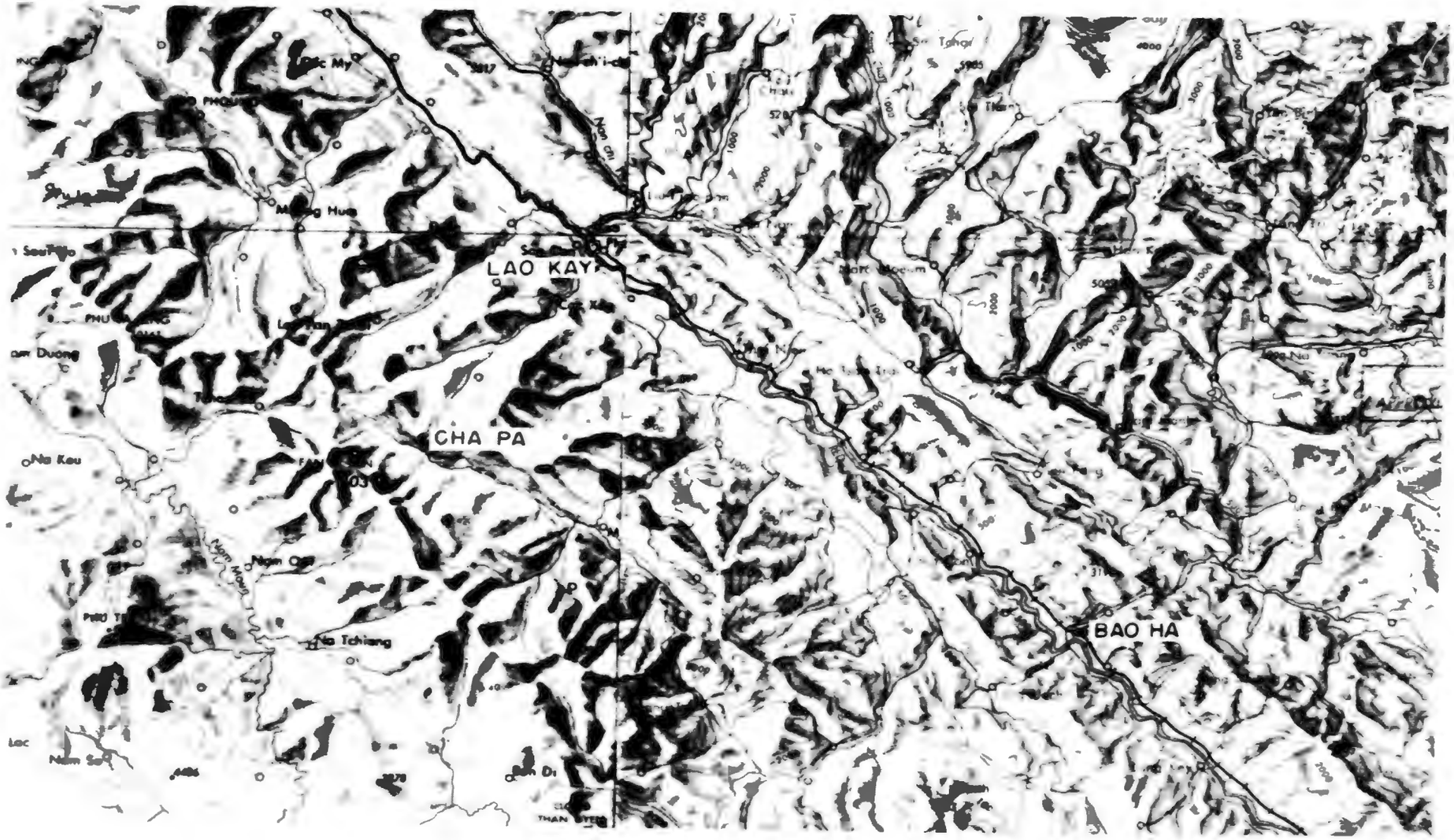


Fig. 52

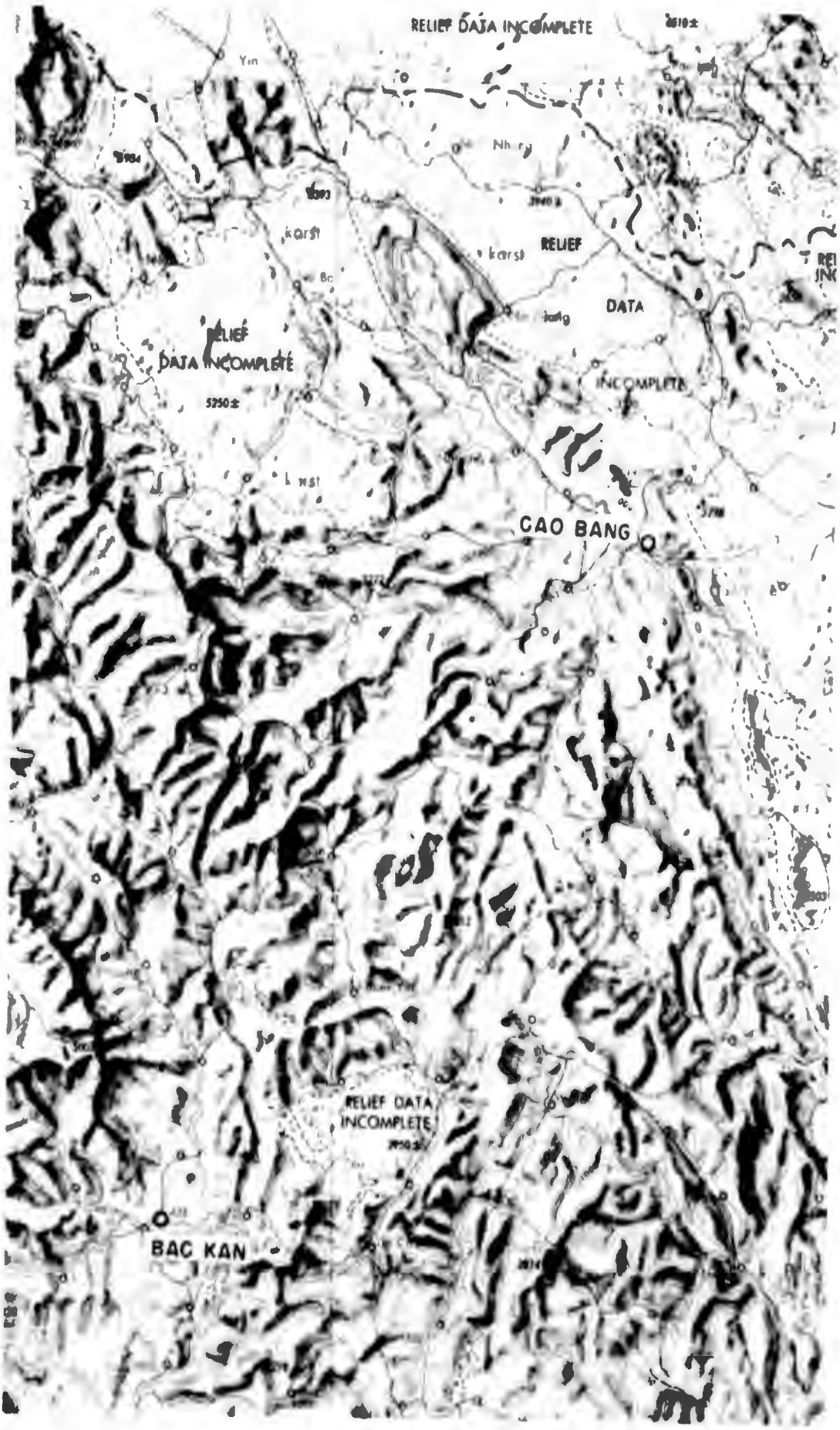

RELIEF DATA INCOMPLETE
RELIEF
DATA
INCOMPLETE
RELIEF
DATA INCOMPLETE
CAO BANG
RELIEF DATA
INCOMPLETE
BAC KAN

Fig. 53

SON LA TERRAIN MAP

TUYEN QUANG TERRAIN MAP

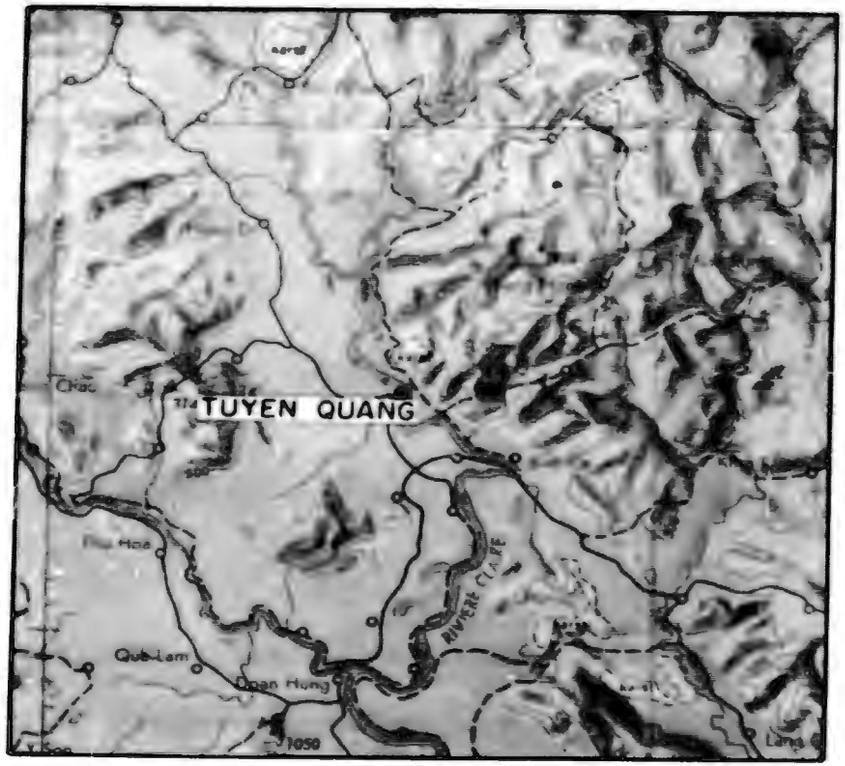
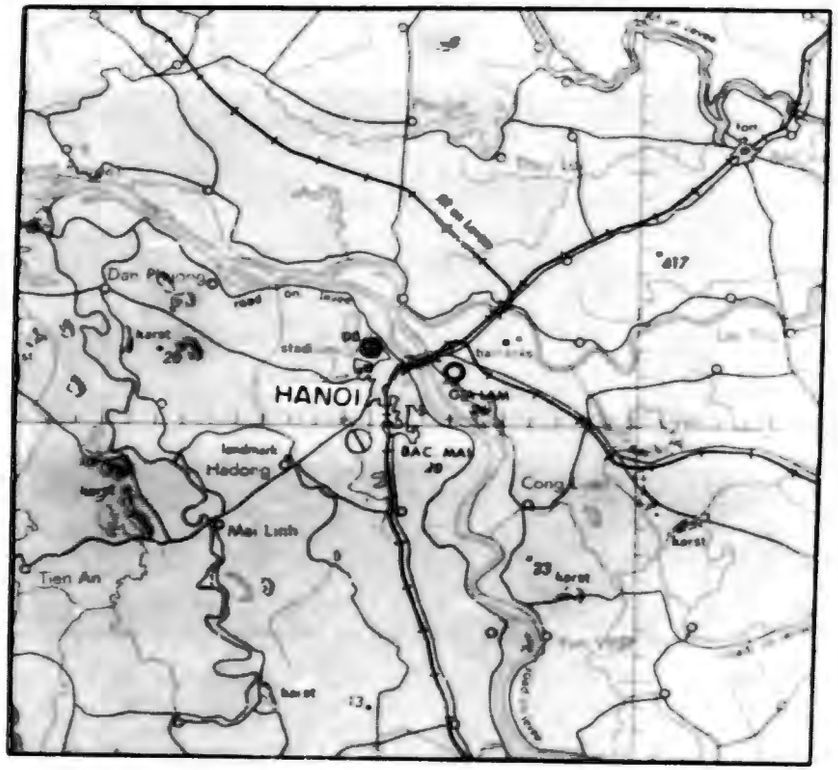


Fig. 54

HANOI TERRAIN MAP



PHU HO TERRAIN MAP

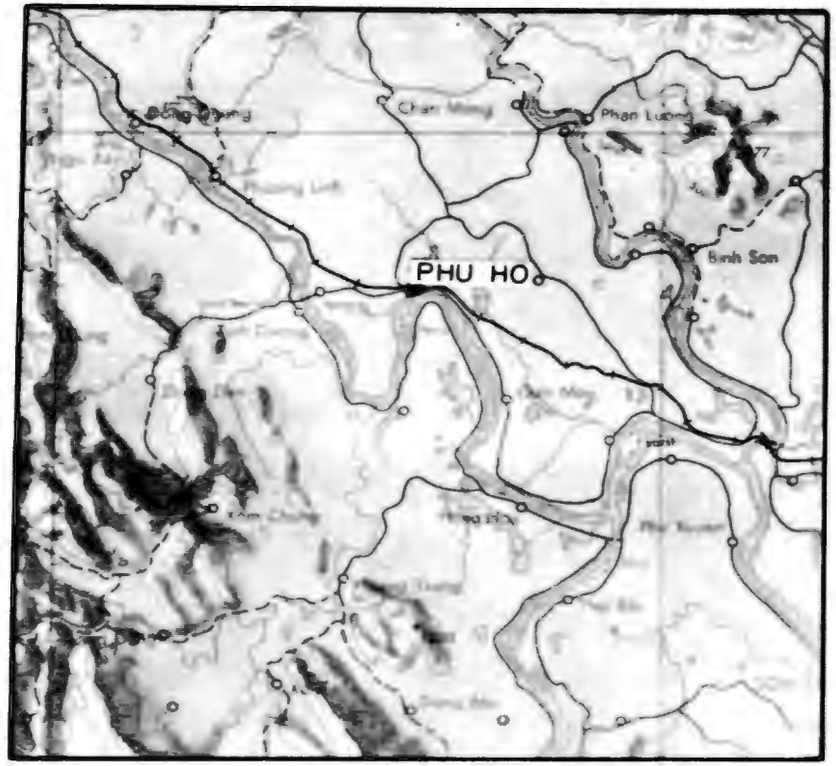
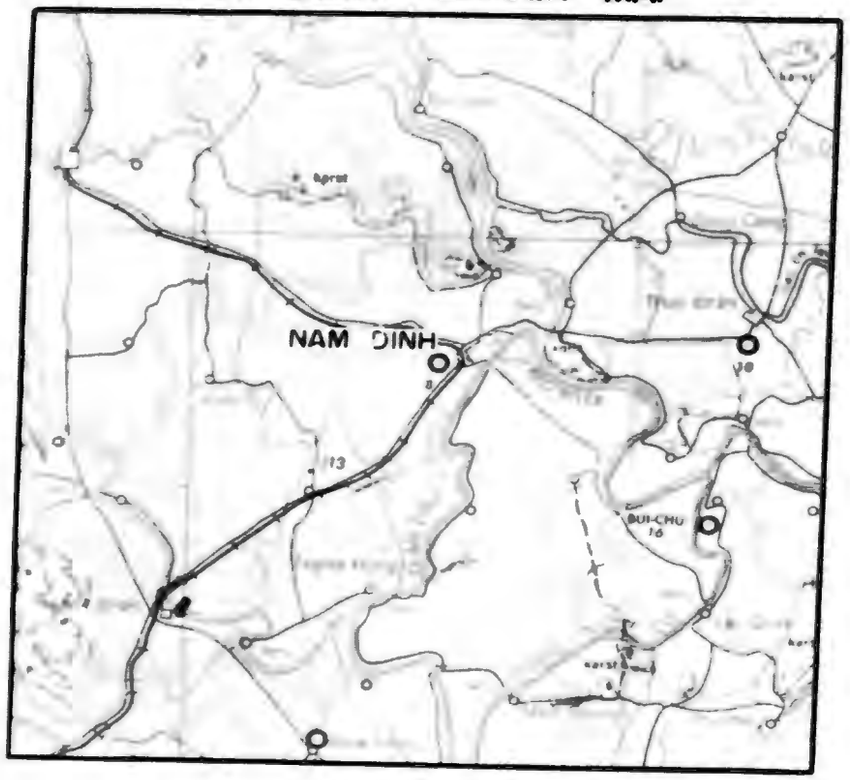


Fig. 55

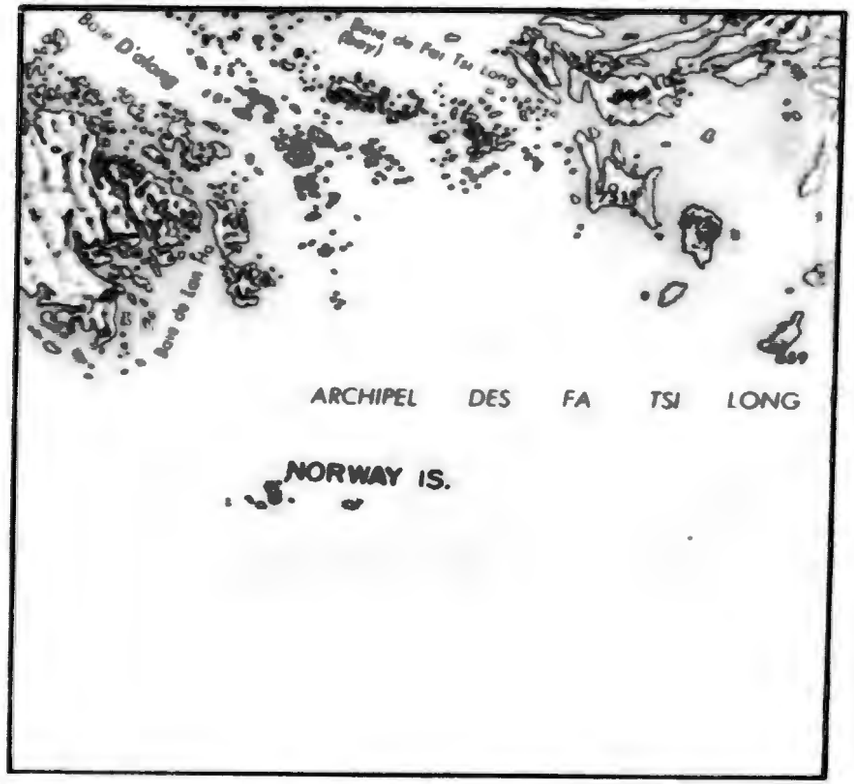
NAM DINH TERRAIN MAP



PHU LIEN - HAIPHONG TERRAIN MAP

Fig. 56

NORWAY IS. TERRAIN MAP



LANG SON TERRAIN MAP

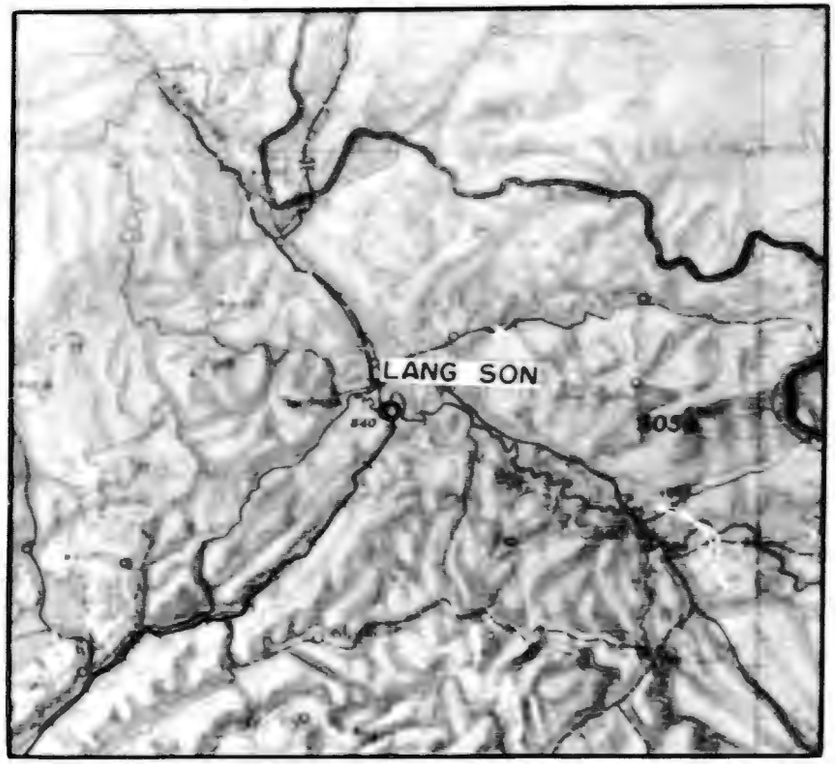
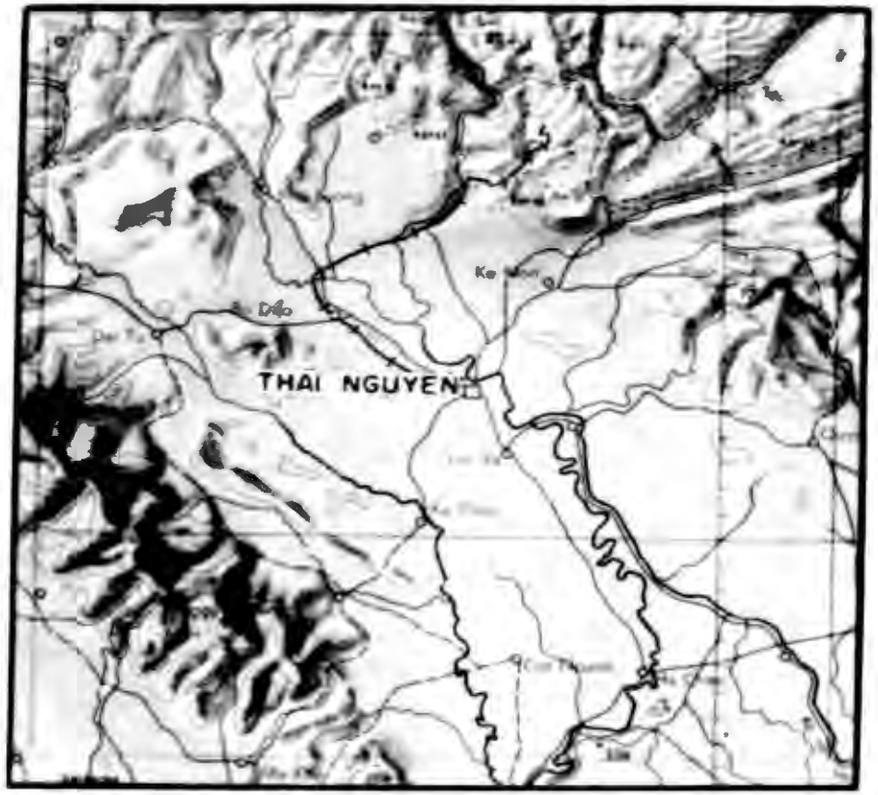


Fig. 57

THAI NGUYEN TERRAIN MAP



GOW TOW TERRAIN MAP

Fig. 58

MON CAY TERRAIN MAP

THANH HOA TERRAIN MAP

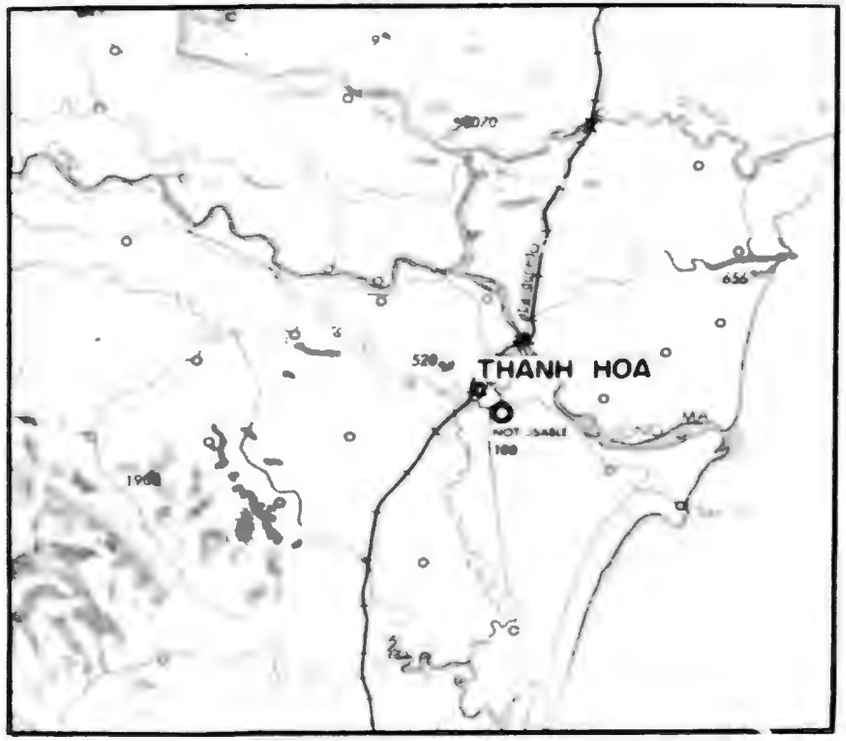
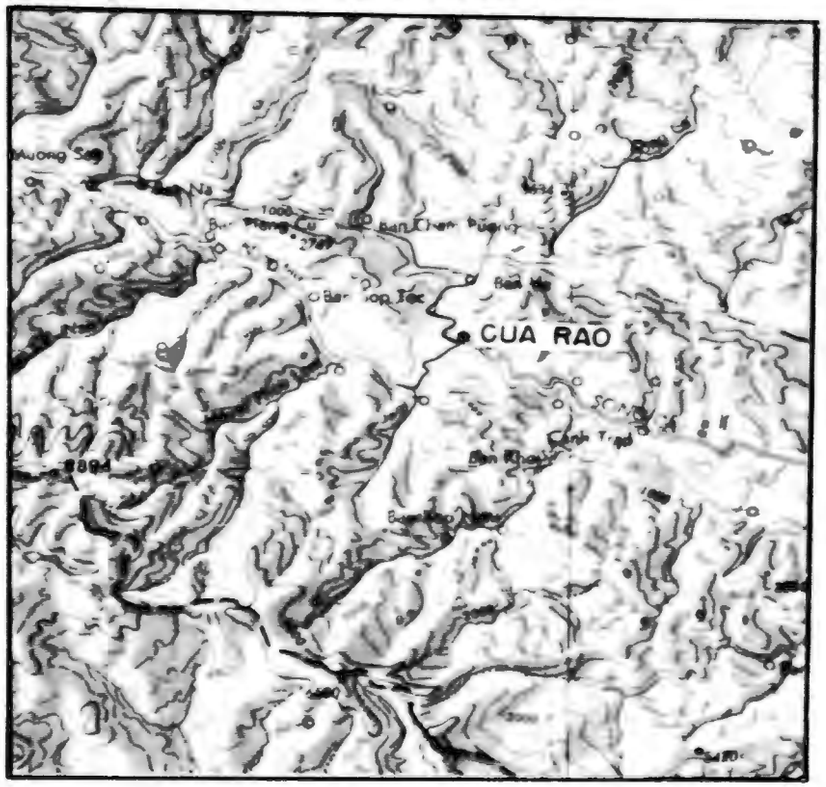


Fig. 59

CUA RAO TERRAIN MAP



DONG HOI TERRAIN MAP

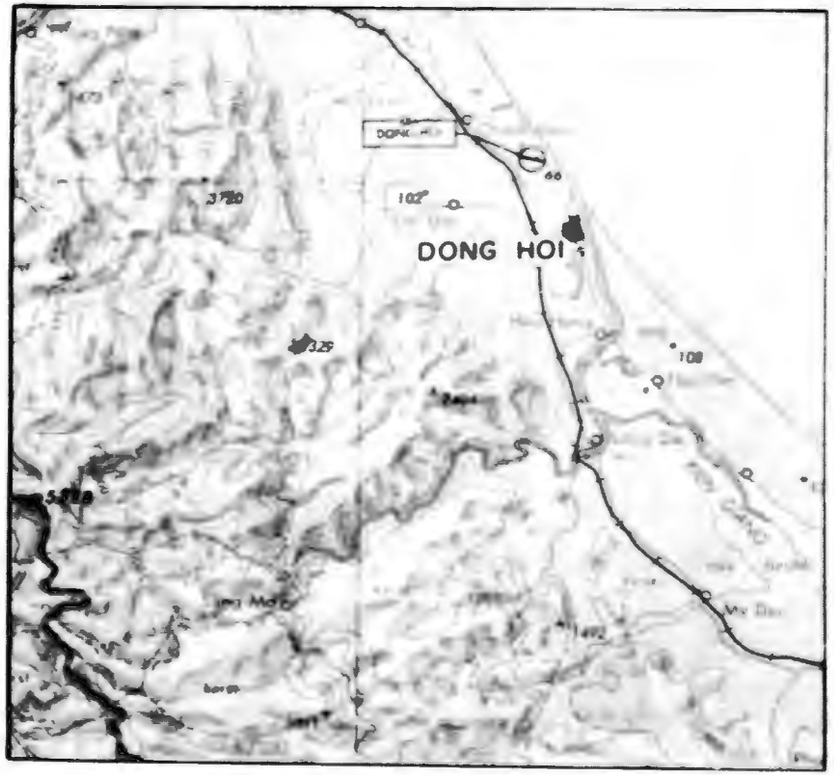


Fig. 60

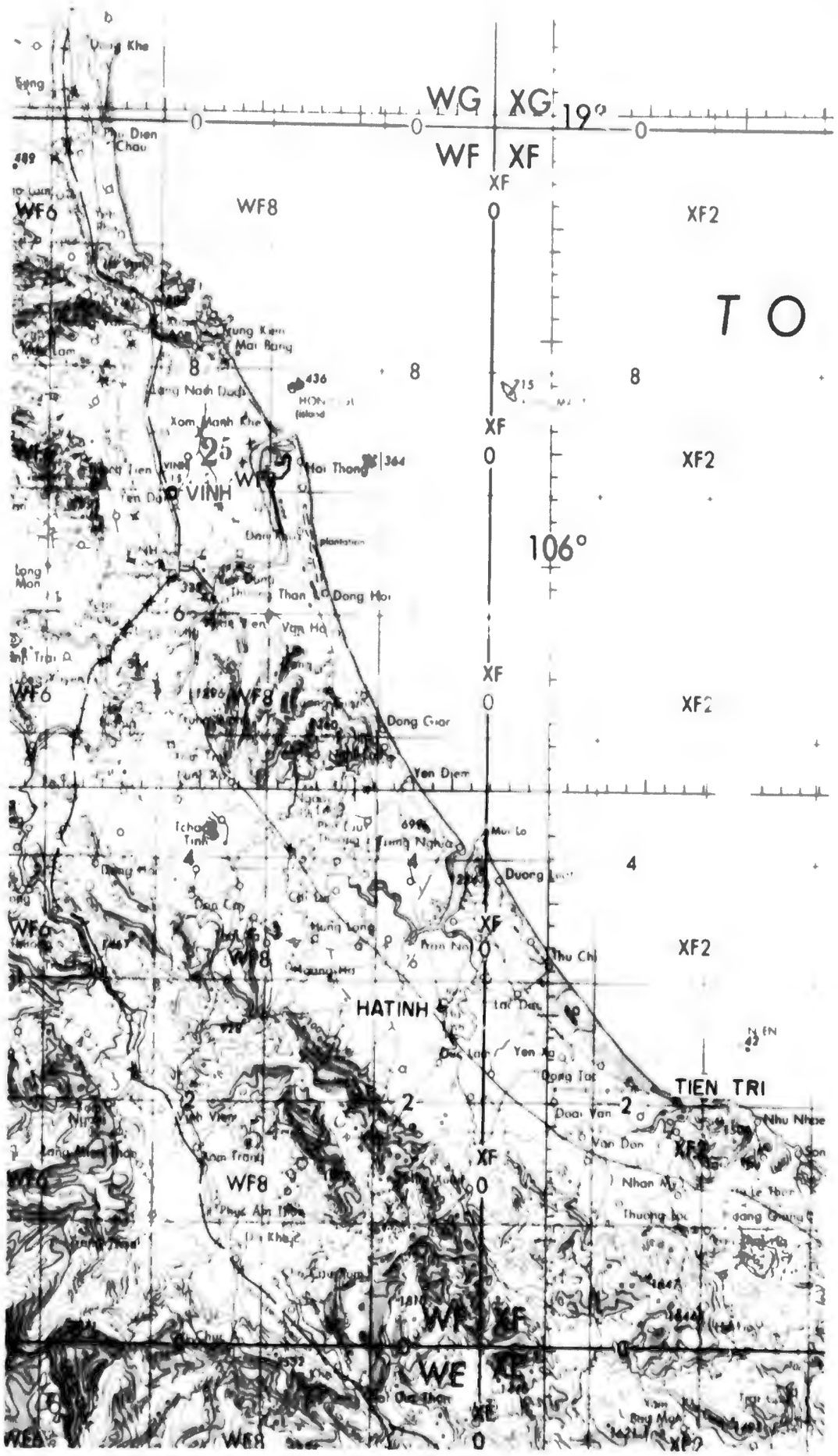


Fig. 61

PPC-Japan