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SOME MODELS FOR WINDSPEED.(U)

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6 SOME MODELS FOR WINDSPEED

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1. INTRODUCTION

Weather records have been kept for many stations throughout the world over long periods of time. For many purposes it is useful to be able to estimate the climatic probability that the reading for a weather element will exceed a specified level at a given location and time. Such estimates can be made by retrieval and tabulation of appropriate records. This can be a slow, costly, and cumbersome process.

Another procedure is to model the probability density functions (histogram) of the readings of a weather element for the location and time of interest. With such a model, the probabilities can be estimated as desired without any further recourse to weather records.

In this report we make use of the Weibull probability distribution to model the data at several locations. The data used to develop the models was extracted from the "Revised Uniform Summary of Weather Observations" (RUSSWO'S) prepared by the Data Processing Division of the Air Weather Service, or the "Summary of Meteorological Observations, Surface" (SMOS) prepared by the Naval Weather Service Detachment. In general, for each of the stations, 96 models are developed, one for each three-hour period of the day for each of the twelve months.

2. MODELING FOR WINDSPEED

In general, data of a given type can be modeled by the use of several different probability distributions. For example, one can usually fit a Pearson or a Johnson curve to data with reasonably good results.

In the present study we use the Weibull family of curves. There are a number of reasons for the choice. One is that the Weibull distribution in general gives good fits. Another is that the Weibull cumulative distribution function is in closed form. This is very useful, since the required estimated probabilities can be obtained by direct substitution into the Weibull cumulative distribution function, and no numerical integration or tables are required.

The cumulative distribution function for the Weibull is given by

$$F(x) = 1 - e^{-\alpha x^\beta} \quad \alpha, \beta > 0, x \geq 0.$$

The constants α and β are parameters of the Weibull distribution. The records for many stations indicated a fairly high probability of "calm", and to obtain good fits using the Weibull distribution, it was found necessary to use a mixed distribution. Using c as the probability of calm, then, if x is windspeed in knots, the probability of a windspeed less than or equal to x is estimated by

$$F(x) = c + (1-c) \left[1 - e^{-\alpha x^\beta} \right]$$

Separate values are estimated for α, β, c for each station, for each three-hour period, for each month. Parameters for the model for 24 stations at diverse locations are given in Section 6.

3. ESTIMATION OF THE PARAMETERS OF THE MODEL

The value of c was taken to be the empirical probability of calm as given from the data, and the Weibull distribution was fitted to the remainder of the data.

A standard method of estimation of the parameters of the Weibull distribution from a sample of size n is by an iterative solution of the maximum likelihood equations. The maximum likelihood equations are

$$n/\alpha - \sum x_i^\beta = 0$$

and

$$\beta = \left[\frac{\sum x_i^\beta \ln x_i}{\sum x_i^\beta} - \frac{\sum \ln x_i}{n} \right]^{-1}$$

The second equation is solved iteratively for β . Substituting this value of β in the first equation, the solution for α can be obtained.

Instead of using the method of maximum likelihood to estimate α and β , the following method was used.* The values for the empirical cumulative distribution were regressed on the Weibull cumulative distribution function. Thus the resulting values for α and β were those which minimized the sum of the squares of the differences between the theoretical cumulative distribution (Weibull) and the empirical cumulative distribution. This is the same as choosing those values of α and β which minimize the sum of the squares of the differences between the empirical probabilities and the model theoretical probabilities. Since our object is not to estimate α and β for their own sake, but only as a means of obtaining probabilities, the method has considerable intuitive appeal. It does indeed have a number of desirable properties which the authors intend to develop in a separate publication at some later date.

* A more detailed description of the method is planned for Scientific Report Number 8 to be titled "Use of Non-linear Regression to Estimate a Cumulative Distribution Function."

Figure 3.1 illustrates the use of the method using windspeed data from Manila for September, 0700 hours. The fitted curve is the Weibull cumulative distribution function for which the sum of the squares of the differences between the fitted curve and the empirical cumulative distribution function is smallest. (The differences are taken at 3.5, 6.5, 10.5, 16.5, 21.5, 27.5, 33.5, 40.5, 47.5, and 55.5 knots. These are the endpoints of the intervals into which the data were summarized in the RUSSWO'S.)

Table 3.1 gives the observed and fitted values for the same station and hours.

	0	3.5	6.5	10.5	16.5	21.5	27.5	33.5	40.5	47.5	55.5
OBSERVED	.222	.453	.773	.912	.994	.999	1.000	1.000	1.000	1.000	1.000
FIT	.222	.470	.746	.940	.997	1.000	1.000	1.000	1.000	1.000	1.000

TABLE 3.1

Observed and Fitted Values For Prob($X \leq x$)

X is Windspeed (Knots) For Manila 0700 Hrs. September

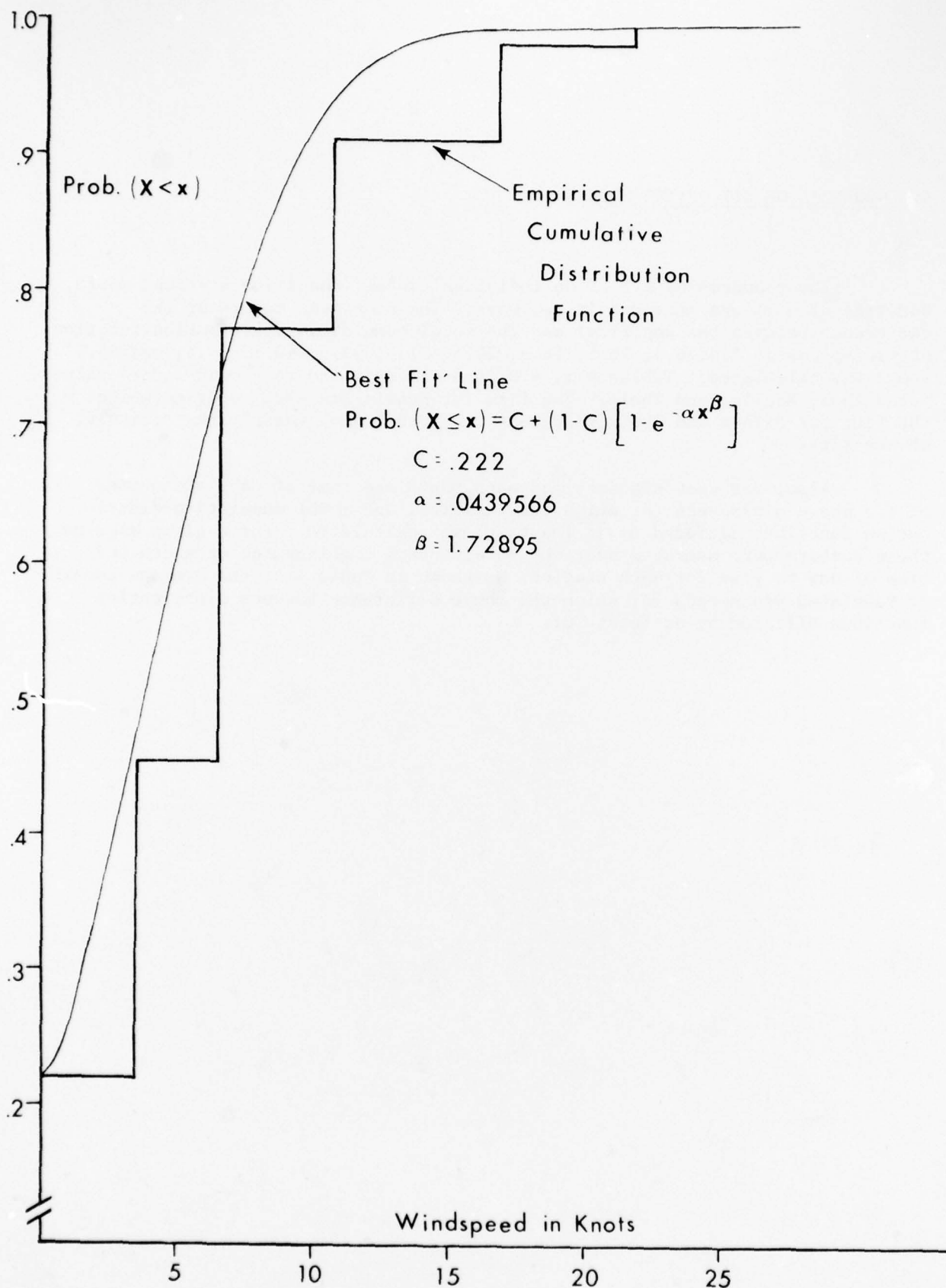


Figure 3.1

Windspeed for Manila
 August 1900 Hours

4. GOODNESS OF FIT OF THE MODELS

The goodness of fit of an individual model (specified station, month, and time of day) was measured in two ways. The root mean square of the difference between the empirical and the model cumulative distribution functions at windspeeds of 3.5, 6.5, 10.5, 16.5, 21.5, 27.5, 33.5, 40.5, 47.5, and 55.5 knots was calculated. Tables 4.1, 4.2, and 4.3 show the root mean square values for Balboa, Manila, and Thule. The fits for Manila are about average while the fits for Balboa and Thule represent the "best" and "worst", respectively, of the fits.

Also, for each station, for each month and time of day, the number of the above windspeeds for which the empirical and model cumulative distribution functions differed by at least .01 was calculated. For a given station these numbers were averaged over the 96 different combinations of month and time of day to give for each station, as shown in Table 4.4, the average number of tabulated windspeeds for which the above difference between distribution functions differed by at least .01.

TABLE 4.1

Hour of Day

<u>Month of Year</u>	<u>0100</u>	<u>0400</u>	<u>0700</u>	<u>1000</u>	<u>1300</u>	<u>1600</u>	<u>1900</u>	<u>2200</u>
1.	.001	.002	.000	.007	.005	.006	.002	.000
2.	.000	.001	.001	.006	.004	.003	.000	.000
3.	.001	.001	.001	.006	.004	.065	.003	.000
4.	.001	.001	.001	.008	.004	.005	.003	.001
5.	.000	.000	.002	.003	.003	.001	.001	.001
6.	.001	.001	.000	.001	.003	.000	.002	.002
7.	.000	.000	.001	.002	.001	.002	.002	.000
8.	.000	.000	.001	.001	.001	.002	.000	.000
9.	.001	.002	.000	.002	.005	.000	.000	.000
10.	.001	.001	.002	.002	.004	.000	.001	.002
11.	.001	.001	.001	.002	.002	.003	.002	.000
12.	.000	.000	.001	.002	.003	.006	.000	.000

RMS of individual fits for Balboa

WINDSPEED

TABLE 4.2

Hour of Day

<u>Month of Year</u>	<u>0100</u>	<u>0400</u>	<u>0700</u>	<u>1000</u>	<u>1300</u>	<u>1600</u>	<u>1900</u>	<u>2200</u>
1.	.006	.012	.009	.009	.025	.025	.010	.009
2.	.012	.012	.016	.013	.020	.022	.018	.016
3.	.016	.013	.018	.016	.015	.020	.020	.014
4.	.018	.017	.017	.017	.010	.014	.020	.016
5.	.010	.005	.004	.006	.009	.020	.020	.014
6.	.008	.006	.003	.015	.013	.016	.010	.009
7.	.008	.005	.007	.012	.023	.012	.013	.013
8.	.008	.008	.003	.012	.026	.015	.017	.011
9.	.009	.004	.003	.019	.027	.007	.015	.010
10.	.007	.009	.010	.013	.024	.021	.010	.010
11.	.012	.011	.006	.013	.022	.015	.011	.012
12.	.003	.007	.003	.010	.031	.016	.013	.006

RMS of individual fits for Manila

WINDSPEED

TABLE 4.3

<u>Month of Year</u>	<u>Hour of Day</u>							
	<u>0100</u>	<u>0400</u>	<u>0700</u>	<u>1000</u>	<u>1300</u>	<u>1600</u>	<u>1900</u>	<u>2200</u>
1.	.031	.031	.032	.036	.031	.033	.033	.030
2.	.037	.034	.032	.031	.028	.034	.031	.028
3.	.028	.035	.034	.036	.043	.037	.028	.026
4.	.018	.024	.032	.028	.031	.028	.030	.023
5.	.027	.027	.025	.029	.032	.034	.033	.026
6.	.026	.029	.035	.045	.045	.045	.040	.032
7.	.028	.025	.029	.041	.045	.039	.033	.028
8.	.031	.023	.018	.028	.042	.039	.024	.020
9.	.032	.031	.028	.031	.026	.021	.021	.030
10.	.025	.023	.025	.022	.027	.024	.029	.026
11.	.026	.026	.024	.023	.030	.029	.028	.026
12.	.025	.021	.023	.022	.025	.024	.024.	.020

RMS of individual fits for Thule AFB

WINDSPEED

TABLE 4.4

<u>Station</u>		<u>Station</u>		<u>Station</u>	
Ascension	1.42	Honolulu	1.59	Patrick AFB	1.18
Balboa	.19	Lajes	3.15	Saigon	.82
Bangor	2.31	Manila	2.65	Scott AFB	2.43
Bedford	2.86	McMurdo	3.03	Shemya	2.07
Bermuda	1.45	Midway	1.00	Thule	5.35
Christchurch	2.43	Mildenhall	1.36	Torrejon	1.49
Furmaki	2.78	Nenana	1.88	Tripoli	3.38
Goose	1.73	Okinawa	3.65	Wake	1.49
Hill	3.81				

Average No. of Tabulated Windspeeds
 (Over 96 Months By Time of Day Combinations)
 For Which Empirical and Model Probabilities
 Differ By at Least .01

5. USE OF MODELS

Suppose one wishes to find the probability that the windspeed is less than 20, 10.5, 10, 6.5, and 5 knots at Goose in September at 1900 hours. Using the appropriate table in Section 6, we find that $c = .054$, $\alpha = .0285801$, $\beta = 1.68269$. Substituting these values into the model

$$\text{Prob} [X < x] = c + (1-c) \left(1 - e^{-\alpha x^\beta} \right)$$

we estimate the required probabilities at .989, .788, .761, .514, and .384.

We can compare these with the empirical probabilities of the RUSSWO for 10.5 and 6.5 knots. The values are .795 and .511, respectively, and compare favorably with the model values of .788 and .514.

It should be noted that our modeling procedure can be used to estimate $P [X < x]$ for any value of x (windspeed), and not just the values of the end points of the intervals listed in the RUSSWO's.

6. TABLES OF COEFFICIENTS OF INDIVIDUAL MODELS

PARAMETERS FOR WINDMILL MODELS OF WINDSPEED

ASCENSION ISLAND AAPI

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.002	0.006	0.007	0.001	0	0.001	0	0.003
ALPHA	.0000936794	.0000964554	.0000494931	3.2863E-07	3.3165E-08	5.0004E-08	8.8529E-07	.0000153643
BETA	3.45358	3.51553	3.70538	5.2686	5.9378	5.8549	4.98068	4.01015
FEB								
CALM	0.011	0.012	0.008	0.002	0	0	0.002	0.011
ALPHA	.0000582498	.0000126379	.0000601262	7.7544E-07	8.6459E-08	7.5394E-08	.0000038215	.0000119719
BETA	3.65744	3.41347	3.61854	4.96696	5.60375	5.7146	4.48906	4.11973
MARCH								
CALM	0.002	0.005	0.004	0	0.001	0.001	0	0.001
ALPHA	.0000656487	.000010246	.0000177049	1.7380E-07	3.7161E-08	1.8397E-07	.0000031106	.0000124851
BETA	3.60332	3.48394	4.02237	5.40883	5.83769	5.37293	4.54894	4.1174
APRIL								
CALM	0.001	0.002	0.002	0	0	0	0	0
ALPHA	.0000027831	.0000090004	.0000060004	2.8529E-08	2.8932E-09	1.2405E-08	1.8388E-07	.0000018158
BETA	4.58606	4.20081	4.29732	5.9126	6.65782	6.25005	5.43719	4.65791
MAY								
CALM	0.001	0.006	0.005	0.001	0	0	0	0.001
ALPHA	.0000103382	.0000338681	.0000102123	1.8153E-07	2.2282E-08	1.4289E-07	5.1768E-07	.0000040029
BETA	4.15461	3.76614	4.11504	5.32287	5.94326	5.3868	5.09532	4.42754
JUNE								
CALM	0.001	0.004	0.002	0	0	0	0	0.001
ALPHA	.000003301	.0000432648	.0000274708	1.4610E-07	2.5467E-09	4.1704E-08	.0000014786	.0000056271
BETA	3.68973	3.65394	3.77099	5.3868	6.6946	5.79401	4.66093	4.24129
JULY								
CALM	0	0.001	0.004	0	0	0	0	0.001
ALPHA	.0000159067	.0000252375	.0000141038	4.8293E-07	1.0172E-07	2.1189E-07	.0000012428	.0000025781
BETA	3.91667	3.80032	3.98322	4.96467	5.42041	5.22969	4.72387	4.47892
AUG								
CALM	0.001	0.002	0.002	0	0	0	0.001	0.004
ALPHA	.0000344584	.0000330544	.0000254669	0.00000187	0.000001203	0.000001403	.0000060009	.0000105958
BETA	3.6389	3.68019	3.76038	4.50354	4.60611	4.6086	4.18786	4.02531
SEPT								
CALM	0.002	0.002	0.002	0	0	0	0	0
ALPHA	.0000016458	.0000389032	.0000205966	.0000013008	3.4442E-07	7.3408E-07	.0000036205	.0000105116
BETA	4.0229	3.73254	3.95816	4.78115	5.1656	4.96186	4.48694	4.11122
OCT								
CALM	0	0.001	0.001	0.001	0.001	0	0	0
ALPHA	.0000138617	.0000265227	.0000153065	.0000013732	8.3137E-08	2.2384E-07	.0000019255	.0000044879
BETA	4.06802	3.91351	4.09047	4.73887	5.6729	5.4136	4.69927	4.43371
NOV								
CALM	0	0	0	0	0	0	0	0
ALPHA	.0000089865	.0000218642	.0000056512	1.0339E-07	1.6564E-08	2.7684E-08	5.0091E-07	.0000033277
BETA	4.24154	3.98675	4.42307	5.63594	6.18266	6.1075	5.17998	4.54067
DEC								
CALM	0	0.001	0.001	0	0	0	0	0
ALPHA	.0000259017	.0000760788	.0000119995	3.3875E-07	2.3624E-08	8.3507E-08	.0000031067	.0000112872
BETA	3.89356	3.56395	4.19272	5.24521	6.09134	5.65125	4.51375	4.10516

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

BALBOA CANAL ZONE/ALBROOK AFB

	JAN	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
CALM		0.18	0.221	0.212	0.053	0.023	0.021	0.068	0.136
ALPHA		0.0271606	0.0376697	0.0361776	0.00874987	0.00186562	0.00239762	0.010425	0.0246348
BETA		2.3862	2.20833	2.2154	2.39029	2.88007	2.81317	2.57803	2.33771
FEB	
CALM		0.115	0.136	0.138	0.03	0.01	0.009	0.032	0.081
ALPHA		0.0228086	0.020038	0.0220049	0.00138838	0.000492011	0.000346638	0.0039462	0.0121743
BETA		2.37835	2.48692	2.38548	3.0441	3.30952	3.50121	2.86894	2.61812
MARCH	
CALM		0.115	0.152	0.128	0.019	0.008	0.006	0.023	0.061
ALPHA		0.0176829	0.0248984	0.023927	0.00155125	0.000521918	0.00115139	0.00346762	0.0127587
BETA		2.49064	2.42333	2.32026	3.00252	3.30168	2.72099	2.84088	2.51907
APRIL	
CALM		0.15	0.193	0.166	0.045	0.016	0.026	0.049	0.096
ALPHA		0.0178527	0.0211116	0.034149	0.00404189	0.00152778	0.00165204	0.00569419	0.0109759
BETA		2.54957	2.51145	2.13266	2.67763	2.96516	2.88736	2.62845	2.6243
MAY	
CALM		0.315	0.363	0.287	0.098	0.042	0.064	0.153	0.276
ALPHA		0.0733911	0.0779404	0.0678281	0.0192865	0.00641009	0.0154971	0.0315779	0.053462
BETA		1.89322	1.88393	1.88937	2.18259	2.53789	2.20455	2.05879	1.96164
JUNE	
CALM		0.391	0.43	0.341	0.11	0.051	0.065	0.189	0.32
ALPHA		0.100513	0.126749	0.0890344	0.0303788	0.0108832	0.0174459	0.0410851	0.0899721
BETA		1.77708	1.68579	1.7899	2.09711	2.41255	2.26048	2.08353	1.78535
JULY	
CALM		0.341	0.376	0.309	0.109	0.053	0.045	0.141	0.252
ALPHA		0.073771	0.080266	0.0811026	0.0245825	0.0104908	0.0134965	0.036658	0.0403242
BETA		1.97328	1.95276	1.85752	2.22551	2.44542	2.36039	2.02453	2.16656
AUG	
CALM		0.331	0.357	0.314	0.115	0.04	0.05	0.126	0.213
ALPHA		0.0790563	0.0804996	0.0820288	0.0303298	0.0140683	0.0134707	0.0380202	0.0551794
BETA		1.92844	1.98064	1.84152	2.09949	2.30182	2.35977	2.04513	2.03907
SEPT	
CALM		0.43	0.447	0.383	0.109	0.04	0.071	0.2	0.372
ALPHA		0.154451	0.167859	0.128492	0.0324505	0.0114175	0.0181502	0.075445	0.136079
BETA		1.55493	1.50931	1.60613	1.98747	2.32655	2.23003	1.78755	1.60247
OCT	
CALM		0.431	0.428	0.33	0.096	0.033	0.068	0.222	0.369
ALPHA		0.222125	0.22806	0.155336	0.0323156	0.0102291	0.0275003	0.0935134	0.178216
BETA		1.21277	1.2427	1.40124	1.92341	2.31919	2.01541	1.63504	1.35733
NOV	
CALM		0.33	0.355	0.289	0.099	0.055	0.076	0.189	0.268
ALPHA		0.0894327	0.097261	0.0992691	0.0295357	0.0124968	0.0255336	0.0498184	0.0724259
BETA		1.84768	1.83763	1.71385	2.0607	2.33342	2.08233	2.01104	1.95038
DEC	
CALM		0.242	0.282	0.246	0.088	0.045	0.051	0.113	0.189
ALPHA		0.0424086	0.0613597	0.083704	0.0290133	0.0133946	0.0163335	0.0298081	0.0458821
BETA		2.26941	2.04857	1.84243	2.05539	2.27346	2.21189	2.26279	2.13448

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

BANGOR MAINE/DOW AFB

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.235	0.204	0.198	0.155	0.098	0.117	0.156	0.196
ALPHA	0.014952	0.0193394	0.0199202	0.0106064	0.00728209	0.0151282	0.0183763	0.0188742
BETA	1.85718	1.75653	1.72829	1.8641	1.97721	1.7856	1.73751	1.75086
FEB								
CALM	0.221	0.226	0.223	0.145	0.088	0.102	0.14	0.189
ALPHA	0.0199016	0.016436	0.0181503	0.00940595	0.00683337	0.0104652	0.0151482	0.0188556
BETA	1.78341	1.85938	1.80152	1.89338	1.97429	1.86352	1.81389	1.76438
MARCH								
CALM	0.193	0.193	0.168	0.095	0.058	0.055	0.099	0.156
ALPHA	0.0170216	0.0161962	0.0148203	0.00741792	0.00456756	0.00476008	0.00905154	0.0126727
BETA	1.89192	1.90566	1.85576	1.97175	2.13139	2.15375	2.04542	1.98051
APRIL								
CALM	0.246	0.274	0.169	0.078	0.044	0.045	0.085	0.163
ALPHA	0.0128118	0.0174612	0.0149021	0.0056457	0.00267778	0.00199105	0.00645854	0.0136613
BETA	2.07996	1.92867	1.85735	2.11508	2.35044	2.49904	2.2764	2.03604
MAY								
CALM	0.226	0.27	0.142	0.083	0.031	0.03	0.048	0.141
ALPHA	0.0251453	0.0259944	0.0141312	0.00496062	0.00278882	0.0015472	0.00310203	0.0123815
BETA	1.95725	1.91256	1.98836	2.2728	2.43845	2.62785	2.68639	2.2932
JUNE								
CALM	0.237	0.308	0.16	0.074	0.047	0.037	0.073	0.163
ALPHA	0.0171468	0.0219322	0.0131818	0.00775646	0.00364298	0.0022778	0.0035899	0.0100115
BETA	2.20737	2.03141	2.08383	2.16449	2.37067	2.58044	2.66126	2.41497
JULY								
CALM	0.273	0.308	0.182	0.088	0.036	0.025	0.06	0.169
ALPHA	0.0238997	0.0260157	0.0188479	0.00956575	0.00396333	0.00219891	0.00532204	0.0167216
BETA	2.13967	2.0858	2.01347	2.11451	2.39394	2.6619	2.60997	2.27895
AUG								
CALM	0.289	0.305	0.178	0.09	0.036	0.026	0.069	0.189
ALPHA	0.0274444	0.0307515	0.0208442	0.00858861	0.00351333	0.00243462	0.00843848	0.017892
BETA	2.06413	2.00986	1.99644	2.18486	2.42423	2.62157	2.40083	2.21391
SEPT								
CALM	0.295	0.345	0.233	0.078	0.039	0.039	0.098	0.215
ALPHA	0.0311596	0.0292197	0.0231798	0.00898915	0.00446459	0.00519803	0.0128342	0.0223534
BETA	1.88755	1.91694	1.86723	2.07847	2.29544	2.32023	2.22885	2.03992
OCT								
CALM	0.209	0.259	0.223	0.097	0.044	0.051	0.134	0.195
ALPHA	0.0194256	0.0178212	0.0177306	0.00720957	0.00445323	0.00528725	0.00965651	0.0200771
BETA	1.95788	1.98621	1.91098	2.08594	2.23872	2.32963	2.25432	1.96197
NOV								
CALM	0.206	0.221	0.216	0.096	0.055	0.097	0.164	0.205
ALPHA	0.0197225	0.0192354	0.0181695	0.012732	0.00753475	0.0131911	0.0179113	0.0173666
BETA	1.86323	1.85404	1.86168	1.84254	2.023	1.91601	1.8442	1.88305
DEC								
CALM	0.229	0.255	0.261	0.162	0.094	0.121	0.178	0.214
ALPHA	0.0274626	0.0261282	0.0286598	0.0192392	0.0116488	0.0179491	0.0206606	0.0212892
BETA	1.6719	1.67885	1.64522	1.66827	1.83573	1.75856	1.74031	1.77357

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

BEDFORD MASS/L. G. HANSCOM FIELD

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.272	0.269	0.255	0.161	0.115	0.145	0.217	0.245
ALPHA	0.0128398	0.012898	0.0154016	0.00967465	0.00699759	0.00910251	0.0132505	0.0118353
BETA	1.92702	1.93438	1.8597	1.9102	1.97175	1.96621	1.90243	1.97304
FEB								
CALM	0.285	0.3	0.278	0.163	0.101	0.112	0.213	0.267
ALPHA	0.0112208	0.0143904	0.0138962	0.00976173	0.00682076	0.0109779	0.0139956	0.0111171
BETA	2.00849	1.894	1.88689	1.8781	1.98182	1.85544	1.85887	1.97253
MARCH								
CALM	0.278	0.286	0.233	0.094	0.057	0.069	0.165	0.244
ALPHA	0.0132906	0.0148264	0.0121102	0.00616566	0.00592029	0.0052112	0.0131133	0.0124357
BETA	1.97695	1.94683	1.93585	2.04222	2.0259	2.11969	1.91131	1.96311
APRIL								
CALM	0.328	0.367	0.228	0.09	0.046	0.039	0.128	0.265
ALPHA	0.0100756	0.0112447	0.007933	0.00485643	0.00304942	0.00225925	0.00680166	0.00722358
BETA	2.17069	2.11657	2.11094	2.15645	2.27658	2.42118	2.18565	2.28998
MAY								
CALM	0.39	0.434	0.248	0.107	0.058	0.046	0.143	0.292
ALPHA	0.0168602	0.0147166	0.00763229	0.00591311	0.00317548	0.00244723	0.00896226	0.0125514
BETA	2.0296	2.12655	2.24713	2.18734	2.35481	2.49713	2.16799	2.12367
JUNE								
CALM	0.425	0.467	0.261	0.117	0.062	0.051	0.192	0.337
ALPHA	0.0174071	0.0296832	0.0160598	0.00434032	0.00251895	0.00214205	0.0108634	0.00977161
BETA	2.13666	1.87964	2.0251	2.43942	2.58044	2.67021	2.13703	2.31875
JULY								
CALM	0.488	0.539	0.325	0.135	0.072	0.063	0.209	0.384
ALPHA	0.0242151	0.0296548	0.0140052	0.00810053	0.00383004	0.00240449	0.00981678	0.0135798
BETA	1.99811	1.91631	2.12936	2.23997	2.46117	2.70981	2.30666	2.22115
AUG								
CALM	0.524	0.564	0.372	0.142	0.07	0.067	0.258	0.42
ALPHA	0.0240311	0.0243838	0.0180147	0.0106952	0.0054416	0.00270802	0.0119406	0.0191547
BETA	2.03071	2.05302	2.08276	2.14924	2.35973	2.71739	2.25632	2.08215
SEPT								
CALM	0.502	0.536	0.376	0.138	0.068	0.079	0.28	0.422
ALPHA	0.0319607	0.0269667	0.0184639	0.00809711	0.0044905	0.0051771	0.018817	0.0245246
BETA	1.81262	1.89258	1.98696	2.14754	2.39796	2.43957	2.01814	1.91269
OCT								
CALM	0.419	0.429	0.359	0.147	0.071	0.094	0.27	0.353
ALPHA	0.0186665	0.0238485	0.0209025	0.00746119	0.00619474	0.00656498	0.0131148	0.0161643
BETA	1.91542	1.8352	1.81224	2.06743	2.11031	2.21122	2.05765	1.9819
NOV								
CALM	0.362	0.361	0.327	0.151	0.096	0.147	0.242	0.301
ALPHA	0.0178853	0.0122706	0.0138301	0.00681993	0.00668721	0.00973389	0.0148769	0.01901
BETA	1.83898	2.01358	1.94715	2.07128	2.0444	2.04123	1.94822	1.84233
DEC								
CALM	0.288	0.306	0.293	0.168	0.104	0.159	0.241	0.277
ALPHA	0.0149522	0.0134656	0.0156957	0.012226	0.00893047	0.0126955	0.0104258	0.011308
BETA	1.87621	1.92976	1.86162	1.81504	1.87187	1.84954	2.01899	2.02181

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

ST. GEORGE, BERMDA NWSD

	JAN	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
CALM		0.066	0.064	0.061	0.033	0.007	0.012	0.045	0.068
ALPHA		0.0055425	0.00475745	0.00440711	0.00247242	0.00260828	0.00360707	0.00541251	0.00463122
BETA		1.9396	1.98383	2.02917	2.23122	2.20156	2.10186	1.98824	2.02683
FEB	
CALM		0.051	0.046	0.05	0.026	0.009	0.012	0.041	0.049
ALPHA		0.00319622	0.00312779	0.0024546	0.00112197	0.000205545	0.00124371	0.00222826	0.00319441
BETA		2.12047	2.12897	2.24193	2.50703	3.18863	2.45454	2.27693	2.14301
MARCH	
CALM		0.037	0.034	0.038	0.025	0.007	0.006	0.03	0.046
ALPHA		0.00324327	0.00343239	0.00301249	0.00139003	0.000977492	0.00118593	0.00220255	0.00265708
BETA		2.12198	2.11893	2.17995	2.41784	2.52818	2.46818	2.2819	2.21402
APRIL	
CALM		0.045	0.047	0.038	0.018	0.008	0.005	0.021	0.039
ALPHA		0.00395973	0.00332051	0.00289381	0.00118864	0.000169486	0.000395977	0.00336805	0.00431306
BETA		2.15747	2.21506	2.26995	2.55399	3.3418	3.01193	2.20549	2.13593
MAY	
CALM		0.041	0.04	0.033	0.012	0.005	0.004	0.021	0.042
ALPHA		0.00422369	0.00294669	0.00253497	0.00127345	0.00082489	0.00025626	0.00252816	0.00349401
BETA		2.28325	2.42361	2.47096	2.66046	2.79294	3.35848	2.48562	2.38164
JUNE	
CALM		0.031	0.049	0.038	0.01	0.007	0.008	0.02	0.024
ALPHA		0.00230299	0.00320913	0.00227929	0.000214639	0.000539441	0.00011959	0.00159955	0.00263462
BETA		2.55317	2.39708	2.52266	3.45602	2.98527	3.69	2.69364	2.5203
JULY	
CALM		0.053	0.058	0.054	0.02	0.011	0.014	0.025	0.045
ALPHA		0.00323731	0.00380284	0.00329686	0.00138145	0.000107471	0.000187239	0.00187322	0.00398874
BETA		2.50422	2.44223	2.47403	2.75248	3.56486	3.6171	2.77111	2.46995
AUG	
CALM		0.09	0.082	0.059	0.027	0.015	0.024	0.065	0.089
ALPHA		0.00364669	0.00533343	0.00579998	0.00272641	0.0017352	0.00189602	0.00464458	0.00490539
BETA		2.49239	2.35032	2.29118	2.50124	2.66824	2.68203	2.42068	2.41682
SEPT	
CALM		0.071	0.071	0.06	0.019	0.01	0.012	0.032	0.058
ALPHA		0.00860448	0.0090552	0.00754912	0.00300758	0.00230424	0.00337257	0.00740181	0.00803741
BETA		2.04436	2.02918	2.09754	2.39393	2.47901	2.38708	2.14388	2.07403
OCT	
CALM		0.054	0.064	0.057	0.025	0.011	0.015	0.042	0.05
ALPHA		0.00478626	0.00456473	0.00369926	0.00202841	0.00138841	0.00177141	0.00389239	0.00409063
BETA		2.18473	2.2026	2.2667	2.49105	2.59473	2.54666	2.28335	2.2511
NOV	
CALM		0.075	0.067	0.061	0.03	0.015	0.018	0.048	0.065
ALPHA		0.00396114	0.0055492	0.00501576	0.00256008	0.00196543	0.00296648	0.00437544	0.00381793
BETA		2.21556	2.09459	2.12843	2.34249	2.43488	2.3206	2.20244	2.23093
DEC	
CALM		0.057	0.056	0.067	0.034	0.015	0.023	0.048	0.056
ALPHA		0.00432409	0.0050334	0.0042518	0.00356934	0.00254907	0.00344158	0.00540507	0.00565761
BETA		2.13846	2.07373	2.14465	2.19421	2.29642	2.20446	2.06476	2.03681

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

CHRISTCHURCH NEW ZEALAND APT

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.234	0.254	0.165	0.059	0.011	0.005	0.023	0.124
ALPHA	0.0121493	0.0130846	0.00841417	0.00347928	0.0010106	0.00032271	0.0015528	0.00748427
BETA	2.03227	2.01854	2.14012	2.27494	2.60675	2.96628	2.52432	2.09614
FEB								
CALM	0.25	0.277	0.249	0.074	0.021	0.011	0.028	0.105
ALPHA	0.0110399	0.010268	0.0202975	0.00523095	0.0012456	0.000925713	0.0023765	0.0126014
BETA	2.10608	2.14353	1.81573	2.19231	2.59403	2.65006	2.44602	1.99102
MARCH								
CALM	0.263	0.315	0.274	0.142	0.048	0.022	0.046	0.171
ALPHA	0.0220511	0.0269297	0.0257597	0.010215	0.00379637	0.0010242	0.00742189	0.0162579
BETA	1.79248	1.67067	1.74403	1.95645	2.2228	2.69154	2.12671	1.89086
APRIL								
CALM	0.311	0.351	0.339	0.23	0.064	0.036	0.102	0.23
ALPHA	0.0169995	0.0237243	0.0218926	0.018543	0.00496202	0.00215071	0.010926	0.0102039
BETA	1.90849	1.76448	1.81746	1.75698	2.17614	2.52208	2.07651	2.1553
MAY								
CALM	0.312	0.318	0.314	0.269	0.14	0.096	0.156	0.245
ALPHA	0.0149697	0.0171146	0.0177147	0.0142823	0.00827465	0.00838723	0.0105076	0.0142509
BETA	1.98231	1.92396	1.90678	1.90653	2.03639	2.10377	2.12004	1.99512
JUNE								
CALM	0.378	0.364	0.329	0.313	0.167	0.142	0.217	0.31
ALPHA	0.0180068	0.0193128	0.0200425	0.0177343	0.0140869	0.0135581	0.016469	0.0155796
BETA	1.99264	1.90238	1.91387	1.92882	1.91933	2.01388	2.01869	2.01706
JULY								
CALM	0.327	0.313	0.273	0.251	0.115	0.1	0.196	0.259
ALPHA	0.018425	0.0203654	0.021979	0.0212867	0.0103481	0.0083399	0.011922	0.0168423
BETA	1.88083	1.83488	1.82939	1.78835	1.96345	2.09897	2.0759	1.94169
AUG								
CALM	0.316	0.349	0.316	0.248	0.117	0.074	0.133	0.256
ALPHA	0.0146273	0.0204251	0.0195658	0.0162092	0.00818139	0.00353847	0.0112704	0.0134338
BETA	2.01591	1.86448	1.89055	1.89093	2.01611	2.37501	2.10702	2.05885
SEPT								
CALM	0.263	0.309	0.26	0.12	0.034	0.017	0.06	0.163
ALPHA	0.00929045	0.0144571	0.0126221	0.00804228	0.00274376	0.000957632	0.0046133	0.00702325
BETA	2.20153	1.99488	2.06565	2.05649	2.33569	2.71763	2.30862	2.22745
OCT								
CALM	0.268	0.303	0.265	0.087	0.019	0.023	0.069	0.158
ALPHA	0.0118763	0.0143824	0.0141721	0.00830814	0.00274767	0.000722143	0.00336386	0.00871118
BETA	2.10282	1.99988	1.94492	1.97274	2.28031	2.74289	2.37787	2.15999
NOV								
CALM	0.275	0.31	0.225	0.057	0.018	0.011	0.024	0.129
ALPHA	0.0129703	0.0175723	0.0136478	0.0071138	0.00185247	0.000496007	0.00239951	0.00875279
BETA	2.03369	1.91391	1.93439	2.02219	2.35784	2.82091	2.46761	2.12353
DEC								
CALM	0.213	0.249	0.178	0.066	0.011	0.002	0.018	0.133
ALPHA	0.0132283	0.0179801	0.013393	0.00478432	0.000683681	0.000126783	0.00101363	0.00703072
BETA	1.98996	1.91557	1.95445	2.17421	2.77165	3.34062	2.72253	2.19156

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

FURUKAWA HONSHU JAPAN/MISAWA

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
CALM	0.097	0.099	0.097	0.057	0.05	0.059	0.104	0.093				
ALPHA	0.0137765	0.0134991	0.0169433	0.00880533	0.00383562	0.0043654	0.0134361	0.016847				
BETA	1.99787	1.98884	1.90833	2.04526	2.20961	2.10271	1.92775	1.87678				
CALM	0.147	0.143	0.117	0.093	0.064	0.065	0.114	0.129				
ALPHA	0.0188518	0.0197251	0.0169038	0.0121823	0.00562188	0.0047967	0.0142805	0.0170133				
BETA	1.91904	1.90345	1.95617	1.90073	2.07033	2.21504	1.9591	1.97516				
CALM	0.154	0.149	0.117	0.059	0.031	0.033	0.117	0.148				
ALPHA	0.0187813	0.0225326	0.0196323	0.0075561	0.00283952	0.00311461	0.0131684	0.0215426				
BETA	1.91586	1.85788	1.85348	2.04094	2.31139	2.33699	1.98653	1.83592				
CALM	0.181	0.194	0.141	0.049	0.014	0.016	0.09	0.172				
ALPHA	0.0264482	0.0268099	0.0183829	0.00446667	0.00114511	0.0016809	0.0120997	0.027185				
BETA	1.78007	1.77595	1.82241	2.16671	2.56234	2.48188	1.97921	1.71121				
CALM	0.28	0.26	0.174	0.055	0.018	0.025	0.139	0.245				
ALPHA	0.0258571	0.0282712	0.0210876	0.00544242	0.00119565	0.00288838	0.0132788	0.032181				
BETA	1.84638	1.81393	1.82726	2.18412	2.65989	2.36569	2.00215	1.75019				
CALM	0.333	0.309	0.224	0.074	0.018	0.027	0.155	0.296				
ALPHA	0.0261559	0.0293415	0.0175047	0.00484506	0.00131559	0.00323162	0.0167684	0.0273064				
BETA	1.92231	1.85478	1.97834	2.38012	2.79839	2.48597	1.97439	1.87117				
CALM	0.35	0.341	0.248	0.096	0.021	0.025	0.16	0.312				
ALPHA	0.0400521	0.0319586	0.0270473	0.00527683	0.00102019	0.00267234	0.018961	0.0363016				
BETA	1.82234	1.95	1.90785	2.48816	3.06128	2.73636	2.09082	1.85407				
CALM	0.353	0.351	0.261	0.102	0.025	0.041	0.191	0.304				
ALPHA	0.0221904	0.0349973	0.0214693	0.00642593	0.00106144	0.00296607	0.0164262	0.0249259				
BETA	2.1466	1.88195	2.00982	2.5587	2.99055	2.60823	2.07873	2.02735				
CALM	0.247	0.244	0.191	0.122	0.057	0.065	0.203	0.254				
ALPHA	0.0193669	0.0188326	0.0171145	0.00723968	0.002453	0.00280998	0.0136134	0.0262562				
BETA	2.14076	2.14678	2.10838	2.22251	2.56575	2.57156	2.20037	1.97067				
CALM	0.162	0.171	0.147	0.111	0.055	0.082	0.193	0.178				
ALPHA	0.0169207	0.0110779	0.0149642	0.012251	0.00513223	0.00779549	0.0258942	0.0208281				
BETA	2.21469	2.4694	2.1962	2.025	2.23931	2.16497	1.88612	2.08435				
CALM	0.112	0.102	0.095	0.06	0.045	0.067	0.14	0.119				
ALPHA	0.0122845	0.0158677	0.0100679	0.00958535	0.0038847	0.00902087	0.0171975	0.018987				
BETA	2.19797	2.06528	2.27251	2.04001	2.27637	2.06019	2.01255	2.00116				
CALM	0.109	0.105	0.088	0.059	0.057	0.079	0.119	0.114				
ALPHA	0.0169255	0.0173466	0.0135126	0.00981515	0.00479033	0.00830671	0.0148546	0.0170298				
BETA	1.94397	1.93455	2.05822	2.01985	2.17211	2.08663	1.98507	1.95788				

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

GOOSE NEWFOUNDLAND DOT APT

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.08	0.078	0.081	0.085	0.096	0.109	0.098	0.091
ALPHA	0.0228007	0.0288087	0.0282693	0.028967	0.0158871	0.0200196	0.0241072	0.0285222
BETA	1.62199	1.52362	1.53767	1.4861	1.6721	1.63932	1.58669	1.5409
FEB								
CALM	0.102	0.097	0.122	0.125	0.117	0.091	0.115	0.11
ALPHA	0.0354758	0.0412587	0.0334004	0.0337443	0.0207528	0.0275377	0.0436971	0.0441999
BETA	1.50766	1.44504	1.52624	1.46546	1.60343	1.53551	1.40813	1.42474
MARCH								
CALM	0.089	0.06	0.064	0.075	0.054	0.048	0.067	0.083
ALPHA	0.0200029	0.0249751	0.0252094	0.0188426	0.0114445	0.00963771	0.0232664	0.0220209
BETA	1.74239	1.66718	1.62817	1.67065	1.8061	1.87983	1.65176	1.68765
APRIL								
CALM	0.077	0.071	0.06	0.052	0.036	0.03	0.04	0.072
ALPHA	0.0371028	0.037939	0.0352877	0.0164637	0.00923044	0.00645086	0.0239441	0.0335471
BETA	1.53475	1.53328	1.51685	1.73853	1.9057	2.04854	1.64817	1.5624
MAY								
CALM	0.106	0.104	0.109	0.07	0.051	0.037	0.058	0.099
ALPHA	0.0547684	0.0514491	0.039574	0.0214366	0.00967947	0.00823254	0.0241181	0.0442422
BETA	1.4414	1.46776	1.50957	1.65792	1.92359	2.01524	1.70096	1.53046
JUNE								
CALM	0.118	0.104	0.095	0.071	0.04	0.031	0.061	0.107
ALPHA	0.0379124	0.0478937	0.0299395	0.0170077	0.00798108	0.00560147	0.015266	0.0328265
BETA	1.6955	1.59865	1.65777	1.81277	2.0459	2.17869	1.90879	1.67206
JULY								
CALM	0.101	0.083	0.087	0.048	0.026	0.032	0.059	0.096
ALPHA	0.032692	0.0356131	0.0221251	0.0163983	0.0067239	0.00647792	0.021503	0.0314546
BETA	1.76259	1.75065	1.8253	1.82533	2.11568	2.16513	1.81959	1.77019
AUG								
CALM	0.052	0.049	0.043	0.037	0.021	0.023	0.044	0.054
ALPHA	0.0236475	0.0213512	0.0240457	0.0152904	0.00715342	0.00646133	0.0239391	0.0262786
BETA	1.90074	1.93135	1.77723	1.8229	2.05621	2.13608	1.81758	1.82035
SEPT								
CALM	0.046	0.047	0.051	0.048	0.029	0.025	0.054	0.048
ALPHA	0.0204345	0.0195195	0.019352	0.0105608	0.00718523	0.00983431	0.0285801	0.0234046
BETA	1.86587	1.87348	1.78528	1.88425	1.98717	1.9419	1.68269	1.81923
OCT								
CALM	0.056	0.061	0.051	0.043	0.04	0.039	0.059	0.057
ALPHA	0.0201572	0.0145681	0.0164975	0.00823245	0.00461309	0.011157	0.022732	0.0186571
BETA	1.82548	1.93405	1.85228	1.96964	2.15584	1.91573	1.74921	1.85374
NOV								
CALM	0.073	0.052	0.061	0.069	0.088	0.08	0.086	0.081
ALPHA	0.0221013	0.0219887	0.0230838	0.0259355	0.0166141	0.0317113	0.0305165	0.0276167
BETA	1.70335	1.71827	1.67823	1.56209	1.70019	1.52608	1.55884	1.60309
DEC								
CALM	0.081	0.067	0.062	0.063	0.092	0.096	0.076	0.084
ALPHA	0.0256466	0.0254598	0.0255597	0.0275784	0.0152053	0.0270191	0.0294724	0.0276949
BETA	1.58591	1.58775	1.58212	1.52395	1.72391	1.56567	1.53866	1.57117

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

HILL AFB UTAH OCEAN

	JAN	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
CALM		0.154	0.134	0.129	0.135	0.178	0.244	0.255	0.191
ALPHA		0.0164938	0.0129218	0.0142755	0.0187537	0.0208594	0.0344554	0.0297924	0.0193207
BETA		1.86814	1.91847	1.84121	1.76527	1.81895	1.65083	1.71173	1.84872
FEB	
CALM		0.122	0.119	0.101	0.096	0.124	0.16	0.205	0.141
ALPHA		0.011642	0.00901903	0.0111919	0.00870413	0.0141382	0.0156779	0.0196695	0.0140286
BETA		1.98745	2.02725	1.89671	2.03916	1.93557	1.94414	1.85842	1.98809
MARCH	
CALM		0.097	0.099	0.079	0.084	0.093	0.119	0.174	0.125
ALPHA		0.00341825	0.00483939	0.00598084	0.00748748	0.0129225	0.0141318	0.0175794	0.00631469
BETA		2.50872	2.2578	2.1389	2.09081	1.8886	1.90112	1.88606	2.32065
APRIL	
CALM		0.079	0.075	0.079	0.086	0.066	0.084	0.172	0.116
ALPHA		0.004374	0.00530794	0.0060445	0.00979966	0.00860904	0.0092961	0.0124442	0.00703121
BETA		2.36878	2.21259	2.13761	2.00635	2.09126	2.09278	2.07094	2.25267
MAY	
CALM		0.06	0.055	0.05	0.105	0.081	0.081	0.174	0.105
ALPHA		0.00392905	0.00334718	0.00405232	0.0101884	0.0084005	0.00888836	0.0241016	0.00534092
BETA		2.35687	2.36046	2.29966	2.06014	2.14006	2.1492	1.74853	2.35731
JUNE	
CALM		0.053	0.05	0.059	0.095	0.072	0.083	0.176	0.089
ALPHA		0.00386122	0.00348023	0.00317971	0.0147717	0.00873067	0.00838094	0.0201766	0.00569888
BETA		2.34963	2.30926	2.40695	1.94241	2.19864	2.25779	1.88281	2.27807
JULY	
CALM		0.041	0.027	0.029	0.073	0.092	0.093	0.197	0.056
ALPHA		0.00331283	0.00295619	0.00259128	0.00698575	0.00827669	0.00901105	0.0254559	0.00404036
BETA		2.33996	2.32474	2.42451	2.28027	2.31979	2.31663	1.79764	2.36951
AUG	
CALM		0.034	0.027	0.027	0.057	0.061	0.083	0.211	0.053
ALPHA		0.00426722	0.00339881	0.00255475	0.0090163	0.00861321	0.00942067	0.0288539	0.00419982
BETA		2.24282	2.29188	2.42381	2.1329	2.27679	2.268	1.72582	2.34312
SEPT	
CALM		0.049	0.041	0.041	0.094	0.099	0.111	0.256	0.075
ALPHA		0.00371851	0.0039748	0.00450854	0.0110394	0.00916956	0.0143675	0.0281951	0.00416689
BETA		2.33418	2.23014	2.18472	2.05461	2.25752	2.12677	1.82659	2.45992
OCT	
CALM		0.064	0.053	0.051	0.085	0.145	0.138	0.249	0.11
ALPHA		0.00446539	0.00431265	0.00419747	0.0111813	0.0183734	0.0190617	0.0343921	0.00752502
BETA		2.35203	2.24063	2.21208	2.00841	1.89701	1.97621	1.71979	2.29504
NOV	
CALM		0.105	0.087	0.083	0.101	0.162	0.193	0.251	0.163
ALPHA		0.0112216	0.00803691	0.00860621	0.0102196	0.0232759	0.026841	0.0283092	0.0165917
BETA		2.04856	2.10507	2.04388	2.06513	1.77725	1.79701	1.77193	1.97996
DEC	
CALM		0.163	0.139	0.129	0.145	0.205	0.231	0.269	0.215
ALPHA		0.0176872	0.0131321	0.0114417	0.0146209	0.0253287	0.0292942	0.0255241	0.0232021
BETA		1.84131	1.91774	1.94101	1.88118	1.76978	1.75567	1.76533	1.77217

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

HONOLULU IAP HAWAII

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.12	0.119	0.107	0.053	0.01	0.011	0.072	0.103
ALPHA	0.0357847	0.0405416	0.0522127	0.00952386	0.000943954	0.00233382	0.0168211	0.035276
BETA	1.61165	1.58983	1.45732	1.9555	2.74238	2.48188	1.87486	1.59523
FEB								
CALM	0.116	0.119	0.112	0.047	0.008	0.008	0.059	0.098
ALPHA	0.023362	0.0249789	0.0272783	0.00513104	0.000458908	0.000993184	0.00757117	0.0198828
BETA	1.78285	1.75717	1.70779	2.13486	2.94623	2.71125	2.12616	1.7912
MARCH								
CALM	0.061	0.069	0.052	0.016	0.003	0.004	0.026	0.042
ALPHA	0.0172004	0.0205081	0.0231612	0.0025197	0.000394531	0.000875131	0.00445746	0.0137483
BETA	1.83517	1.80405	1.70944	2.32192	2.90711	2.68312	2.26253	1.87812
APRIL								
CALM	0.089	0.1	0.07	0.011	0.003	0.005	0.032	0.069
ALPHA	0.0125449	0.0177006	0.013587	0.000742417	0.000141788	0.000302929	0.0024491	0.00931235
BETA	1.976	1.88781	1.89139	2.75905	3.25975	3.04028	2.47472	2.01042
MAY								
CALM	0.108	0.125	0.08	0.011	0.004	0.005	0.027	0.077
ALPHA	0.00834732	0.0105375	0.00700611	0.000228612	0.0000946481	0.00016945	0.00143529	0.00362155
BETA	2.19587	2.16395	2.17132	3.20627	3.39667	3.22934	2.6622	2.44668
JUNE								
CALM	0.076	0.088	0.054	0.009	0	0.002	0.019	0.047
ALPHA	0.0037666	0.00624327	0.00415395	0.000104798	0.000020415	0.000313549	0.000471036	0.00229865
BETA	2.49645	2.35979	2.35451	3.46468	3.9016	3.79048	3.05044	2.58014
JULY								
CALM	0.049	0.064	0.045	0.006	0.002	0.003	0.013	0.03
ALPHA	0.0021871	0.00427181	0.00270393	0.000105384	0.000115624	0.000221857	0.000324971	0.000781478
BETA	2.69489	2.49384	2.52384	3.4243	4.07561	3.87043	3.15533	2.9937
AUG								
CALM	0.032	0.046	0.027	0.002	0.002	0.003	0.008	0.016
ALPHA	0.00181682	0.00457297	0.00234956	0.000072038	0.000086316	0.000105624	0.000305752	0.000600515
BETA	2.79174	2.42911	2.56849	3.53673	4.14892	4.13042	3.19477	3.10903
SEPT								
CALM	0.076	0.094	0.068	0.007	0.004	0.006	0.023	0.055
ALPHA	0.00719274	0.0129771	0.0105635	0.000313709	0.00005047	0.000106237	0.00146517	0.00414083
BETA	2.32986	2.12232	2.0725	3.12312	3.6542	3.42005	2.71081	2.428
OCT								
CALM	0.077	0.093	0.069	0.01	0.003	0.006	0.029	0.062
ALPHA	0.0133264	0.0192071	0.0156061	0.000908828	0.000102688	0.0004406	0.00341416	0.00882043
BETA	2.04858	1.92087	1.92424	2.75732	3.45734	3.00244	2.44269	2.15467
NOV								
CALM	0.088	0.096	0.086	0.03	0.004	0.013	0.058	0.081
ALPHA	0.0226877	0.0220411	0.024377	0.00235429	0.000379994	0.00117828	0.00830524	0.0189107
BETA	1.7784	1.82052	1.68842	2.39598	3.001	2.67151	2.07961	1.78296
DEC								
CALM	0.073	0.078	0.07	0.027	0.006	0.007	0.04	0.059
ALPHA	0.020529	0.0212684	0.0247904	0.00466197	0.000908883	0.00184042	0.0116984	0.019178
BETA	1.76828	1.76725	1.67839	2.14545	2.67869	2.49738	1.92427	1.77182

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

LAJES FLD AZORES/TERCEIRA

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.132	0.148	0.141	0.072	0.031	0.045	0.116	0.135
ALPHA	0.00863015	0.00905577	0.00763039	0.00462279	0.000703833	0.00669663	0.00843153	0.0084735
BETA	1.82675	1.80997	1.8853	2.05066	2.7051	1.92897	1.84268	1.83564
FEB								
CALM	0.124	0.13	0.126	0.046	0.019	0.029	0.088	0.111
ALPHA	0.0105566	0.0112321	0.010586	0.00466845	0.000699659	0.00513004	0.00980189	0.0123597
BETA	1.80194	1.76446	1.7831	2.04763	2.69992	2.0265	1.81579	1.73849
MARCH								
CALM	0.115	0.142	0.125	0.026	0.01	0.022	0.092	0.116
ALPHA	0.00801603	0.00834247	0.00696491	0.00323963	0.00171599	0.00316397	0.00573791	0.00609954
BETA	1.85649	1.82853	1.88992	2.12609	2.31943	2.13036	1.97147	1.95626
APRIL								
CALM	0.18	0.191	0.127	0.021	0.011	0.02	0.105	0.171
ALPHA	0.0135119	0.0123097	0.0075935	0.00272387	0.000399497	0.00316148	0.0092328	0.0125511
BETA	1.80574	1.81893	1.99294	2.32102	2.96093	2.27877	1.94799	1.85163
MAY								
CALM	0.199	0.197	0.122	0.016	0.013	0.018	0.089	0.18
ALPHA	0.0105016	0.00933105	0.004032	0.00213555	0.000360939	0.00162948	0.00595258	0.0122212
BETA	1.9872	2.02148	2.30805	2.46263	3.04358	2.57776	2.19894	1.9242
JUNE								
CALM	0.283	0.301	0.154	0.018	0.017	0.025	0.104	0.241
ALPHA	0.017193	0.0188851	0.0098529	0.0024498	0.00054748	0.0030479	0.00885246	0.0176107
BETA	1.89109	1.82604	2.05745	2.25889	2.97054	2.42927	2.14482	1.90238
JULY								
CALM	0.333	0.356	0.196	0.025	0.014	0.024	0.128	0.305
ALPHA	0.0201198	0.0158219	0.00690331	0.00193266	0.00121541	0.00240118	0.0102839	0.0168481
BETA	1.97093	2.02458	2.31359	2.77478	2.9798	2.68413	2.18947	2.03804
AUG								
CALM	0.349	0.355	0.226	0.023	0.017	0.019	0.127	0.28
ALPHA	0.0127477	0.0114753	0.00611733	0.00134561	0.000746491	0.00158206	0.00812433	0.0156952
BETA	2.11679	2.16992	2.40919	2.90471	3.0933	2.82904	2.30627	2.03364
SEPT								
CALM	0.282	0.279	0.197	0.023	0.013	0.023	0.158	0.261
ALPHA	0.0142508	0.0145167	0.0103955	0.00270309	0.00212262	0.00404718	0.0129288	0.0130525
BETA	1.90322	1.87803	2.00281	2.46557	2.51888	2.33327	1.94967	1.9371
OCT								
CALM	0.194	0.193	0.154	0.034	0.018	0.043	0.154	0.189
ALPHA	0.0136486	0.0107984	0.00805714	0.00369238	0.00241095	0.00578439	0.0113967	0.0113204
BETA	1.81115	1.8912	2.00193	2.23197	2.37127	2.09743	1.88222	1.88394
NOV								
CALM	0.154	0.147	0.153	0.056	0.027	0.056	0.126	0.142
ALPHA	0.0103857	0.0101919	0.00837095	0.00491848	0.00381342	0.00752714	0.0106493	0.0106017
BETA	1.81265	1.81186	1.86604	2.0475	2.13636	1.9284	1.81213	1.80321
DEC								
CALM	0.171	0.171	0.159	0.077	0.032	0.067	0.136	0.155
ALPHA	0.00972116	0.00859385	0.009533	0.00550217	0.00430085	0.00915529	0.0095953	0.0102527
BETA	1.8249	1.86699	1.83055	2.01976	2.10577	1.87166	1.85334	1.82539

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

MANILA INTL PHILIPPINES

	JAN	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
CALM		0.207	0.132	0.147	0.047	0.042	0.083	0.162	0.231
ALPHA	0.0988843	0.104052	0.174808	0.0567954	0.0331789	0.0275048	0.0313577	0.0452747	0.0452747
BETA	1.63152	1.5453	1.10105	1.56874	1.63469	1.56491	1.77333	1.84712	1.84712
FEB									
CALM		0.134	0.097	0.126	0.016	0.018	0.043	0.129	0.175
ALPHA	0.074634	0.147426	0.232888	0.0370025	0.0166067	0.00789226	0.0106991	0.0284139	0.0284139
BETA	1.60549	1.21224	0.90808	1.5888	1.75743	1.93302	2.00015	1.82889	1.82889
MARCH									
CALM		0.067	0.046	0.084	0.011	0.007	0.035	0.097	0.151
ALPHA	0.033875	0.109244	0.15047	0.0128626	0.00422259	0.00250948	0.00471745	0.0134374	0.0134374
BETA	1.83077	1.26926	1.00805	1.88007	2.13244	2.25311	2.22233	1.95704	1.95704
APRIL									
CALM		0.066	0.071	0.081	0.004	0.004	0.018	0.072	0.123
ALPHA	0.027503	0.113749	0.109241	0.0100955	0.00392641	0.00317274	0.00805195	0.0181365	0.0181365
BETA	1.91359	1.19866	1.11446	1.98042	2.18597	2.20802	2.02949	1.93417	1.93417
MAY									
CALM		0.081	0.074	0.078	0.009	0.028	0.073	0.151	0.204
ALPHA	0.0451391	0.103137	0.0864941	0.0111589	0.0106563	0.0126566	0.020121	0.042231	0.042231
BETA	1.77762	1.35292	1.30001	2.01822	1.87665	1.7594	1.7275	1.60843	1.60843
JUNE									
CALM		0.17	0.163	0.138	0.032	0.046	0.105	0.17	0.224
ALPHA	0.0816774	0.0913833	0.102251	0.0221811	0.0177405	0.0188003	0.0434102	0.0792169	0.0792169
BETA	1.82308	1.61085	1.40343	1.97614	1.90346	1.76981	1.65679	1.66325	1.66325
JULY									
CALM		0.187	0.134	0.124	0.043	0.045	0.129	0.198	0.234
ALPHA	0.13759	0.138903	0.115528	0.0338413	0.0203563	0.0223121	0.0402419	0.08078	0.08078
BETA	1.389	1.29041	1.28604	1.83157	1.95028	1.80411	1.77877	1.66817	1.66817
AUG									
CALM		0.184	0.143	0.133	0.047	0.081	0.16	0.222	0.303
ALPHA	0.0927557	0.100008	0.105023	0.0335605	0.0211556	0.0263532	0.0439566	0.0706728	0.0706728
BETA	1.65054	1.45525	1.32713	1.83026	1.94112	1.78424	1.72895	1.76627	1.76627
SEPT									
CALM		0.203	0.144	0.154	0.076	0.104	0.162	0.241	0.311
ALPHA	0.183642	0.155676	0.127199	0.0322691	0.0240772	0.042043	0.0504885	0.111631	0.111631
BETA	1.28165	1.24546	1.28478	1.91731	1.86316	1.56533	1.73505	1.56204	1.56204
OCT									
CALM		0.242	0.217	0.217	0.093	0.086	0.152	0.217	0.259
ALPHA	0.117945	0.165583	0.112463	0.0453834	0.0116196	0.0283267	0.0408794	0.0630408	0.0630408
BETA	1.6167	1.35509	1.49745	1.92	2.54674	2.08718	2.11825	1.95417	1.95417
NOV									
CALM		0.227	0.169	0.179	0.079	0.093	0.161	0.244	0.284
ALPHA	0.127443	0.128138	0.147502	0.0405592	0.0242559	0.0364493	0.0399244	0.0795441	0.0795441
BETA	1.5576	1.39212	1.21959	1.95974	1.99429	1.7476	2.0985	1.83208	1.83208
DEC									
CALM		0.261	0.193	0.215	0.101	0.099	0.145	0.221	0.278
ALPHA	0.105857	0.159045	0.185609	0.0462945	0.0341894	0.0435651	0.0291834	0.0554885	0.0554885
BETA	1.73389	1.32249	1.13873	1.84606	1.73448	1.55496	2.16978	1.94067	1.94067

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

McMURDO SOUND, ANTARCTICA NAP

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.12	0.148	0.128	0.083	0.047	0.031	0.041	0.073
ALPHA	0.00783551	0.0101997	0.011606	0.0131739	0.0106964	0.0100574	0.00753549	0.00704178
BETA	2.03335	1.91596	1.87103	1.7969	1.86075	1.865	1.99834	2.03826
FEB								
CALM	0.075	0.08	0.068	0.053	0.052	0.042	0.047	0.055
ALPHA	0.00473136	0.00537201	0.00342931	0.00263453	0.00205869	0.00286538	0.00180847	0.00306713
BETA	2.02005	1.9764	2.11314	2.18823	2.25834	2.14821	2.32412	2.1468
MARCH								
CALM	0.047	0.058	0.05	0.082	0.077	0.074	0.067	0.05
ALPHA	0.00288129	0.00183737	0.00223626	0.00240247	0.00178052	0.00190916	0.00510287	0.00686916
BETA	2.04772	2.17515	2.10495	2.08265	2.17887	2.16289	1.77547	1.6791
APRIL								
CALM	0.14	0.129	0.126	0.13	0.123	0.13	0.114	0.116
ALPHA	0.00291301	0.00380487	0.0074955	0.00504266	0.0039949	0.00468061	0.00397289	0.00337155
BETA	2.06037	1.97015	1.76841	1.8874	1.96891	1.89151	1.93857	1.99479
MAY								
CALM	0.18	0.183	0.186	0.174	0.168	0.194	0.192	0.173
ALPHA	0.00747788	0.0050022	0.0055409	0.00702413	0.00814215	0.00680228	0.00574728	0.00928431
BETA	1.72966	1.85822	1.81295	1.74052	1.6915	1.75923	1.82304	1.68643
JUNE								
CALM	0.176	0.173	0.164	0.176	0.148	0.18	0.186	0.17
ALPHA	0.00407241	0.00364657	0.00727778	0.00630667	0.0096173	0.00661532	0.00630683	0.00540064
BETA	1.9318	1.94375	1.73009	1.75015	1.62399	1.74693	1.78168	1.82904
JULY								
CALM	0.207	0.215	0.215	0.199	0.172	0.194	0.203	0.202
ALPHA	0.00710027	0.00718845	0.00750242	0.00535237	0.00642573	0.00416786	0.0102146	0.00509717
BETA	1.74738	1.70776	1.72652	1.81123	1.7729	1.91963	1.5829	1.84485
AUG								
CALM	0.263	0.24	0.252	0.208	0.213	0.23	0.246	0.251
ALPHA	0.00650795	0.00813425	0.00772852	0.00805117	0.00579639	0.00761619	0.00587617	0.0064576
BETA	1.76973	1.67841	1.71835	1.69843	1.81827	1.73369	1.79706	1.74981
SEPT								
CALM	0.191	0.172	0.191	0.227	0.208	0.215	0.201	0.209
ALPHA	0.00752353	0.00663102	0.00538786	0.00307258	0.010611	0.00545018	0.00627024	0.00497641
BETA	1.72591	1.77394	1.84341	1.98757	1.54306	1.79329	1.7666	1.84754
OCT								
CALM	0.177	0.194	0.209	0.189	0.192	0.168	0.188	0.172
ALPHA	0.0089851	0.00789672	0.00541966	0.0063657	0.00448862	0.00616742	0.00497747	0.0077449
BETA	1.76141	1.79086	1.8908	1.84158	1.94728	1.84397	1.91322	1.78438
NOV								
CALM	0.156	0.17	0.148	0.112	0.075	0.07	0.074	0.114
ALPHA	0.00580166	0.00994166	0.00884294	0.00869926	0.00863383	0.00806448	0.00708494	0.00608757
BETA	2.07982	1.86194	1.87958	1.86103	1.85108	1.90693	1.95778	2.04986
DEC								
CALM	0.123	0.143	0.113	0.052	0.036	0.032	0.038	0.071
ALPHA	0.00731493	0.00911895	0.00846197	0.00924164	0.0062573	0.00440781	0.0056305	0.00784563
BETA	2.02673	1.95472	1.95426	1.90245	2.02967	2.15702	2.08982	2.00667

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

MIDWAY ISLANDS NS

	JAN	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
CALM		0.041	0.038	0.035	0.028	0.014	0.019	0.03	0.036
ALPHA	0.0056438	0.00557104	0.00458303	0.00354619	0.00345377	0.00303708	0.00440026	0.00528128	
BETA		1.9333	1.93685	1.99405	2.09722	2.0999	2.1431	2.01958	1.95058
FEB									
CALM		0.046	0.046	0.039	0.023	0.01	0.01	0.026	0.042
ALPHA	0.00411763	0.00420073	0.0048495	0.00443725	0.00349969	0.0037741	0.0047567	0.00487739	
BETA		2.07525	2.09316	2.02187	2.03519	2.10053	2.08214	2.01515	2.01412
MARCH									
CALM		0.043	0.033	0.028	0.013	0.004	0.005	0.011	0.029
ALPHA	0.00199863	0.00282703	0.0026427	0.00134114	0.000960615	0.00123226	0.0025112	0.00269343	
BETA		2.45835	2.34133	2.37046	2.60243	2.69789	2.62379	2.39163	2.34943
APRIL									
CALM		0.038	0.036	0.028	0.013	0.005	0.006	0.016	0.025
ALPHA	0.00320907	0.00420614	0.00361614	0.00222501	0.00129425	0.00155024	0.0024547	0.00280956	
BETA		2.38285	2.29208	2.34491	2.50966	2.7074	2.6394	2.49842	2.43531
MAY									
CALM		0.032	0.037	0.04	0.011	0.006	0.003	0.016	0.034
ALPHA	0.00363388	0.00515806	0.00413204	0.00197212	0.00104713	0.00133738	0.00219946	0.00264972	
BETA		2.4493	2.3353	2.41425	2.65301	2.86855	2.80186	2.64236	2.56001
JUNE									
CALM		0.053	0.043	0.047	0.015	0.01	0.009	0.017	0.04
ALPHA	0.00908253	0.00994217	0.00821179	0.00349022	0.00171814	0.00157545	0.00501147	0.00852166	
BETA		2.11715	2.0814	2.14588	2.44506	2.69229	2.77207	2.37162	2.17906
JULY									
CALM		0.026	0.028	0.019	0.007	0.005	0.006	0.007	0.022
ALPHA	0.00156942	0.00200002	0.00210355	0.00103856	0.000667848	0.000800196	0.00174258	0.00205758	
BETA		2.71395	2.62658	2.59077	2.8117	2.96809	2.92628	2.68414	2.61918
AUG									
CALM		0.047	0.059	0.064	0.021	0.01	0.015	0.028	0.044
ALPHA	0.00382699	0.06354565	0.00454741	0.00297002	0.00209612	0.00210949	0.00494089	0.00553574	
BETA		2.41503	2.26664	2.3316	2.46706	2.59936	2.65036	2.34624	2.28606
SEPT									
CALM		0.088	0.091	0.085	0.026	0.017	0.018	0.045	0.078
ALPHA	0.0111534	0.00945902	0.00833209	0.00618584	0.00432246	0.00489292	0.0104016	0.0104929	
BETA		2.01596	2.0931	2.12501	2.22049	2.34049	2.32922	2.06817	2.07551
OCT									
CALM		0.034	0.047	0.047	0.02	0.008	0.008	0.021	0.033
ALPHA	0.00489303	0.00452538	0.0062668	0.00361835	0.0023697	0.00253008	0.00565282	0.00482783	
BETA		2.22196	2.25972	2.11687	2.32105	2.46158	2.46787	2.15201	2.20836
NOV									
CALM		0.037	0.036	0.047	0.019	0.006	0.014	0.032	0.039
ALPHA	0.00489384	0.00551495	0.0062668	0.00376257	0.00334432	0.00367904	0.00428544	0.00401531	
BETA		2.144	2.12255	2.11687	2.23494	2.26752	2.25815	2.21773	2.21958
DEC									
CALM		0.038	0.041	0.037	0.024	0.008	0.014	0.032	0.043
ALPHA	0.0032584	0.00301471	0.00339422	0.0036625	0.00278906	0.00307781	0.00360234	0.0033484	
BETA		2.20924	2.23471	2.18304	2.14149	2.22951	2.20976	2.17767	2.19389

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

MILDENHALL RAF STN ENGLAND

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.087	0.109	0.092	0.074	0.047	0.065	0.078	0.082
ALPHA	0.0139037	0.0126668	0.0151119	0.00980505	0.0047253	0.0109709	0.0127357	0.0125051
BETA	1.88297	1.92217	1.85264	1.97985	2.20357	1.95632	1.93079	1.91164
FEB								
CALM	0.115	0.109	0.101	0.063	0.04	0.049	0.093	0.11
ALPHA	0.0160721	0.0164661	0.0163351	0.0075964	0.00326167	0.00521902	0.0123019	0.0169357
BETA	1.89301	1.87138	1.84742	2.05043	2.29453	2.2195	1.99167	1.84942
MARCH								
CALM	0.129	0.136	0.124	0.063	0.036	0.04	0.081	0.108
ALPHA	0.0119489	0.0132073	0.0118168	0.0033584	0.00197419	0.0025534	0.00864028	0.0114285
BETA	2.03595	1.99907	2.00573	2.32023	2.47239	2.43949	2.14495	2.06169
APRIL								
CALM	0.144	0.163	0.112	0.048	0.038	0.036	0.074	0.111
ALPHA	0.0187003	0.0166519	0.00984653	0.00306825	0.00205217	0.00169947	0.00848699	0.0143773
BETA	1.93127	1.98365	2.07801	2.36992	2.49929	2.5973	2.16642	2.06021
MAY								
CALM	0.178	0.193	0.102	0.029	0.019	0.016	0.045	0.116
ALPHA	0.0195047	0.0210769	0.00919178	0.00307992	0.00214037	0.00145127	0.00493265	0.0201938
BETA	2.01046	1.95041	2.12067	2.44843	2.53335	2.70847	2.43956	1.98957
JUNE								
CALM	0.254	0.243	0.118	0.062	0.039	0.04	0.071	0.191
ALPHA	0.0252246	0.0265383	0.0123355	0.00649322	0.00351018	0.00278148	0.0069367	0.0185492
BETA	1.96106	1.93716	2.07942	2.2192	2.41764	2.5309	2.34513	2.13678
JULY								
CALM	0.207	0.232	0.118	0.045	0.032	0.04	0.108	0.171
ALPHA	0.0156164	0.0198776	0.00919575	0.00454734	0.00400671	0.00467762	0.0115272	0.0178166
BETA	2.2093	2.04052	2.23348	2.38884	2.38932	2.35524	2.16939	2.14434
AUG								
CALM	0.22	0.244	0.15	0.064	0.048	0.044	0.112	0.178
ALPHA	0.026257	0.0228927	0.0101279	0.00495838	0.00368768	0.00381349	0.0136589	0.0223084
BETA	1.90651	1.97171	2.18541	2.27846	2.36025	2.39298	2.11558	2.00109
SEPT								
CALM	0.235	0.269	0.205	0.073	0.04	0.043	0.121	0.17
ALPHA	0.0358202	0.0314409	0.0228528	0.00738688	0.00390282	0.0072521	0.0253497	0.034621
BETA	1.684	1.71954	1.79677	2.1114	2.31004	2.1296	1.84756	1.71028
OCT								
CALM	0.169	0.166	0.177	0.086	0.051	0.091	0.15	0.183
ALPHA	0.0189927	0.0169942	0.0153612	0.0078832	0.00461697	0.00835299	0.021368	0.0231959
BETA	1.88448	1.93713	1.95703	2.06704	2.22067	2.12512	1.86393	1.80514
NOV								
CALM	0.103	0.116	0.118	0.075	0.047	0.075	0.107	0.113
ALPHA	0.012086	0.0121288	0.0117504	0.00656868	0.00369321	0.0116753	0.0139583	0.0133169
BETA	1.97958	1.96627	1.97568	2.12684	2.29674	1.96124	1.91316	1.9256
DEC								
CALM	0.131	0.121	0.13	0.087	0.06	0.089	0.108	0.12
ALPHA	0.0122257	0.0153655	0.0145941	0.0137604	0.00924236	0.0162354	0.0156584	0.0121016
BETA	1.93854	1.82956	1.85844	1.8492	1.95992	1.82342	1.86218	1.9469

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

NENANA ALASKA FAA

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.33	0.346	0.337	0.331	0.332	0.335	0.358	0.356
ALPHA	0.023271	0.0217982	0.0208824	0.0238378	0.0224125	0.0219641	0.0192999	0.0201773
BETA	1.74846	1.75524	1.78142	1.71048	1.74659	1.76451	1.80164	1.78029
FEB								
CALM	0.398	0.428	0.407	0.331	0.234	0.214	0.314	0.369
ALPHA	0.0195403	0.0167141	0.0221769	0.0174225	0.0100792	0.0151518	0.0320606	0.024382
BETA	1.9033	1.99208	1.85199	1.93768	2.20748	2.11253	1.68539	1.77513
MARCH								
CALM	0.39	0.421	0.387	0.256	0.154	0.127	0.287	0.363
ALPHA	0.0213666	0.022921	0.0198514	0.00846653	0.00240172	0.00677152	0.0121742	0.0186006
BETA	1.90645	1.87659	1.90147	2.1809	2.70226	2.36796	2.19389	1.95505
APRIL								
CALM	0.349	0.328	0.212	0.093	0.072	0.056	0.185	0.33
ALPHA	0.0101149	0.00779566	0.00436356	0.00186418	0.00154934	0.00247329	0.0102043	0.0129018
BETA	2.39815	2.41837	2.60674	2.86911	2.91752	2.76661	2.30771	2.28602
MAY								
CALM	0.386	0.38	0.168	0.082	0.072	0.065	0.14	0.343
ALPHA	0.0129959	0.0130367	0.00395273	0.00313573	0.00345285	0.00283564	0.00435372	0.0127571
BETA	2.36576	2.32031	2.67733	2.61497	2.55553	2.61637	2.58024	2.34554
JUNE								
CALM	0.435	0.452	0.201	0.119	0.082	0.085	0.159	0.337
ALPHA	0.00984191	0.011664	0.00581266	0.00573483	0.00609725	0.00573772	0.00948143	0.0102168
BETA	2.55886	2.41411	2.59847	2.49078	2.43149	2.45332	2.34766	2.54922
JULY								
CALM	0.457	0.447	0.235	0.118	0.109	0.129	0.25	0.406
ALPHA	0.0124438	0.0102642	0.00772346	0.00704514	0.0083044	0.00730812	0.013981	0.0153152
BETA	2.48811	2.51904	2.50774	2.46792	2.34257	2.43652	2.27503	2.37067
AUG								
CALM	0.462	0.445	0.254	0.15	0.115	0.129	0.302	0.455
ALPHA	0.0132299	0.0163639	0.00800446	0.00661314	0.00608185	0.00753489	0.0184358	0.0183747
BETA	2.41943	2.25627	2.51542	2.48487	2.48198	2.4484	2.19281	2.22627
SEPT								
CALM	0.364	0.367	0.301	0.143	0.092	0.11	0.29	0.378
ALPHA	0.0126304	0.0106495	0.00955373	0.00447759	0.00299701	0.00689239	0.0155229	0.00926374
BETA	2.27872	2.3747	2.32628	2.56663	2.72788	2.46458	2.25163	2.49261
OCT								
CALM	0.304	0.348	0.31	0.203	0.123	0.18	0.285	0.313
ALPHA	0.0165387	0.0152254	0.0137699	0.00934278	0.00425541	0.0101414	0.0129634	0.0119256
BETA	2.04331	2.06243	2.12142	2.22721	2.57321	2.31521	2.16139	2.19956
NOV								
CALM	0.332	0.356	0.352	0.338	0.282	0.314	0.35	0.355
ALPHA	0.019839	0.0185861	0.0203906	0.0196774	0.0140351	0.0147412	0.0183806	0.0162762
BETA	1.89606	1.94167	1.91551	1.89565	2.06636	2.06707	1.93792	1.96859
DEC								
CALM	0.406	0.402	0.41	0.402	0.403	0.416	0.405	0.388
ALPHA	0.0257882	0.0207646	0.0191487	0.0277071	0.021634	0.0219639	0.0292916	0.0258748
BETA	1.75777	1.88419	1.92996	1.75655	1.88037	1.84823	1.71722	1.78235

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

OKINAWA RYUKYU IS/NAHA AB

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.052	0.054	0.037	0.027	0.016	0.017	0.036	0.034
ALPHA	0.0118641	0.0107809	0.00199466	0.00437969	0.00182496	0.000279616	0.00650491	0.0116203
BETA	1.75528	1.78701	2.35459	2.08266	2.36036	3.01935	1.91571	1.74276
FEB								
CALM	0.039	0.045	0.034	0.021	0.009	0.013	0.017	0.039
ALPHA	0.00898831	0.0109457	0.00179006	0.00220315	0.000114445	0.000147772	0.00425631	0.00755896
BETA	1.92764	1.84515	2.46074	2.36254	3.40063	3.2943	2.14109	1.96704
MARCH								
CALM	0.077	0.072	0.059	0.019	0.017	0.006	0.03	0.049
ALPHA	0.0120805	0.0152997	0.0141347	0.00253687	0.000209701	0.00115428	0.00533463	0.0100682
BETA	1.91195	1.81216	1.81509	2.39172	3.24903	2.64975	2.13524	1.93964
APRIL								
CALM	0.061	0.071	0.064	0.021	0.012	0.007	0.022	0.053
ALPHA	0.00909931	0.0109534	0.00714472	0.000508088	0.000179248	0.000286748	0.00211487	0.00798528
BETA	2.07476	1.99601	2.15516	3.02078	3.3339	3.19415	2.57573	2.13551
MAY								
CALM	0.098	0.103	0.075	0.014	0.006	0.009	0.026	0.063
ALPHA	0.00691429	0.00833858	0.00407457	0.000831494	0.000388221	0.000517533	0.00114557	0.00518751
BETA	2.28203	2.20045	2.47464	2.90177	3.12888	3.05377	2.93183	2.41664
JUNE								
CALM	0.065	0.084	0.054	0.016	0.015	0.015	0.018	0.053
ALPHA	0.00553468	0.00611654	0.00403397	0.000721598	0.000231413	0.000293465	0.00142019	0.00494119
BETA	2.30364	2.22794	2.39488	2.83419	3.25749	3.20702	2.77907	2.36444
JULY								
CALM	0.081	0.088	0.064	0.009	0.004	0.009	0.019	0.058
ALPHA	0.0111688	0.0117599	0.00873317	0.00108004	0.000711978	0.00027117	0.00232624	0.0109282
BETA	1.99805	1.9429	2.05388	2.73356	3.66848	3.23066	2.55963	2.01541
AUG								
CALM	0.142	0.175	0.131	0.024	0.009	0.015	0.041	0.123
ALPHA	0.0350415	0.0294849	0.024519	0.00109808	0.000142718	0.000244888	0.00648156	0.0231608
BETA	1.49871	1.55046	1.65579	2.72445	3.40334	3.24744	2.16263	1.70323
SEPT								
CALM	0.169	0.181	0.158	0.037	0.012	0.012	0.058	0.124
ALPHA	0.0333878	0.0309201	0.0224095	0.000943914	0.00119198	0.00199732	0.0101775	0.0195699
BETA	1.55206	1.58463	1.69665	2.7478	2.64636	2.4661	1.98981	1.78562
OCT								
CALM	0.066	0.071	0.06	0.014	0.005	0.009	0.026	0.048
ALPHA	0.0171158	0.0153402	0.0107107	0.000978437	0.000379592	0.00043372	0.00374509	0.0116831
BETA	1.77418	1.79745	1.89981	2.70158	2.98488	2.94203	2.23859	1.87919
NOV								
CALM	0.052	0.06	0.037	0.017	0.004	0.008	0.027	0.044
ALPHA	0.00916915	0.0101423	0.00921615	0.00117793	0.000309458	0.00036225	0.0030306	0.00156246
BETA	1.94657	1.90147	1.92708	2.62655	3.05849	3.00663	2.2918	2.55546
DEC								
CALM	0.044	0.054	0.05	0.028	0.012	0.009	0.027	0.041
ALPHA	0.0137966	0.00277584	0.00178722	0.000501211	0.000191721	0.000193426	0.00197772	0.00240911
BETA	1.79004	2.32293	2.47561	2.93225	3.24664	3.23714	2.41815	2.37091

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

PATRICK AFB

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.144	0.149	0.172	0.055	0.011	0.008	0.066	0.106
ALPHA	0.0303711	0.0314015	0.0207719	0.0149602	0.00689782	0.00636197	0.0142327	0.0251977
BETA	1.73533	1.71181	1.89513	1.97301	2.24996	2.2796	2.04893	1.8401
FEB								
CALM	0.087	0.091	0.104	0.036	0.008	0.005	0.066	0.107
ALPHA	0.0137361	0.0198152	0.0234738	0.0131303	0.00638014	0.00365836	0.0116724	0.0163011
BETA	1.98198	1.82079	1.75301	1.9369	2.18574	2.41745	2.01553	1.9357
MARCH								
CALM	0.088	0.135	0.131	0.022	0.002	0.002	0.023	0.056
ALPHA	0.0174467	0.0211377	0.0121994	0.00793556	0.00209467	0.000270817	0.0036105	0.00985285
BETA	1.89107	1.83922	2.0437	2.13469	2.63433	3.48306	2.50455	2.14573
APRIL								
CALM	0.039	0.067	0.061	0.008	0.003	0	0.011	0.025
ALPHA	0.00652933	0.00933713	0.012905	0.00272434	0.000123505	0.000070003	0.00202636	0.0052181
BETA	2.34655	2.24447	2.05999	2.62129	3.87102	4.04658	2.70859	2.38953
MAY								
CALM	0.051	0.083	0.077	0.016	0.004	0.008	0.019	0.048
ALPHA	0.0147008	0.017187	0.0133632	0.00623991	0.000579397	0.000338469	0.00221337	0.00844445
BETA	2.02482	1.99651	2.13648	2.33873	3.24474	3.42557	2.73274	2.25088
JUNE								
CALM	0.091	0.149	0.14	0.02	0.006	0.016	0.044	0.092
ALPHA	0.0179249	0.0370111	0.0253995	0.0152158	0.00114852	0.000440598	0.00363528	0.0088936
BETA	2.09953	1.82712	2.00442	2.13906	3.09551	3.44825	2.64294	2.39596
JULY								
CALM	0.137	0.185	0.175	0.021	0.009	0.026	0.073	0.125
ALPHA	0.0228293	0.0381996	0.0164925	0.00656499	0.000888418	0.00200332	0.0101447	0.0229124
BETA	2.17712	2.01951	2.4913	2.77866	3.40168	2.90104	2.33735	2.10933
AUG								
CALM	0.159	0.252	0.232	0.022	0.008	0.011	0.079	0.125
ALPHA	0.0319477	0.0349593	0.0370874	0.00549736	0.000600864	0.000842141	0.00789191	0.0119633
BETA	2.11126	2.03485	1.97711	2.85246	3.5399	3.30119	2.49301	2.49746
SEPT								
CALM	0.089	0.137	0.189	0.034	0.012	0.013	0.043	0.072
ALPHA	0.0164422	0.0230435	0.0200969	0.01138	0.00214072	0.0012516	0.00600268	0.0124944
BETA	2.07077	1.9955	2.05767	2.2531	2.86784	3.02179	2.43254	2.13219
OCT								
CALM	0.066	0.105	0.087	0.035	0.004	0.004	0.017	0.045
ALPHA	0.0156052	0.0167245	0.0198322	0.00907349	0.00280403	0.000464124	0.00946945	0.0101621
BETA	1.83854	1.80411	1.76678	2.0349	2.50291	3.25773	2.02514	2.01082
NOV								
CALM	0.096	0.121	0.108	0.028	0.009	0.006	0.05	0.081
ALPHA	0.0150962	0.0155973	0.0184942	0.00808215	0.00434309	0.00563043	0.0129966	0.0114362
BETA	1.94644	1.9239	1.8536	2.16168	2.39368	2.33575	2.0678	2.10224
DEC								
CALM	0.121	0.133	0.125	0.03	0.011	0.009	0.061	0.113
ALPHA	0.0324311	0.0317483	0.0336404	0.0104473	0.00581869	0.00798904	0.0125263	0.0182744
BETA	1.68322	1.67074	1.65365	2.14332	2.35076	2.26378	2.13579	1.9449

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED
SAIGON VIETNAM/TAN SON NHUT APT

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.053	0.104	0.052	0.005	0.001	0.004	0.009	0.019
ALPHA	0.0170012	0.0216412	0.025435	0.00064707	0.000390227	0.00165525	0.000714636	0.00333125
BETA	2.70016	2.74136	2.4588	4.12682	4.39062	3.52568	3.93922	3.35995
FEB								
CALM	0.055	0.118	0.062	0.003	0.009	0.008	0	0.011
ALPHA	0.00551345	0.0159179	0.0143585	0.000698047	0.000491009	0.00178808	0.000103708	0.000400054
BETA	3.16753	2.77523	2.7824	4.00986	4.24141	3.13496	4.58836	4.2545
MARCH								
CALM	0.026	0.058	0.042	0	0.001	0.001	0	0.001
ALPHA	0.00305394	0.0151642	0.0139246	0.000154711	0.000178333	0.000318911	0.000120658	0.000118466
BETA	3.49738	2.76608	2.73569	4.63299	4.60478	4.91875	5.51447	4.84819
APRIL								
CALM	0.032	0.089	0.055	0	0	0.002	0	0.005
ALPHA	0.00458239	0.01162	0.0135084	0.000343513	0.000775097	0.000398975	0.000216073	0.00034695
BETA	3.25362	2.97238	2.68406	4.09508	3.68469	3.49095	5.17322	4.31735
MAY								
CALM	0.105	0.096	0.056	0.004	0.006	0.003	0.007	0.044
ALPHA	0.0165428	0.0258776	0.0195182	0.00134856	0.00215646	0.000278139	0.00310569	0.00461607
BETA	2.77257	2.57301	2.55677	3.56945	3.17067	4.13359	3.02674	3.283
JUNE								
CALM	0.099	0.142	0.079	0.002	0.002	0.007	0.021	0.05
ALPHA	0.011343	0.0130341	0.0144109	0.000594636	0.000443503	0.00122338	0.00257799	0.0068063
BETA	2.87655	2.9216	2.68615	3.73641	3.76033	3.35478	3.3058	3.0026
JULY								
CALM	0.098	0.152	0.077	0.003	0.004	0.014	0.02	0.046
ALPHA	0.0143435	0.0133605	0.0230517	0.00135597	0.000220477	0.000366844	0.00539484	0.00919223
BETA	2.58865	2.71135	2.29652	3.31093	4.06234	3.85057	2.74088	2.71986
AUG								
CALM	0.121	0.131	0.074	0.001	0.005	0.007	0.026	0.065
ALPHA	0.0165345	0.0257749	0.017693	0.00138925	0.00166029	0.00209553	0.00418083	0.00541809
BETA	2.46895	2.35629	2.41562	3.06508	2.72889	2.74005	2.8049	2.97644
SEPT								
CALM	0.097	0.18	0.108	0.006	0.005	0.005	0.027	0.059
ALPHA	0.00800532	0.0170289	0.0166669	0.000372296	0.000405443	0.00052003	0.00132569	0.00345396
BETA	3.0521	2.65999	2.48779	3.96889	4.96202	3.73226	3.69516	3.36849
OCT								
CALM	0.162	0.181	0.087	0.005	0.002	0.006	0.04	0.072
ALPHA	0.0207577	0.027357	0.0255259	0.00119939	0.000539246	0.00125868	0.00542069	0.0201943
BETA	2.70228	2.60948	2.46655	3.81952	4.05423	3.62582	3.14718	2.59783
NOV								
CALM	0.14	0.158	0.078	0.006	0.004	0.005	0.018	0.051
ALPHA	0.026655	0.034852	0.0193079	0.00182652	0.000574846	0.00104975	0.00398807	0.018962
BETA	2.61156	2.46506	2.62367	3.6224	4.14677	3.87302	3.37893	2.6302
DEC								
CALM	0.081	0.115	0.059	0.006	0.005	0.002	0.019	0.046
ALPHA	0.0193784	0.0232136	0.0173979	0.00169598	0.000522275	0.000323161	0.0015887	0.0058132
BETA	2.749	2.70209	2.65742	3.67039	4.25728	4.53265	3.77788	3.27194

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

SCOTT AFB ILLINOIS/BELLEVILLE

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.113	0.125	0.117	0.049	0.03	0.04	0.099	0.116
ALPHA	0.0173144	0.0162003	0.0163417	0.00934252	0.00642512	0.00860088	0.0171562	0.0172296
BETA	1.83826	1.86842	1.86496	2.00556	2.11073	2.04646	1.81412	1.82026
FEB								
CALM	0.119	0.118	0.105	0.034	0.019	0.021	0.083	0.111
ALPHA	0.0147449	0.014944	0.0115903	0.00794972	0.00656925	0.00686942	0.0149687	0.01599
BETA	1.91344	1.90677	2.02203	2.05951	2.06777	2.07044	1.8509	1.84655
MARCH								
CALM	0.12	0.119	0.076	0.018	0.016	0.02	0.057	0.095
ALPHA	0.0133781	0.0156601	0.0132933	0.00432089	0.00332703	0.00389861	0.00932567	0.0126581
BETA	1.94211	1.87133	1.89603	2.19055	2.2201	2.18901	1.99632	1.92039
APRIL								
CALM	0.123	0.128	0.092	0.02	0.014	0.023	0.063	0.115
ALPHA	0.0137716	0.013707	0.0102892	0.00326579	0.00328234	0.00325884	0.00761503	0.00795582
BETA	1.97765	2.00102	2.02702	2.3246	2.25064	2.28057	2.11145	2.18786
MAY								
CALM	0.266	0.271	0.141	0.042	0.029	0.026	0.116	0.224
ALPHA	0.0250273	0.0297689	0.0139815	0.0051694	0.00429348	0.00495805	0.0134581	0.0195236
BETA	1.87473	1.80952	2.06002	2.30891	2.31912	2.28036	2.08216	1.98088
JUNE								
CALM	0.301	0.312	0.166	0.052	0.029	0.034	0.118	0.258
ALPHA	0.0297955	0.0330187	0.0186493	0.0066297	0.00366436	0.003059	0.0142474	0.0298343
BETA	1.92406	1.89855	2.02382	2.31799	2.49662	2.58398	2.14001	1.88539
JULY								
CALM	0.396	0.405	0.244	0.074	0.051	0.052	0.181	0.336
ALPHA	0.0457332	0.0395369	0.0323109	0.0114982	0.0088542	0.00837418	0.0244108	0.0409994
BETA	1.77602	1.88091	1.89094	2.22436	2.26937	2.31724	1.99333	1.80344
AUG								
CALM	0.403	0.396	0.274	0.088	0.051	0.056	0.213	0.348
ALPHA	0.0491734	0.0480637	0.0324023	0.0115849	0.00700334	0.00829323	0.0301464	0.0439407
BETA	1.74077	1.78696	1.90406	2.23456	2.39264	2.34502	1.95051	1.77107
SEPT								
CALM	0.348	0.357	0.247	0.065	0.035	0.049	0.22	0.307
ALPHA	0.0376841	0.038722	0.0321126	0.0114018	0.00568256	0.00740951	0.022508	0.0316422
BETA	1.80688	1.81362	1.83793	2.11749	2.35263	2.29965	1.99505	1.85768
OCT								
CALM	0.298	0.303	0.227	0.064	0.033	0.062	0.203	0.267
ALPHA	0.0288232	0.0344058	0.0277608	0.00783339	0.00390623	0.00680235	0.0179817	0.0211127
BETA	1.85842	1.78705	1.86192	2.21503	2.42338	2.28818	2.03551	1.9657
NOV								
CALM	0.194	0.21	0.173	0.055	0.028	0.053	0.137	0.171
ALPHA	0.0195419	0.0202293	0.0195755	0.00875677	0.00554729	0.00884415	0.012558	0.0127714
BETA	1.84867	1.83543	1.84794	2.02559	2.13923	2.04293	1.99841	2.02271
DEC								
CALM	0.132	0.139	0.119	0.039	0.028	0.044	0.102	0.127
ALPHA	0.0133413	0.015267	0.016208	0.00830916	0.00456679	0.0084886	0.0150018	0.014263
BETA	2.00183	1.94263	1.91837	2.08607	2.27627	2.09665	1.89651	1.94533

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

SHEMYA ISLAND APT ALASKA

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.032	0.029	0.02	0.02	0.018	0.016	0.016	0.021
ALPHA	0.00166747	0.00179737	0.0020438	0.00123432	0.001006	0.00133446	0.00147572	0.00122509
BETA	2.10807	2.0874	2.04769	2.20408	2.26982	2.18313	2.15133	2.2116
FEB								
CALM	0.027	0.025	0.019	0.031	0.014	0.017	0.017	0.032
ALPHA	0.00137525	0.00148802	0.00213108	0.00134096	0.00122801	0.00123114	0.00149191	0.00109628
BETA	2.17226	2.13637	2.02227	2.16573	2.20158	2.20373	2.14524	2.22647
MARCH								
CALM	0.024	0.028	0.033	0.022	0.009	0.007	0.022	0.027
ALPHA	0.00187079	0.00151732	0.00125874	0.0012193	0.00130162	0.00114832	0.00128006	0.00132112
BETA	2.07794	2.13876	2.19789	2.21641	2.18661	2.22398	2.19487	2.18252
APRIL								
CALM	0.024	0.023	0.022	0.011	0.009	0.007	0.013	0.021
ALPHA	0.00199528	0.00207735	0.00162102	0.00112404	0.000733437	0.000173976	0.00150066	0.00210901
BETA	2.14074	2.12166	2.20943	2.31446	2.43315	2.95771	2.22687	2.12823
MAY								
CALM	0.033	0.028	0.016	0.008	0.005	0.007	0.01	0.029
ALPHA	0.00241169	0.00201004	0.00163308	0.000859877	0.000556231	0.000705539	0.00133373	0.00246081
BETA	2.14864	2.22101	2.27928	2.48022	2.60974	2.54433	2.3361	2.14454
JUNE								
CALM	0.044	0.045	0.035	0.02	0.008	0.005	0.019	0.036
ALPHA	0.0037167	0.00456043	0.0031119	0.00169842	0.00124703	0.000262177	0.00206335	0.00336047
BETA	2.16487	2.08102	2.20315	2.40891	2.495	3.06101	2.36101	2.19719
JULY								
CALM	0.035	0.032	0.028	0.01	0.007	0.01	0.015	0.033
ALPHA	0.00423628	0.00380702	0.00368436	0.00198421	0.00150133	0.00194114	0.00276955	0.00457395
BETA	2.13664	2.1763	2.19077	2.40248	2.47205	2.38867	2.29127	2.10537
AUG								
CALM	0.028	0.027	0.029	0.008	0.005	0.006	0.012	0.027
ALPHA	0.00580755	0.00535571	0.00354129	0.00171629	0.00154066	0.00167376	0.00356825	0.00555737
BETA	2.00327	2.03309	2.18594	2.41414	2.43629	2.39823	2.16012	2.01608
SEPT								
CALM	0.04	0.033	0.035	0.013	0.005	0.007	0.019	0.032
ALPHA	0.0038327	0.00334263	0.00280493	0.00175183	0.00131167	0.001381	0.00287495	0.00424053
BETA	2.02737	2.0739	2.1328	2.27452	2.36174	2.34559	2.12677	1.99887
OCT								
CALM	0.02	0.016	0.017	0.011	0.005	0.006	0.011	0.013
ALPHA	0.00179256	0.00159574	0.00160285	0.000179879	0.000148146	0.00033805	0.000240496	0.00221207
BETA	2.13365	2.15832	2.16286	2.93431	2.96094	2.4368	2.80948	2.05686
NOV								
CALM	0.013	0.011	0.014	0.013	0.011	0.007	0.014	0.011
ALPHA	0.000898774	0.000819961	0.000970991	0.000717446	0.000584077	0.000566917	0.000718586	0.000917055
BETA	2.29091	2.32071	2.27186	2.35533	2.40632	2.42843	2.35549	2.28825
DEC								
CALM	0.032	0.03	0.033	0.03	0.026	0.025	0.032	0.039
ALPHA	0.000971073	0.00108373	0.00119181	0.00124455	0.000897583	0.000770583	0.000899505	0.00072644
BETA	2.27999	2.24705	2.22285	2.20772	2.30476	2.35289	2.30275	2.36771

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

THULE AB GREENLAND

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.07	0.071	0.072	0.065	0.064	0.069	0.073	0.076
ALPHA	0.00623507	0.00557853	0.00463783	0.0105035	0.00795681	0.007405	0.00915836	0.00620278
BETA	2.42516	2.49347	2.56303	2.18893	2.34524	2.38923	2.28549	2.42608
FEB								
CALM	0.071	0.064	0.084	0.073	0.072	0.062	0.066	0.055
ALPHA	0.00946208	0.0076103	0.00889649	0.00838015	0.0101142	0.00892849	0.00589568	0.00646942
BETA	2.24051	2.3549	2.27039	2.34044	2.2296	2.27486	2.48897	2.41362
MARCH								
CALM	0.071	0.06	0.064	0.087	0.116	0.103	0.08	0.089
ALPHA	0.00679502	0.00836015	0.0103741	0.0131852	0.0334729	0.0264317	0.008053	0.0046302
BETA	2.48811	2.37861	2.2848	2.23785	1.84976	1.90846	2.42123	2.64548
APRIL								
CALM	0.06	0.065	0.12	0.261	0.315	0.283	0.158	0.084
ALPHA	0.00671208	0.00784662	0.0173028	0.0740922	0.138763	0.108801	0.0248652	0.00884906
BETA	2.48059	2.43498	2.09075	1.43795	1.15618	1.23029	2.02462	2.39171
MAY								
CALM	0.162	0.168	0.203	0.184	0.126	0.098	0.15	0.153
ALPHA	0.0393116	0.0448043	0.0730008	0.080952	0.0617193	0.0605349	0.0633054	0.0601435
BETA	1.67378	1.63604	1.39707	1.30719	1.44184	1.42435	1.40103	1.46875
JUNE								
CALM	0.253	0.256	0.127	0.056	0.023	0.037	0.064	0.167
ALPHA	0.110082	0.134555	0.0737855	0.0320219	0.01597	0.0255145	0.02474	0.0711911
BETA	1.21756	1.13941	1.47389	1.77932	2.05996	1.81162	1.88373	1.40893
JULY								
CALM	0.322	0.334	0.187	0.059	0.033	0.032	0.088	0.233
ALPHA	0.120923	0.149102	0.0940882	0.0381648	0.0221549	0.0207567	0.0384601	0.106647
BETA	1.17147	1.08735	1.34159	1.75712	1.97577	2.0305	1.78189	1.25364
AUG								
CALM	0.29	0.288	0.309	0.141	0.084	0.076	0.18	0.321
ALPHA	0.107678	0.110721	0.105192	0.0967349	0.0504122	0.0572536	0.0950592	0.121473
BETA	1.21392	1.14983	1.1359	1.18897	1.50383	1.46686	1.25166	1.11478
SEPT								
CALM	0.134	0.126	0.153	0.196	0.177	0.19	0.199	0.153
ALPHA	0.0312916	0.0292885	0.0406294	0.0631024	0.0674681	0.0866923	0.0720051	0.0360958
BETA	1.74395	1.77631	1.6398	1.39077	1.36098	1.24902	1.34255	1.68982
OCT								
CALM	0.057	0.057	0.055	0.048	0.053	0.05	0.057	0.043
ALPHA	0.00594289	0.00742545	0.00687441	0.00723594	0.00949122	0.00735428	0.00826962	0.0102292
BETA	2.4523	2.32243	2.37031	2.31732	2.19746	2.32744	2.27549	2.17211
NOV								
CALM	0.06	0.061	0.053	0.058	0.058	0.062	0.059	0.06
ALPHA	0.00743886	0.00777349	0.00575997	0.0101997	0.00990088	0.00951268	0.00692803	0.00669864
BETA	2.33486	2.27248	2.45217	2.16472	2.17158	2.21313	2.34775	2.375
DEC								
CALM	0.061	0.058	0.067	0.074	0.065	0.07	0.07	0.055
ALPHA	0.00823614	0.00881864	0.00558216	0.00719847	0.00774962	0.00782321	0.00476789	0.00611402
BETA	2.29052	2.2916	2.50172	2.37267	2.34457	2.33244	2.55438	2.41504

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

TORRELON AB SPAIN/MADRID

JAN	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
CALM	0.335	0.345	0.363	0.321	0.198	0.206	0.251	0.288
ALPHA	0.102288	0.0879713	0.104419	0.0779963	0.0709032	0.0519646	0.0589319	0.0850885
BETA	1.24834	1.34935	1.25533	1.29514	1.25609	1.40018	1.49128	1.33354
FEB	.	.	.	.	.	.	.	.
CALM	0.273	0.309	0.326	0.244	0.15	0.127	0.187	0.261
ALPHA	0.0594148	0.0956994	0.0731329	0.0583639	0.0511481	0.0381826	0.0357399	0.0402621
BETA	1.55151	1.35848	1.45773	1.38655	1.35013	1.48158	1.69642	1.69136
MARCH	.	.	.	.	.	.	.	.
CALM	0.198	0.248	0.236	0.149	0.084	0.075	0.124	0.183
ALPHA	0.0632087	0.0713064	0.0813828	0.055733	0.0305166	0.0204858	0.0303836	0.0409412
BETA	1.45743	1.42113	1.38192	1.35886	1.52168	1.66699	1.67089	1.61348
APRIL	.	.	.	.	.	.	.	.
CALM	0.187	0.249	0.25	0.115	0.073	0.052	0.088	0.174
ALPHA	0.0403626	0.0711792	0.0560594	0.0340323	0.0157117	0.0148304	0.0180446	0.0305834
BETA	1.65863	1.4738	1.51953	1.56101	1.83054	1.78763	1.82435	1.7465
MAY	.	.	.	.	.	.	.	.
CALM	0.267	0.309	0.271	0.131	0.071	0.059	0.108	0.197
ALPHA	0.0427506	0.0633806	0.0818888	0.0398822	0.0198075	0.0123691	0.0193435	0.0304523
BETA	1.80579	1.72415	1.43275	1.61331	1.83862	1.99485	1.93515	1.87917
JUNE	.	.	.	.	.	.	.	.
CALM	0.244	0.349	0.263	0.118	0.045	0.038	0.1	0.228
ALPHA	0.064038	0.0920369	0.105352	0.0567721	0.013374	0.00816054	0.0230885	0.0354545
BETA	1.64643	1.60288	1.37232	1.60099	2.15236	2.32515	1.93217	1.92349
JULY	.	.	.	.	.	.	.	.
CALM	0.244	0.333	0.266	0.084	0.041	0.036	0.089	0.184
ALPHA	0.054587	0.106043	0.0692603	0.0388457	0.0128709	0.00623855	0.015342	0.0449113
BETA	1.65692	1.50059	1.60833	1.87121	2.19844	2.40716	2.05766	1.69653
AUG	.	.	.	.	.	.	.	.
CALM	0.242	0.298	0.242	0.109	0.045	0.038	0.109	0.244
ALPHA	0.0620746	0.0924156	0.0913923	0.0577657	0.0155849	0.00900287	0.0248328	0.0518355
BETA	1.6224	1.57501	1.51246	1.59911	2.07248	2.23285	1.88385	1.62902
SEPT	.	.	.	.	.	.	.	.
CALM	0.321	0.366	0.341	0.155	0.059	0.056	0.161	0.268
ALPHA	0.0699532	0.104254	0.10442	0.0893264	0.0220355	0.0134864	0.0363418	0.0406816
BETA	1.68642	1.55832	1.51124	1.40613	1.91492	2.06021	1.84698	1.87666
OCT	.	.	.	.	.	.	.	.
CALM	0.293	0.323	0.311	0.184	0.128	0.154	0.25	0.285
ALPHA	0.0695921	0.0675584	0.0906614	0.0860152	0.0452386	0.0335863	0.0548077	0.0454292
BETA	1.60451	1.60603	1.41275	1.28158	1.49682	1.61098	1.55999	1.71683
NOV	.	.	.	.	.	.	.	.
CALM	0.279	0.298	0.331	0.268	0.166	0.187	0.243	0.248
ALPHA	0.069113	0.0699998	0.0793862	0.0766788	0.0491109	0.0392856	0.0488222	0.0635587
BETA	1.47473	1.485	1.41532	1.28365	1.42803	1.58246	1.60946	1.51173
DEC	.	.	.	.	.	.	.	.
CALM	0.358	0.356	0.387	0.299	0.204	0.231	0.253	0.297
ALPHA	0.0569746	0.0675351	0.0668524	0.0642193	0.0563648	0.047851	0.0523799	0.0651876
BETA	1.43229	1.41234	1.39865	1.30668	1.30017	1.37642	1.43011	1.37793

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

TRIPOLI LIBYA/WHEELS AB

	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
JAN								
CALM	0.032	0.025	0.034	0.03	0.027	0.05	0.11	0.074
ALPHA	0.0054576	0.00471132	0.00454247	0.00349835	0.000840185	0.00605272	0.0128379	0.00810858
BETA	2.26045	2.29926	2.30606	2.31598	2.74064	2.12371	1.9099	2.12103
FEB								
CALM	0.089	0.084	0.084	0.055	0.017	0.037	0.097	0.087
ALPHA	0.00795789	0.00660693	0.00643525	0.00586805	0.000703821	0.00321748	0.011448	0.00916403
BETA	2.12655	2.19191	2.18693	2.12597	2.84073	2.39352	1.99955	2.1164
MARCH								
CALM	0.084	0.081	0.07	0.03	0.013	0.036	0.088	0.099
ALPHA	0.00897666	0.00738223	0.00783343	0.00395684	0.000118565	0.00230272	0.0109769	0.0113872
BETA	2.11533	2.17789	2.15139	2.28116	3.47008	2.45438	1.95324	2.01587
APRIL								
CALM	0.096	0.101	0.107	0.032	0.009	0.021	0.058	0.09
ALPHA	0.0104462	0.00886233	0.00777446	0.00268331	0.000187371	0.000234864	0.00625888	0.0110404
BETA	2.02356	2.11104	2.10794	2.3884	3.26253	3.16184	2.04101	1.93992
MAY								
CALM	0.157	0.18	0.122	0.024	0.01	0.016	0.068	0.139
ALPHA	0.0166467	0.0171124	0.0119932	0.00109908	0.0000976566	0.000254559	0.00713184	0.0135189
BETA	1.9621	1.94335	2.05812	2.7487	3.52808	3.15777	2.07839	2.02433
JUNE								
CALM	0.184	0.205	0.161	0.029	0.009	0.011	0.05	0.137
ALPHA	0.0142832	0.0142616	0.0116263	0.000655643	0.0000523688	0.000150201	0.00382845	0.00900948
BETA	2.08095	2.14407	2.14175	3.00254	3.79424	3.36416	2.30434	2.15976
JULY								
CALM	0.21	0.259	0.192	0.033	0.005	0.005	0.039	0.149
ALPHA	0.019456	0.01324	0.012844	0.000520739	0.0000184484	0.0000576245	0.000585827	0.00820997
BETA	2.13447	2.36572	2.26388	3.15922	4.29938	3.83812	3.07025	2.36051
AUG								
CALM	0.2	0.254	0.239	0.027	0.002	0.001	0.019	0.112
ALPHA	0.0149751	0.0125493	0.014713	0.00141326	0.0000273022	0.0000120808	0.00113396	0.00822858
BETA	2.33335	2.4485	2.28571	3.00624	4.16259	4.40407	2.95821	2.39244
SEPT								
CALM	0.142	0.18	0.156	0.037	0.005	0.009	0.031	0.098
ALPHA	0.0204152	0.0133692	0.0102583	0.00376253	0.000171087	0.0000261032	0.00109884	0.0108236
BETA	2.00143	2.24397	2.33518	2.51697	3.40173	4.02555	2.75472	2.14239
OCT								
CALM	0.106	0.104	0.108	0.065	0.024	0.036	0.091	0.127
ALPHA	0.0113146	0.00934421	0.00771005	0.00494694	0.00043506	0.00196407	0.0081789	0.0134336
BETA	2.19122	2.27543	2.36668	2.43218	3.12265	2.66964	2.17623	2.04082
NOV								
CALM	0.07	0.061	0.057	0.055	0.028	0.061	0.098	0.083
ALPHA	0.00599306	0.0038351	0.00444383	0.00378799	0.00304153	0.00457661	0.015685	0.0117384
BETA	2.41517	2.60502	2.52626	2.49229	2.50967	2.44402	1.99233	2.13641
DEC								
CALM	0.052	0.047	0.037	0.054	0.05	0.075	0.122	0.066
ALPHA	0.00358499	0.0016967	0.00271163	0.00462966	0.00431108	0.0114752	0.0168493	0.00706045
BETA	2.67806	2.61787	2.6072	2.27011	2.21531	1.93589	1.83202	2.20544

PARAMETERS FOR WEIBULL MODELS OF WINDSPEED

WAKE ISLAND NAS/PACIFIC IS

	JAN	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23
CALM		0.04	0.045	0.046	0.023	0.008	0.004	0.02	0.035
ALPHA	0.00170099	0.00203167	0.00194544	0.00145227	0.000904365	0.00143696	0.00176298	0.00165082	
BETA	2.45741	2.40871	2.41531	2.52453	2.72202	2.54845	2.44424	2.45491	
FEB									
CALM		0.029	0.031	0.035	0.014	0.006	0.004	0.016	0.023
ALPHA	0.00120861	0.00128004	0.00175085	0.00124677	0.00121658	0.0013134	0.00159438	0.00121634	
BETA	2.57904	2.5808	2.47542	2.6042	2.61193	2.60324	2.48159	2.56621	
MARCH									
CALM		0.013	0.019	0.017	0.008	0.003	0.004	0.012	0.013
ALPHA	0.000956595	0.00114727	0.0010477	0.000791147	0.000817055	0.00116171	0.00141352	0.00115298	
BETA	2.63505	2.58672	2.61742	2.7131	2.73	2.59325	2.48912	2.54784	
APRIL									
CALM		0.009	0.008	0.008	0.003	0.005	0.003	0.006	0.01
ALPHA	0.000199094	0.000325122	0.00037821	0.000292662	0.000219368	0.000239341	0.000228205	0.000157253	
BETA	3.15443	2.99674	2.93788	3.02571	3.11831	3.09409	3.09105	3.19588	
MAY									
CALM		0.006	0.009	0.007	0.003	0.001	0.002	0.004	0.006
ALPHA	0.00243376	0.00266911	0.000789502	0.000579417	0.000449824	0.000472312	0.000603002	0.000465155	
BETA	2.29553	2.29861	2.73668	2.83698	2.94557	2.91728	2.80266	2.88572	
JUNE									
CALM		0.018	0.016	0.01	0.003	0	0.006	0.009	0.016
ALPHA	0.000790537	0.00312181	0.00105785	0.000517918	0.000516125	0.000667327	0.000526361	0.000640086	
BETA	2.91933	2.47604	2.83288	3.02	3.09111	3.00025	3.0765	2.96709	
JULY									
CALM		0.01	0.013	0.012	0.004	0.003	0.003	0.006	0.005
ALPHA	0.000308149	0.000439432	0.000440631	0.000240035	0.00025473	0.000400612	0.000304351	0.000287296	
BETA	3.26101	3.17116	3.16667	3.3764	3.35252	3.15865	3.24687	3.27187	
AUG									
CALM		0.009	0.01	0.006	0.004	0.003	0.007	0.008	0.007
ALPHA	0.00084486	0.0007279	0.00137723	0.000606873	0.000470286	0.000535321	0.000891159	0.000677899	
BETA	2.91574	3.00197	2.73441	3.03194	3.14418	3.11761	2.89007	3.00107	
SEPT									
CALM		0.03	0.021	0.019	0.005	0.002	0.006	0.023	0.019
ALPHA	0.000944798	0.00102639	0.00150874	0.000866626	0.000615344	0.00072387	0.000603281	0.000604499	
BETA	2.84062	2.8482	2.67231	2.86743	3.01688	2.9529	2.98849	3.00718	
OCT									
CALM		0.025	0.022	0.017	0.006	0.009	0.008	0.013	0.018
ALPHA	0.000858365	0.000992249	0.000916101	0.000665955	0.000679118	0.00100738	0.000860519	0.000611297	
BETA	2.74055	2.6974	2.72437	2.8341	2.84045	2.69167	2.71869	2.84557	
NOV									
CALM		0.011	0.014	0.015	0.004	0.007	0.005	0.014	0.01
ALPHA	0.000843593	0.000958212	0.000805429	0.000635459	0.000619577	0.000711425	0.000430339	0.000477663	
BETA	2.65134	2.62257	2.68243	2.76476	2.77771	2.72493	2.8791	2.83559	
DEC									
CALM		0.023	0.024	0.035	0.021	0.007	0.017	0.029	0.027
ALPHA	0.000834783	0.00100924	0.000775885	0.000923019	0.00115823	0.000958777	0.000765223	0.000702403	
BETA	2.6845	2.65006	2.72664	2.65673	2.59097	2.66819	2.72152	2.73794	