COMPUTATION OF AVERAGED MONTHLY ZONAL ALBEDO UTILIZING THE SOLAR ZENITH ANGLE, PROPERTIES OF CLEAR AND CLOUDY ATMOSPHERES

By

Harbans Dhuria

UNIVERSITY OF THE DISTRICT OF COLUMBIA

Washington, D.C.

Computer Information System Sciences Department

Grant # NAG-5-75

August 1981

BIBLIOGRAPHIC DATA SHEET

Research Grant # NAG-5-75

Period June 1980 - August 1981

Title: Computation of Albedo Utilizing the Solar Zenith Angle, Properties of Clear and Cloudy Atmospheres

Author: Harbans Dhuria, Telephone: (202) 727-2704

Performing Organization & Address: University of the District of Columbia
Computer Information & Systems Science Dept.
929 E Street, N. W.
Washington, D. C. 20004

Sponsoring Agency Name and Address: Goddard Space Flight Center
Greenbelt, Md. 20771

Technical Monitor: R. J. Curran, Code 301 344-8235

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ACKNOWLEDGEMENTS

I acknowledge Ms. Karen Green's valuable help in data processing work, Mrs Karen Green worked as a student research assistant.

I acknowledge Dr. Robert Curran's valuable contribution through meetings, technical discussions towards the success of this technical memorandum and monitoring this research project under NASA Research Grant # NAG-5-75 Sponsored by NASA.

ABSTRACT

The zonal temporal averages of albedos at the top of the atmosphere has been considered as a function of the length of the day. The length of the day is used to determine the average daily values of $\mu_o = \cos\theta_o$ The length of the day and the value of θ_o were computed from an Astronomical equation. Polynominal fits of the slope and intercept functions of A_s and A_c as function of $\cos\theta_o$ were obtained by using the sample values of Dave and Braslau (1974) of albedos corresponding to solar zenith angles from 0-90° with interval of 5°. The daily zonal values of μ_o and the surface albedos have been used to compute the daily zonal values of albedos at the top of the clear (A_s) and cloudy atmosphere (A_c). These zonal daily average values of A_s and A_c were used to compute the zonal monthly and annual averages of A_s and A_c. The monthly zonal cloud fractions were used to compute planetary albedo A at the top of the atmosphere. The global values of monthly albedos A_s, A_c, and A were computed by using the weighting function defined as the difference of the sines of zonal values of latitudes.

INTRODUCTION

Satellite observations of the earth's albedo are constrained due to the characteristics of the satellite orbits. Most of our presently existing albedo data has been collected from satellites situated in sun-synchronous, near polar orbits. Such orbits allow observations at a fixed time of day for each latitude observed. These satellite data are then used in forming monthly averaged values. The assumption usually made in forming such averages is that albedo observed is applicable for the entire day. It has been shown that the albedo of clear and cloudy atmospheres do depend on the solar zenith angle. In the present study, the angular models of Nack and Curran (1978) have been used. These angular models were analyzed and in this model the updated version of the model is presented. These models were used to compute more accurate monthly averaged albedo.

This technical memorandum is consisted of two sections. Section I presents the theory and assumption and general discussion of the causes and computations of albedos at the top of the atmosphere. Section II is related to Data Processing which include the design and development of computer programs for computation of averaged monthly zonal albedos at the top of the atmosphere. Table on page A-1 is about organization of input data files and their source. The output in the form of tables representing the zonal monthly averaged values of T_{m1} time (in length of day) in hours of day, (2) moments of μ(cosine of solar zenith angle) (3) slopes of As and Ac, intercepts as As and Ac and planetary albedos and global values of As and Ac and planetary albedos are given along

with the discussion of model in Section I. The numerical averaged zonal monthly values of T_{ml}, A_s A_c, cloud fractions, surface albedo and A albedo at the top of the atmosphere from July 1975-Dec 1976 were plotted. The plots are given in figures 1-6.

Pages A-11 - A-30 include the flowcharts, programs developed and the description of model for computation of albedos at the top of the atmosphere. This computer program designed for the computations of albedo can be utilized to compute the averaged values of albedos (zonal or global) at the top of the atmosphere with or without clouds for any day, month of any year. In this the results were computed for years 1975 and 1976. The results in the form of tables were checked against physical intuition and other sources and were found accurate. (refer to Jacobowitz et al.). The assumption made in this analysis were that the monthly zonal cloud fractions of Curran et al. 1978 were representative of all times of day for that month. The resulting monthly zonal albedos were finally compared with the measured albedos.

Definitions & Notations

The albedo of the earth-atmosphere system is defined as the ratio of reflected solar irradiance to that incident from the sun. For the present study the system albedo, denoted A_s for cloud free and A_c for cloudy, is assumed to be a function of the surface albedo a, the solar zenith angle θ_o and a cloud optical thickness T_c. The surface albedo a is defined in a manner similar to the system albedo, i.e., the surface albedo a is the ratio of the irradiance reflected from a surface to that incident upon it. For the purposes of the present study, the surface is assumed to be a Lambert reflector. It should be noted that the reflectance of natural surfaces may depend on the angular distribution of the incident radiation. This latter dependency is assumed to be second order to the parameterization being investigated. The cloud optical thickness is defined at 0.55 μm.

The albedo at the top of the atmosphere A is considered to be dependent on: (i) solar zenith angle θ_o, (ii) length of in day, (iii) surface albedo a and cloud fractions f_c (Lattitude. → + 87.5 - - 87.5 with step differences of 5^o).

Daily and Monthly Zonal Averaged Albedos At The Top of The Atmosphere, Solar zenith Angle And The Weighingting Functions

One of the basic problems in acquiring climatalogical radiation data from satellites is that of temporal sampling. A polar orbiting satellite will sample the reflective irradiance which is used to compute albedos at the top of the atmosphere at a given time of the day for many locations so that global spatial sampling is achieved. A geostationary satellite could sample a given region of the globe with high temporal resolution so that a costly system of well spaced geostationary satellites could give the temporal and spatial sampling resolution. We will now show how θ_o (t) time dependent solar zenith angle parametorization of albedos can be used to overcome the temporal sampling problem of the less costly polar orbiting satellite.

To compute time averages at a latitude l and longitude, m, the surface albedo, a_{dl} is assumed to remain constant for the period of one day. (a_{dl} - surface albedo at the lth latitude and on the dth day of the year.) The time dependence of the solar zenith angle θ_o (t) can be computed from a well known equation of astronomy:

$$\theta_o(t) = \cos^{-1}\mu_o(t) \tag{1}$$

$$\mu_o(t) = \sin\delta_{dl}\sin\phi + \cos\delta_{dl}\cos\phi\cos H(t)$$

$$H(t) = 2\pi t/T$$

where ϕ is the latitude, δ_{dl} is the solar declination on the d th day and lth latitude, T is the earth's rotation period (24 hrs), t is the

time elasped since noon, and H is the hour angle.

The time of sunrise and sunset $\pm T_{dl}$ are defined by $\mu_o(t) = 0$ such that

$$\cos(2\pi T_{dl}/T) = -\tan\delta_{dl} \tan\phi \tag{2}$$

$$T_{dl} = \frac{T}{2\pi} \cos^{-1}(-\tan\delta_{dl} \tan\phi) \tag{3}$$

$T_{dl} = 0$ For $(-\tan\delta_{dl} \tan\phi) \geq 1$

$T_{dl} = 12$ For $(-\tan\delta_{dl} \tan\phi) < -1$

If we donote T_{ml} as the average values of time of sunrise and sunset at latitude l for mth month of the year and n is the number of days in the mth month.

$$T_{ml} = \frac{1}{n}\sum_{d=1}^{n} T_{dl} \tag{4}$$

(See table of T_{ml} on page 7,8.

The minimum solar zenith angle, θ_{dl}, is determined by t=0 so that

$\cos\theta_{dl} = \sin\delta_{dl} \sin\phi + \cos\delta_{dl} \cos\phi$

$\cos\theta_{dl} = \cos(\phi - \delta_{dl})$

$\theta_{dl} = \phi - \delta_{dl}$

If we let $(t_1, t_2) = (T_{dl}, T_{dl})$, the daily averaged values at latitude 1 of (i) $\mu_{dl}(t)$, (ii) the cloud free albedo, As (a_{dl}, t_{dl}) and (iii), total cloud cover Ac (a_{dl}, t_{dl}, T_c) albedos can be given as follows [ref. TM NC (78057) (Aug 1978)]

$$\bar{\mu}_{dl} = 1/2T_{dl} \int_{-T_{dl}}^{T_{dl}} \mu_o(t)dt \qquad (5)$$

$$\bar{\mu}_{ml} = \frac{1}{n} \sum_{d=1}^{n} \mu_{dl}$$

(Refer $\bar{\mu}_{ml}$ tables of 1975 and 1976 on pages 10 and 11.)

$$\text{As } (a_{dl}, t_{dl}) = 1/T_{dl} \int_{-T_{dl}}^{T_{dl}} \text{As}[a_{dl}, \cos\theta_{dl}(t)\ \mu_o(t), /\bar{\mu}_{dl}]dt$$

$$\text{Ac } (a_{dl}, t_{dl}, T_c) = 1/2T_{dl} \int_{-T_{dl}}^{T_{dl}} \text{Ac}[a_{dl}, \cos\theta_{dl}(t), T_c]\ \gamma\ [\mu_o(t)/\bar{\mu}_{dl}]dt \qquad (7)$$

Due to simplicity of our θ_o parameter of As (a, μ_o) and Ac $(a, \mu_o T_c)$, we will only need to compute μ_{dl} and the weighted mean values of $\mu^n_{odl}(t)$ defined by:

$$\mu^n_{odl} = (\cos\theta)^n_{dl} = 1/2\ T_{dl} \int_{-T_{dl}}^{T_{dl}} \cos^n \theta_{odl}(t)[\mu_o(t)/\bar{\mu}_{dl}]dt \qquad (8)$$

(μ^n_{odl} for n = 1, 2, 3, 4. Tables in pages) .

for n = 1,2,3,4,.....in order to obtain daily averaged values of Equations 8. If we view the time dependent albedos to be specifically

TABLE 1

AVERAGE ZONAL MONTHLY TIME IN HRS ELASPED FROM NOON TO SUNRISE OR SUNSET

MATRIX TBL 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	3.9679	12.0000	12.0000	12.0000	12.0000	12.0000	9.2719	0.0	0.0	0.0	6.1292
82.5	0.0	0.0	4.6830	11.2341	12.0000	12.0000	12.0000	12.0000	7.9900	1.2209	0.0	0.0	6.1253
77.5	0.0	0.9473	5.3468	9.6333	12.0000	12.0000	12.0000	11.2986	6.9945	2.8352	0.0	0.0	6.1185
72.5	0.0	2.6912	5.5525	8.2126	11.5268	12.0000	12.0000	9.7017	6.6800	4.0585	0.6382	0.0	6.1076
67.5	1.3127	3.7036	5.6627	7.6201	9.7496	11.8969	10.8898	8.4797	6.5123	4.5689	2.4095	0.1509	6.0879
62.5	2.8491	4.2267	5.7329	7.2683	8.7243	9.6549	9.2417	7.9042	6.4057	4.8770	3.3672	2.3628	6.0593
57.5	3.5475	4.5726	5.7823	7.0274	8.1486	8.7928	8.5161	7.5290	6.3306	5.0892	3.9186	3.2187	6.0462
52.5	4.0142	4.8253	5.8196	6.8488	7.7500	8.2443	8.0348	7.2567	6.2740	5.2472	4.3028	3.7643	6.0374
47.5	4.3619	5.0218	5.8491	6.7082	7.4483	7.8438	7.6773	7.0457	6.2292	5.3714	4.5945	4.1630	6.0309
42.5	4.6380	5.1817	5.8734	6.5933	7.2067	7.5292	7.3940	6.8742	6.1923	5.4733	4.8285	4.4763	6.0257
37.5	4.8672	5.3166	5.8940	6.4960	7.0051	7.2699	7.1591	6.7299	6.1609	5.5595	5.0240	4.7346	6.0213
32.5	5.0640	5.4337	5.9120	6.4113	6.8313	7.0481	6.9576	6.6047	6.1335	5.6347	5.1926	4.9556	6.0176
27.5	5.2378	5.5379	5.9281	6.3358	6.6774	6.8528	6.7797	6.4933	6.1091	5.7017	5.3420	5.1502	6.0143
22.5	5.3950	5.6327	5.9428	6.2670	6.5379	6.6765	6.6187	6.3921	6.0868	5.7620	5.4774	5.3259	6.0113
17.5	5.5403	5.7206	5.9565	6.2032	6.4089	6.5138	6.4701	6.2982	6.0660	5.8195	5.6028	5.4880	6.0086
12.5	5.6772	5.8037	5.9694	6.1428	6.2872	6.3607	6.3301	6.2095	6.0464	5.8731	5.7210	5.6405	6.0060
7.5	5.8084	5.8834	5.9818	6.0848	6.1704	6.2140	6.1959	6.1244	6.0276	5.9247	5.8344	5.7867	6.0035
2.5	5.9365	5.9613	5.9940	6.0281	6.0565	6.0709	6.0649	6.0412	6.0091	5.9750	5.9451	5.9293	6.0011
-2.5	6.0635	6.0386	6.0060	5.9719	5.9435	5.9291	5.9351	5.9587	5.9908	6.0250	6.0549	6.0707	5.9987
-7.5	6.1915	6.1166	6.0182	5.9152	5.8296	5.7860	5.8041	5.8756	5.9724	6.0753	6.1656	6.2133	5.9963
-12.5	6.3228	6.1963	6.0306	5.8572	5.7128	5.6393	5.6599	5.7904	5.9536	6.1269	6.2790	6.3595	5.9938
-17.5	6.4597	6.2794	6.0435	5.7968	5.5912	5.4842	5.5299	5.7018	5.9339	6.1805	6.3972	6.5120	5.9912
-22.5	6.6050	6.3673	6.0572	5.7329	5.4621	5.3235	5.3812	5.6079	5.9132	6.2372	6.5226	6.6741	5.9884
-27.5	6.7622	6.4621	6.0718	5.6642	5.3226	5.1472	5.2203	5.5067	5.8909	6.2983	6.6580	6.8498	5.9855
-32.5	6.9380	6.5663	6.0880	5.5886	5.1687	4.9519	5.0424	5.3953	5.8664	6.3653	6.8074	7.0444	5.9822
-37.5	7.1328	6.6834	6.1060	5.5040	4.9949	4.7301	4.8409	5.2701	5.8391	6.4405	6.9760	7.2654	5.9785
-42.5	7.3620	6.8182	6.1266	5.4057	4.7933	4.4707	4.6060	5.1258	5.8077	6.5267	7.1715	7.5237	5.9741
-47.5	7.6380	6.9782	6.1509	5.2918	4.5517	4.1562	4.3227	4.9543	5.7708	6.6286	7.4055	7.8370	5.9689
-52.5	7.9859	7.1747	6.1804	5.1514	4.2500	3.7556	3.9652	4.7433	5.7260	6.7528	7.6972	8.2357	5.9624
-57.5	8.4525	7.4274	6.2177	4.9726	3.8514	3.2072	3.4839	4.4710	5.6694	6.9108	8.0813	8.7813	5.9536
-62.5	9.1509	7.7733	6.2671	4.7317	3.2757	2.3450	2.7583	4.0958	5.5943	7.1230	8.6328	9.6372	5.9405
-67.5	10.6972	8.2964	6.3373	4.3798	2.2503	0.1031	1.1102	3.5202	5.4876	7.4310	9.5905	11.8491	5.9119
-72.5	12.0000	9.3088	6.4474	3.7873	0.4732	0.0	0.0	2.2983	5.3200	7.9414	11.3618	12.0000	5.8922
-77.5	12.0000	11.0527	6.6532	2.3667	0.0	0.0	0.0	0.7014	5.0055	9.1648	12.0000	12.0000	5.8814
-82.5	12.0000	12.0000	7.3170	0.7659	0.0	0.0	0.0	0.0	4.0100	10.7791	12.0000	12.0000	5.8746
-87.5	12.0000	12.0000	8.0321	0.0	0.0	0.0	0.0	0.0	2.7281	12.0000	12.0000	12.0000	5.8708

TABLE 2

AVERAGE ZONAL MONTHLY TIME IN HRS ELASPED FROM NOON TO SUNRISE OR SUNSET

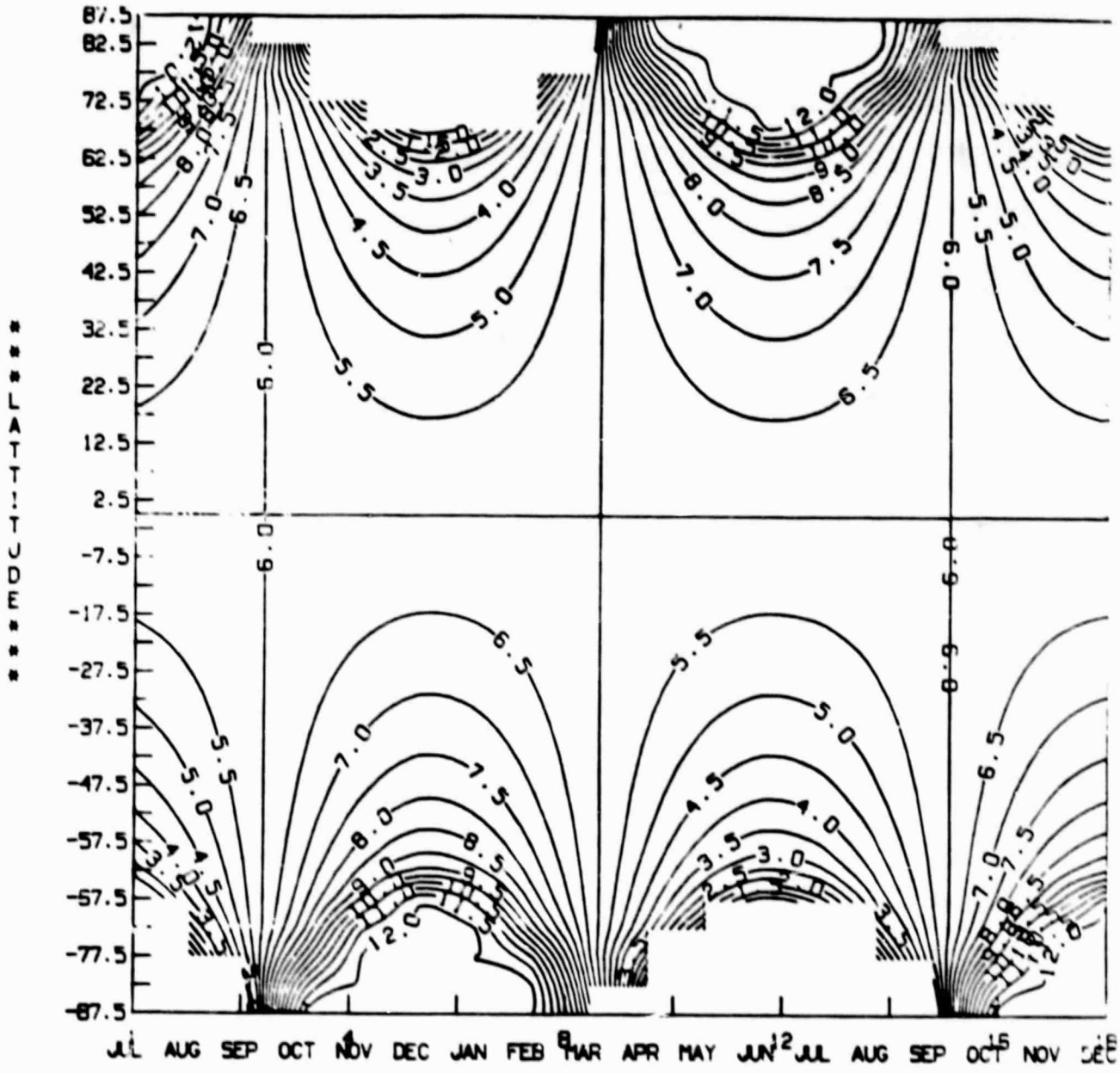
MATRIX TAL 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	4.2610	12.0000	12.0000	12.0000	12.0000	12.0000	8.9669	0.0	0.0	0.0	6.1123
82.5	0.0	0.0	4.8902	11.3346	12.0000	12.0000	12.0000	12.0000	7.7997	1.1123	0.0	0.0	6.1096
77.5	0.0	1.0060	5.4416	9.7583	12.0000	12.0000	12.0000	11.2254	6.9006	2.7152	0.0	0.0	6.1031
72.5	0.0	2.7116	5.6171	8.2856	11.5823	12.0000	12.0000	9.6062	6.6167	3.9873	0.5770	0.0	6.0917
67.5	1.2889	3.7211	5.7113	7.6696	9.8089	11.9210	10.8297	8.4289	6.4649	4.5194	2.3493	0.1268	6.0715
62.5	2.8401	4.2401	5.7713	7.3059	8.7569	9.6625	9.2156	7.8678	6.3681	4.8390	3.3324	2.3543	6.0492
57.5	3.5412	4.5834	5.8136	7.0575	8.1724	8.7978	8.4981	7.5007	6.3000	5.0587	3.8931	3.2132	6.0384
52.5	4.0094	4.8341	5.8455	6.8732	7.7686	8.2480	8.0210	7.2339	6.2497	5.2221	4.2827	3.7601	6.0312
47.5	4.3581	5.0292	5.8708	6.7287	7.4634	7.8467	7.6663	7.0269	6.2080	5.3506	4.5782	4.1597	6.0257
42.5	4.6349	5.1879	5.8916	6.6104	7.2191	7.5316	7.3850	6.8586	6.1745	5.4558	4.8151	4.4736	6.0214
37.5	4.8646	5.3217	5.9092	6.5103	7.0153	7.2718	7.1518	6.7169	6.1461	5.5450	5.0129	4.7324	6.0178
32.5	5.0618	5.4379	5.9247	6.4231	6.8396	7.0497	6.9516	6.5940	6.1212	5.6226	5.1835	4.9539	6.0147
27.5	5.2361	5.5414	5.9385	6.3454	6.6941	6.8541	6.7748	6.4846	6.0990	5.6919	5.3346	5.1487	6.0120
22.5	5.3937	5.6354	5.9510	6.2747	6.5432	6.6775	6.6149	6.3852	6.0788	5.7550	5.4716	5.3247	6.0095
17.5	5.5393	5.7227	5.9627	6.2090	6.4129	6.5145	6.4672	6.2929	6.0600	5.8136	5.5983	5.4871	6.0072
12.5	5.6765	5.8051	5.9738	6.1469	6.2900	6.3612	6.3281	6.2059	6.0422	5.8689	5.7179	5.6399	6.0050
7.5	5.8080	5.8843	5.9844	6.0872	6.1721	6.2143	6.1947	6.1222	6.0250	5.9222	5.8325	5.7864	6.0029
2.5	5.9364	5.9616	5.9948	6.0289	6.0571	6.0710	6.0645	6.0405	6.0083	5.9742	5.9445	5.9292	6.0009
-2.5	6.0636	6.0384	6.0052	5.9711	5.9429	5.9290	5.9355	5.9595	5.9917	6.0258	6.0555	6.0708	5.9989
-7.5	6.1920	6.1157	6.0155	5.9128	5.8279	5.7857	5.8053	5.8778	5.9750	6.0778	6.1674	6.2136	5.9969
-12.5	6.3235	6.1949	6.0262	5.8531	5.7100	5.6388	5.6719	5.7941	5.9578	6.1310	6.2821	6.3601	5.9948
-17.5	6.4607	6.2773	6.0372	5.7910	5.5871	5.4854	5.5328	5.7070	5.9400	6.1864	6.4016	6.5129	5.9926
-22.5	6.6069	6.3645	6.0489	5.7253	5.4567	5.3225	5.3851	5.6148	5.9212	6.2450	6.5284	6.6752	5.9903
-27.5	6.7639	6.4586	6.0615	5.6545	5.3158	5.1459	5.2252	5.5154	5.9010	6.3081	6.6654	6.8512	5.9878
-32.5	6.9381	6.5620	6.0753	5.5769	5.1604	4.9503	5.0484	5.4060	5.8788	6.3774	6.8165	7.0462	5.9851
-37.5	7.1354	6.6782	6.0907	5.4897	4.9847	4.7282	4.8482	5.2831	5.8539	6.4550	6.9871	7.2675	5.9820
-42.5	7.3651	6.8121	6.1084	5.3896	4.7809	4.4684	4.6150	5.1414	5.8255	6.5441	7.1849	7.5264	5.9784
-47.5	7.6419	6.9708	6.1292	5.2713	4.5366	4.1533	4.3337	4.9731	5.7920	6.6494	7.4218	7.8403	5.9740
-52.5	7.9906	7.1659	6.1545	5.1268	4.2314	3.7519	3.9790	4.7661	5.7513	6.7779	7.7173	8.2399	5.9686
-57.5	8.4587	7.4166	6.1864	4.9425	3.8276	3.2022	3.5019	4.4992	5.7000	6.9413	8.1069	8.7869	5.9613
-62.5	9.1598	7.7599	6.2287	4.6941	3.2431	2.3374	2.7844	4.1322	5.6318	7.1610	8.6676	9.6456	5.9506
-67.5	10.7110	8.2789	6.2887	4.3304	2.1910	0.0790	1.1702	3.5711	5.5351	7.4806	9.6506	11.8732	5.9283
-72.5	12.0000	9.2884	6.3829	3.7144	0.4177	0.0	0.0	2.3938	5.3833	8.0127	11.4230	12.0000	5.9081
-77.5	12.0000	10.9939	6.5583	2.2432	0.0	0.0	0.0	0.7746	5.0994	9.2848	12.0000	12.0000	5.8968
-82.5	12.0000	12.0000	7.1098	0.6654	0.0	0.0	0.0	0.0	4.2003	10.8877	12.0000	12.0000	5.8904
-87.5	12.0000	12.0000	7.7390	0.0	0.0	0.0	0.0	0.0	3.0330	12.0000	12.0000	12.0000	5.8877

AVERAGE ZONAL MONTHLY TIME IN HRS ELASPED FROM NOON TO SUNRISE OR SUNSET

(1975 - 1976)

Figure 1



AVERAGE ZONAL MONTHLY AND ANNUAL VALUES OF COSINE OF SOLAR ZENITH ANGLES

TABLE 3

MATRIX NUMBER 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0180	0.1654	0.3199	0.3910	0.3621	0.2390	0.0664	0.0	0.0	0.0	0.1309
82.5	0.0	0.0	0.0601	0.1740	0.3175	0.3880	0.3594	0.2372	0.1085	0.0112	0.0	0.0	0.1388
77.5	0.0	0.0109	0.1155	0.2130	0.3126	0.3821	0.3539	0.2480	0.1666	0.0468	0.0	0.0	0.1549
72.5	0.0	0.0513	0.1698	0.2735	0.3182	0.3732	0.3457	0.2952	0.2203	0.1018	0.0076	0.0	0.1804
67.5	0.0201	0.1077	0.2227	0.3252	0.3757	0.3648	0.3724	0.3546	0.2718	0.1567	0.0496	0.0010	0.2191
62.5	0.0767	0.1628	0.2738	0.3728	0.4291	0.4440	0.4393	0.4025	0.3210	0.2103	0.1062	0.0523	0.2747
57.5	0.1328	0.2164	0.3228	0.4169	0.4720	0.4900	0.4834	0.4454	0.3677	0.2620	0.1615	0.1090	0.3238
52.5	0.1875	0.2681	0.3693	0.4575	0.5090	0.5265	0.5199	0.4840	0.4116	0.3117	0.2153	0.1645	0.3692
47.5	0.2405	0.3176	0.4130	0.4944	0.5409	0.5567	0.5508	0.5185	0.4523	0.3589	0.2672	0.2183	0.4112
42.5	0.2914	0.3646	0.4536	0.5274	0.5681	0.5814	0.5764	0.5487	0.4895	0.4034	0.3168	0.2701	0.4496
37.5	0.3398	0.4087	0.4907	0.5563	0.5905	0.6008	0.5971	0.5745	0.5230	0.4447	0.3639	0.3197	0.4844
32.5	0.3856	0.4496	0.5240	0.5809	0.6080	0.6151	0.6127	0.5957	0.5525	0.4826	0.4080	0.3666	0.5154
27.5	0.4282	0.4870	0.5533	0.6011	0.6207	0.6244	0.6233	0.6123	0.5778	0.5167	0.4490	0.4106	0.5423
22.5	0.4674	0.5207	0.5785	0.6165	0.6285	0.6285	0.6290	0.6242	0.5986	0.5470	0.4864	0.4512	0.5649
17.5	0.5030	0.5503	0.5992	0.6273	0.6314	0.6277	0.6296	0.6312	0.6149	0.5730	0.5200	0.4883	0.5831
12.5	0.5346	0.5758	0.6152	0.6333	0.6292	0.6218	0.6253	0.6333	0.6266	0.5947	0.5496	0.5215	0.5968
7.5	0.5620	0.5967	0.6268	0.6344	0.6222	0.6110	0.6160	0.6306	0.6334	0.6118	0.5748	0.5507	0.6058
2.5	0.5850	0.6131	0.6335	0.6306	0.6104	0.5954	0.6019	0.6230	0.6354	0.6242	0.5957	0.5754	0.6102
-2.5	0.6034	0.6249	0.6353	0.6220	0.5937	0.5751	0.5831	0.6106	0.6326	0.6318	0.6118	0.5957	0.6099
-7.5	0.6171	0.6317	0.6324	0.6087	0.5725	0.5503	0.5598	0.5934	0.6249	0.6346	0.6233	0.6112	0.6048
-12.5	0.6260	0.6337	0.6246	0.5906	0.5468	0.5211	0.5320	0.5718	0.6125	0.6326	0.6299	0.6220	0.5950
-17.5	0.6300	0.6308	0.6120	0.5681	0.5169	0.4878	0.5001	0.5457	0.5955	0.6257	0.6315	0.6278	0.5807
-22.5	0.6290	0.6231	0.5948	0.5412	0.4829	0.4507	0.4642	0.5154	0.5738	0.6141	0.6283	0.6286	0.5618
-27.5	0.6230	0.6105	0.5730	0.5102	0.4451	0.4100	0.4247	0.4811	0.5479	0.5977	0.6201	0.6244	0.5386
-32.5	0.6120	0.5932	0.5469	0.4752	0.4039	0.3660	0.3818	0.4431	0.5177	0.5767	0.6070	0.6151	0.5111
-37.5	0.5960	0.5713	0.5166	0.4366	0.3594	0.3190	0.3358	0.4016	0.4836	0.5513	0.5890	0.6007	0.4796
-42.5	0.5751	0.5449	0.4824	0.3946	0.3121	0.2694	0.2871	0.3570	0.4458	0.5216	0.5663	0.5812	0.4442
-47.5	0.5492	0.5142	0.4445	0.3496	0.2622	0.2175	0.2360	0.3096	0.4046	0.4879	0.5388	0.5565	0.4053
-52.5	0.5182	0.4792	0.4032	0.3018	0.2101	0.1637	0.1829	0.2596	0.3603	0.4504	0.5066	0.5263	0.3629
-57.5	0.4816	0.4403	0.3588	0.2517	0.1561	0.1083	0.1280	0.2076	0.3132	0.4093	0.4695	0.4897	0.3172
-62.5	0.4377	0.3972	0.3116	0.1994	0.1007	0.0515	0.0718	0.1537	0.2637	0.3648	0.4268	0.4439	0.2679
-67.5	0.3732	0.3496	0.2620	0.1456	0.0439	0.0006	0.0155	0.0984	0.2122	0.3170	0.3745	0.3653	0.2123
-72.5	0.3389	0.2956	0.2102	0.0902	0.0051	0.0	0.0	0.0423	0.1589	0.2656	0.3151	0.3721	0.1737
-77.5	0.3470	0.2394	0.1565	0.0366	0.0	0.0	0.0	0.0074	0.1044	0.2061	0.3046	0.3809	0.1482
-82.5	0.3523	0.2231	0.0992	0.0061	0.0	0.0	0.0	0.0	0.0494	0.1622	0.3093	0.3869	0.1321
-87.5	0.3550	0.2248	0.0539	0.0	0.0	0.0	0.0	0.0	0.0120	0.1473	0.3117	0.3898	0.1242

Table 4

Average Zonal Monthly and Annual Values of Cosine of Solar Zenith Angles

MATRIX NUML 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0198	0.1700	0.3228	0.3915	0.3602	0.2350	0.0627	0.0	0.0	0.0	0.1306
82.5	0.0	0.0	0.0631	0.1772	0.3203	0.3885	0.3574	0.2332	0.1061	0.0099	0.0	0.0	0.1384
77.5	0.0	0.0118	0.1185	0.2147	0.3154	0.3826	0.3520	0.2457	0.1640	0.0442	0.0	0.0	0.1545
72.5	0.0	0.0524	0.1728	0.2754	0.3194	0.3737	0.3438	0.2944	0.2176	0.0987	0.0067	0.0	0.1799
67.5	0.0197	0.1088	0.2256	0.3272	0.3760	0.3645	0.3727	0.3532	0.2692	0.1538	0.0474	0.0008	0.2185
62.5	0.0762	0.1638	0.2766	0.3748	0.4299	0.4441	0.4389	0.4010	0.3185	0.2074	0.1041	0.0519	0.2741
57.5	0.1323	0.2173	0.3255	0.4188	0.4728	0.4901	0.4829	0.4440	0.3654	0.2593	0.1595	0.1087	0.3232
52.5	0.1870	0.2690	0.3719	0.4593	0.5098	0.5266	0.5195	0.4827	0.4094	0.3091	0.2133	0.1641	0.3686
47.5	0.2400	0.3184	0.4154	0.4960	0.5416	0.5568	0.5504	0.5173	0.4502	0.3565	0.2653	0.2179	0.4106
42.5	0.2909	0.3654	0.4557	0.5289	0.5687	0.5814	0.5761	0.5476	0.4877	0.4011	0.3150	0.2698	0.4492
37.5	0.3394	0.4094	0.4926	0.5576	0.5910	0.6009	0.5968	0.5736	0.5213	0.4426	0.3622	0.3194	0.4840
32.5	0.3852	0.4503	0.5257	0.5820	0.6084	0.6152	0.6125	0.5950	0.5510	0.4806	0.4065	0.3663	0.5150
27.5	0.4278	0.4877	0.5549	0.6019	0.6210	0.6244	0.6233	0.6118	0.5765	0.5150	0.4475	0.4103	0.5419
22.5	0.4671	0.5212	0.5797	0.6171	0.6286	0.6285	0.6290	0.6239	0.5977	0.5455	0.4851	0.4510	0.5646
17.5	0.5027	0.5508	0.6002	0.6277	0.6313	0.6276	0.6297	0.6311	0.6142	0.5717	0.5188	0.4881	0.5828
12.5	0.5343	0.5762	0.6161	0.6334	0.6290	0.6217	0.6255	0.6334	0.6261	0.5936	0.5485	0.5213	0.5966
7.5	0.5617	0.5970	0.6273	0.6342	0.6218	0.6109	0.6163	0.6309	0.6332	0.6109	0.5740	0.5505	0.6057
2.5	0.5848	0.6134	0.6337	0.6302	0.6098	0.5953	0.6024	0.6235	0.6355	0.6236	0.5949	0.5753	0.6101
-2.5	0.6033	0.6249	0.6353	0.6214	0.5931	0.5749	0.5837	0.6113	0.6329	0.6315	0.6113	0.5955	0.6098
-7.5	0.6170	0.6317	0.6321	0.6078	0.5717	0.5501	0.5604	0.5944	0.6255	0.6346	0.6229	0.6111	0.6048
-12.5	0.6259	0.6336	0.6240	0.5896	0.5459	0.5209	0.5327	0.5729	0.6133	0.6328	0.6296	0.6219	0.5951
-17.5	0.6299	0.6307	0.6112	0.5668	0.5158	0.4876	0.5009	0.5470	0.5965	0.6261	0.6315	0.6277	0.5808
-22.5	0.6290	0.6229	0.5937	0.5397	0.4817	0.4505	0.4651	0.5168	0.5751	0.6147	0.6284	0.6286	0.5620
-27.5	0.6230	0.6102	0.5717	0.5085	0.4438	0.4097	0.4257	0.4827	0.5494	0.5986	0.6203	0.6244	0.5388
-32.5	0.6120	0.5928	0.5454	0.4733	0.4024	0.3657	0.3828	0.4449	0.5194	0.5778	0.6074	0.6151	0.5114
-37.5	0.5961	0.5709	0.5149	0.4345	0.3579	0.3187	0.3369	0.4036	0.4855	0.5526	0.5896	0.6008	0.4799
-42.5	0.5752	0.5444	0.4804	0.3924	0.3104	0.2691	0.2883	0.3591	0.4479	0.5232	0.5670	0.5813	0.4446
-47.5	0.5493	0.5136	0.4423	0.3472	0.2604	0.2172	0.2373	0.3118	0.4069	0.4896	0.5396	0.5566	0.4057
-52.5	0.5183	0.4786	0.4008	0.2993	0.2083	0.1634	0.1842	0.2620	0.3627	0.4523	0.5075	0.5264	0.3633
-57.5	0.4818	0.4396	0.3563	0.2490	0.1543	0.1079	0.1293	0.2100	0.3158	0.4113	0.4705	0.4898	0.3176
-62.5	0.4379	0.3965	0.3090	0.1967	0.0987	0.0512	0.0731	0.1563	0.2665	0.3669	0.4277	0.4439	0.2683
-67.5	0.3730	0.3489	0.2592	0.1427	0.0419	0.0004	0.0167	0.1010	0.2150	0.3192	0.3749	0.3650	0.2127
-72.5	0.3396	0.2928	0.2074	0.0873	0.0043	0.0	0.0	0.0448	0.1619	0.2677	0.3163	0.3727	0.1743
-77.5	0.3476	0.2391	0.1537	0.0342	0.0	0.0	0.0	0.0085	0.1074	0.2080	0.3077	0.3815	0.1489
-82.5	0.3530	0.2214	0.0968	0.0051	0.0	0.0	0.0	0.0	0.0522	0.1654	0.3124	0.3874	0.1328
-87.5	0.3557	0.2231	0.0505	0.0	0.0	0.0	0.0	0.0	0.0132	0.1520	0.3148	0.3904	0.1249

dependent on $\mu_o^n(t)$ as a polynomial instead of generally dependent on $\mu_o(t)$ then the daily averaged values of As $[a_{dl}, u_o^n(t)]$ and Ac $[a_{dl}, u_o^n(t), \tau_c]$ are obtained by substituting u_{odl}^n and $u_o^n(t)$ in these functions, or

$$As(a_{dl}, t_{dl}) = As(a_{dl}, \mu^n{}_{dl}) \tag{9}$$

$$Ac(a_{dl}, t_{dl}) = Ac(a_{dl}, \mu^n{}_{dl}, \tau_c) \tag{10}$$

(Analytical method of evaluation of the integral given in appendix page.)

Now to fit the results of Dave and Braslau (1974), 1975) linear functions are chosen as follows:

$$A_s(a, \mu_o(t)) = m_s(\mu_o)a + A_s(0, \mu_o) \tag{11}$$

$$A_c(a, \mu_o, \tau_c) = m_c^c(\mu_o)g(\tau_c)a + A_c(0, \mu_o, \tau_c)$$

$$= A_c[a, \mu_o, A_c(0, 1, \tau)]. \tag{12}$$

Terms dependent on higher powers of a were neglected since the fit resulting from the linear functions seemed satisfactory.

Equation (12) indicates that the explicit τ_c dependence of A can be replaced by an implicit dependence on A_c (0, 1, τ_c). The slope factor of Eq. 11 depends only on μ_o. However, the slope factor of Eq. 12 has been separated into a factor dependent on $m_c(\mu_o)$, and a factor dependent on cloud optical thickness $g(\tau_c)$.

Since the Dave and Braslau results were computed at only one optical thickness (τ_c = 3.35), the present formulation sets g(3.35) = 1.0. To accomodate other values of τ_c or A_c $(0,1,\tau_c)$ we require g to decrease as its argument increases. A function which satisfies this constraint is:

$$g(\tau_c) = g\ A_c(0,0,\tau_c) = \frac{A_c(0,1,3.35)}{A_c(0,1,\tau_c)} \tag{13}$$

The purpose of the function is to dampen the dependence of $A_c(a,\mu_o,\tau_c)$ on a as τ_c increases. A further constraint on g is

$$A_c(a,\mu_o,\tau_c) > 1.0 \tag{14}$$

for all a including the extreme case of a = 1.0, since the realistic atmospheric model of Dave and Braslau (1974, 1975) that we parameterize includes absorption.

The intercepts $A_s(0,\mu_o)$ and $A_c(0,\mu_o,3.35)$ of Eqs 11 and 12 are found using Table * of Dave and Braslau (1974) for the atmospheric models C1 and C1-ST, respectively. A polynomial fit to these data was made as follows:

*Table - refer table in NASA TM 78057 (CWN)

TABLE 5

AVERAGED ZONAL MONTHLY AND ANNUAL VALUES OF INTERCEPT OF As

MATRIX ASCNST 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.1692	0.2098	0.1356	0.1132	0.1215	0.1697	0.2805	0.0	0.0	0.0	0.1002
82.5	0.0	0.0	0.2593	0.1861	0.1332	0.1131	0.1207	0.1606	0.2305	0.1332	0.0	0.0	0.1121
77.5	0.0	0.1368	0.2301	0.1567	0.1270	0.1120	0.1181	0.1420	0.1899	0.2515	0.0	0.0	0.1220
72.5	0.0	0.2914	0.1902	0.1340	0.1148	0.1082	0.1114	0.1226	0.1598	0.2425	0.1307	0.0	0.1325
67.5	0.2580	0.2369	0.1600	0.1179	0.1019	0.0990	0.0997	0.1089	0.1373	0.1995	0.2927	0.0665	0.1558
62.5	0.2643	0.1951	0.1374	0.1061	0.0935	0.0899	0.0912	0.0992	0.1205	0.1669	0.2378	0.2885	0.1574
57.5	0.2158	0.1635	0.1206	0.0972	0.0873	0.0842	0.0853	0.0918	0.1080	0.1424	0.1957	0.2344	0.1354
52.5	0.1790	0.1398	0.1081	0.0903	0.0825	0.0799	0.0809	0.0861	0.0987	0.1243	0.1638	0.1930	0.1188
47.5	0.1513	0.1223	0.0986	0.0850	0.0787	0.0766	0.0774	0.0816	0.0915	0.1108	0.1401	0.1618	0.1063
42.5	0.1308	0.1093	0.0915	0.0807	0.0756	0.0740	0.0746	0.0780	0.0859	0.1007	0.1225	0.1385	0.0968
37.5	0.1156	0.0996	0.0859	0.0773	0.0733	0.0721	0.0725	0.0752	0.0814	0.0930	0.1094	0.1213	0.0897
32.5	0.1043	0.0922	0.0814	0.0746	0.0715	0.0707	0.0710	0.0729	0.0779	0.0871	0.0997	0.1086	0.0843
27.5	0.0958	0.0864	0.0779	0.0724	0.0703	0.0698	0.0700	0.0712	0.0750	0.0824	0.0923	0.0990	0.0802
22.5	0.0893	0.0819	0.0750	0.0709	0.0695	0.0695	0.0695	0.0700	0.0728	0.0786	0.0865	0.0918	0.0771
17.5	0.0842	0.0783	0.0728	0.0698	0.0693	0.0696	0.0695	0.0694	0.0711	0.0756	0.0820	0.0862	0.0748
12.5	0.0801	0.0753	0.0711	0.0692	0.0696	0.0703	0.0699	0.0692	0.0699	0.0733	0.0783	0.0817	0.0732
7.5	0.0769	0.0730	0.0699	0.0691	0.0703	0.0714	0.0709	0.0695	0.0692	0.0715	0.0754	0.0782	0.0721
2.5	0.0743	0.0713	0.0692	0.0695	0.0716	0.0731	0.0724	0.0703	0.0690	0.0702	0.0731	0.0753	0.0716
-2.5	0.0723	0.0701	0.0691	0.0704	0.0733	0.0754	0.0745	0.0716	0.0693	0.0694	0.0714	0.0731	0.0717
-7.5	0.0708	0.0694	0.0693	0.0718	0.0757	0.0782	0.0771	0.0734	0.0701	0.0691	0.0702	0.0714	0.0722
-12.5	0.0699	0.0692	0.0701	0.0737	0.0787	0.0818	0.0804	0.0758	0.0714	0.0693	0.0695	0.0703	0.0734
-17.5	0.0694	0.0694	0.0714	0.0762	0.0824	0.0862	0.0846	0.0788	0.0732	0.0700	0.0693	0.0696	0.0751
-22.5	0.0695	0.0702	0.0732	0.0793	0.0870	0.0919	0.0898	0.0826	0.0755	0.0711	0.0696	0.0695	0.0775
-27.5	0.0700	0.0714	0.0756	0.0832	0.0929	0.0992	0.0964	0.0873	0.0785	0.0728	0.0703	0.0698	0.0807
-32.5	0.0710	0.0732	0.0786	0.0882	0.1005	0.1087	0.1051	0.0933	0.0822	0.0751	0.0716	0.0707	0.0849
-37.5	0.0726	0.0755	0.0823	0.0944	0.1105	0.1215	0.1167	0.1010	0.0869	0.0779	0.0735	0.0721	0.0905
-42.5	0.0748	0.0785	0.0869	0.1025	0.1239	0.1388	0.1323	0.1112	0.0927	0.0815	0.0759	0.0740	0.0979
-47.5	0.0776	0.0822	0.0928	0.1132	0.1421	0.1621	0.1533	0.1249	0.1003	0.0859	0.0789	0.0766	0.1076
-52.5	0.0811	0.0869	0.1004	0.1275	0.1665	0.1935	0.1816	0.1433	0.1103	0.0915	0.0828	0.0800	0.1206
-57.5	0.0857	0.0928	0.1104	0.1468	0.1992	0.2350	0.2194	0.1682	0.1235	0.0987	0.0877	0.0842	0.1379
-62.5	0.0916	0.1004	0.1237	0.1727	0.2425	0.2893	0.2689	0.2013	0.1414	0.1081	0.0940	0.0899	0.1606
-67.5	0.1000	0.1104	0.1415	0.2072	0.2988	0.0576	0.2408	0.2451	0.1653	0.1207	0.1025	0.0991	0.1581
-72.5	0.1120	0.1243	0.1654	0.2527	0.1067	0.0	0.0	0.2674	0.1973	0.1376	0.1155	0.1084	0.1322
-77.5	0.1196	0.1446	0.1974	0.2260	0.0	0.0	0.0	0.1152	0.2395	0.1612	0.1287	0.1122	0.1199
-82.5	0.1227	0.1656	0.2400	0.0976	0.0	0.0	0.0	0.0	0.2582	0.1926	0.1358	0.1133	0.1099
-87.5	0.1238	0.1766	0.2471	0.0	0.0	0.0	0.0	0.0	0.1363	0.2210	0.1386	0.1135	0.0960

TABLE 5A

AVERAGED ZONAL MONTHLY AND ANNUAL VALUES OF INTERCEPT OF As

MATRIX ASCNST 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.1672	0.2071	0.1346	0.1130	0.1221	0.1717	0.2722	0.0	0.0	0.0	0.0990
82.5	0.0	0.0	0.2674	0.1845	0.1323	0.1129	0.1212	0.1620	0.2329	0.1235	0.0	0.0	0.1118
77.5	0.0	0.1426	0.2275	0.1557	0.1264	0.1119	0.1185	0.1427	0.1918	0.2431	0.0	0.0	0.1216
72.5	0.0	0.2904	0.1882	0.1332	0.1146	0.1082	0.1116	0.1231	0.1612	0.2452	0.1202	0.0	0.1321
67.5	0.2472	0.2361	0.1585	0.1173	0.1018	0.0991	0.0998	0.1094	0.1383	0.2015	0.2950	0.0668	0.1554
62.5	0.2647	0.1945	0.1363	0.1056	0.0933	0.0899	0.0913	0.0995	0.1213	0.1684	0.2396	0.2889	0.1578
57.5	0.2162	0.1630	0.1197	0.0968	0.0871	0.0842	0.0854	0.0921	0.1086	0.1436	0.1970	0.2347	0.1357
52.5	0.1792	0.1395	0.1074	0.0900	0.0824	0.0799	0.0809	0.0863	0.0991	0.1251	0.1649	0.1932	0.1190
47.5	0.1515	0.1221	0.0982	0.0848	0.0786	0.0766	0.0774	0.0818	0.0918	0.1114	0.1408	0.1620	0.1064
42.5	0.1310	0.1091	0.0911	0.0805	0.0756	0.0740	0.0747	0.0782	0.0862	0.1012	0.1230	0.1387	0.0969
37.5	0.1157	0.0994	0.0856	0.0772	0.0732	0.0720	0.0725	0.0753	0.0817	0.0934	0.1098	0.1214	0.0898
32.5	0.1044	0.0921	0.0812	0.0745	0.0715	0.0707	0.0710	0.0730	0.0781	0.0874	0.1000	0.1086	0.0843
27.5	0.0959	0.0863	0.0777	0.0723	0.0702	0.0698	0.0700	0.0713	0.0752	0.0826	0.0925	0.0991	0.0802
22.5	0.0893	0.0818	0.0749	0.0708	0.0695	0.0695	0.0695	0.0701	0.0729	0.0788	0.0867	0.0918	0.0771
17.5	0.0842	0.0782	0.0727	0.0697	0.0693	0.0696	0.0694	0.0694	0.0712	0.0758	0.0821	0.0862	0.0748
12.5	0.0802	0.0753	0.0710	0.0692	0.0696	0.0703	0.0699	0.0692	0.0700	0.0734	0.0785	0.0818	0.0732
7.5	0.0769	0.0730	0.0699	0.0691	0.0703	0.0714	0.0709	0.0695	0.0693	0.0716	0.0755	0.0782	0.0721
2.5	0.0743	0.0713	0.0692	0.0696	0.0716	0.0731	0.0724	0.0702	0.0690	0.0702	0.0732	0.0753	0.0716
-2.5	0.0723	0.0701	0.0691	0.0705	0.0734	0.0754	0.0744	0.0715	0.0693	0.0694	0.0715	0.0731	0.0717
-7.5	0.0709	0.0694	0.0694	0.0719	0.0758	0.0782	0.0770	0.0733	0.0700	0.0691	0.0702	0.0714	0.0722
-12.5	0.0699	0.0692	0.0702	0.0738	0.0788	0.0818	0.0803	0.0757	0.0713	0.0693	0.0695	0.0703	0.0733
-17.5	0.0694	0.0694	0.0715	0.0763	0.0825	0.0863	0.0845	0.0787	0.0731	0.0699	0.0693	0.0696	0.0751
-22.5	0.0695	0.0702	0.0733	0.0795	0.0872	0.0919	0.0896	0.0824	0.0754	0.0711	0.0696	0.0695	0.0774
-27.5	0.0700	0.0714	0.0757	0.0835	0.0931	0.0992	0.0962	0.0871	0.0783	0.0727	0.0703	0.0698	0.0806
-32.5	0.0710	0.0732	0.0787	0.0884	0.1008	0.1088	0.1049	0.0930	0.0820	0.0749	0.0716	0.0707	0.0849
-37.5	0.0726	0.0756	0.0825	0.0948	0.1109	0.1216	0.1164	0.1006	0.0866	0.0777	0.0734	0.0721	0.0904
-42.5	0.0748	0.0786	0.0872	0.1030	0.1245	0.1389	0.1319	0.1107	0.0924	0.0813	0.0758	0.0740	0.0978
-47.5	0.0776	0.0823	0.0932	0.1138	0.1428	0.1623	0.1528	0.1242	0.0998	0.0857	0.0788	0.0766	0.1076
-52.5	0.0811	0.0870	0.1009	0.1283	0.1675	0.1937	0.1809	0.1424	0.1096	0.0912	0.0827	0.0799	0.1205
-57.5	0.0856	0.0939	0.1110	0.1479	0.2005	0.2353	0.2184	0.1669	0.1227	0.0983	0.0875	0.0842	0.1377
-62.5	0.0915	0.1035	0.1245	0.1743	0.2442	0.2897	0.2676	0.1996	0.1402	0.1076	0.0938	0.0899	0.1604
-67.5	0.1000	0.1106	0.1427	0.2093	0.3010	0.0462	0.2507	0.2428	0.1638	0.1199	0.1023	0.0991	0.1579
-72.5	0.1120	0.1246	0.1670	0.2555	0.0963	0.0	0.0	0.2647	0.1953	0.1367	0.1152	0.1083	0.1312
-77.5	0.1194	0.1449	0.1995	0.2169	0.0	0.0	0.0	0.1252	0.2368	0.1600	0.1280	0.1121	0.1198
-82.5	0.1225	0.1662	0.2426	0.0871	0.0	0.0	0.0	0.0	0.2551	0.1909	0.1348	0.1132	0.1090
-87.5	0.1235	0.1776	0.2388	0.0	0.0	0.0	0.0	0.0	0.1463	0.2181	0.1375	0.1133	0.0961

TABLE 6

AVERAGED ZONAL MONTHLY AND ANNUAL VALUES OF INTERCEPT of A_C

MATRIX ACCNST 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.3945	0.6871	0.6493	0.6317	0.6389	0.6693	0.7111	0.0	0.0	0.0	0.3666
82.5	0.0	0.0	0.6643	0.6755	0.6445	0.6283	0.6350	0.6618	0.6947	0.3027	0.0	0.0	0.4113
77.5	0.0	0.3096	0.6944	0.6588	0.6348	0.6215	0.6271	0.6476	0.6777	0.6216	0.0	0.0	0.4586
72.5	0.0	0.7145	0.6777	0.6424	0.6203	0.6110	0.6150	0.6311	0.6613	0.6990	0.2897	0.0	0.5114
67.5	0.5827	0.6973	0.6615	0.6273	0.6048	0.5967	0.5997	0.6160	0.6456	0.6822	0.7151	0.1410	0.5961
62.5	0.7069	0.6805	0.6457	0.6130	0.5914	0.5829	0.5862	0.6023	0.6304	0.6658	0.6979	0.7142	0.6429
57.5	0.6898	0.6641	0.6306	0.5997	0.5796	0.5717	0.5748	0.5897	0.6161	0.6498	0.6810	0.6970	0.6285
52.5	0.6731	0.6482	0.6163	0.5874	0.5691	0.5620	0.5647	0.5782	0.6026	0.6345	0.6645	0.6802	0.6149
47.5	0.6569	0.6329	0.6028	0.5762	0.5599	0.5537	0.5561	0.5679	0.5901	0.6200	0.6486	0.6637	0.6022
42.5	0.6412	0.6184	0.5903	0.5662	0.5520	0.5469	0.5489	0.5589	0.5787	0.6062	0.6333	0.6478	0.5906
37.5	0.6263	0.6048	0.5788	0.5574	0.5456	0.5416	0.5431	0.5512	0.5684	0.5934	0.6188	0.6325	0.5800
32.5	0.6121	0.5921	0.5685	0.5500	0.5405	0.5377	0.5387	0.5449	0.5593	0.5817	0.6051	0.6180	0.5706
27.5	0.5989	0.5805	0.5595	0.5439	0.5370	0.5354	0.5359	0.5400	0.5516	0.5711	0.5924	0.6044	0.5625
22.5	0.5867	0.5700	0.5517	0.5393	0.5349	0.5346	0.5346	0.5366	0.5452	0.5617	0.5808	0.5917	0.5556
17.5	0.5756	0.5607	0.5453	0.5361	0.5344	0.5352	0.5347	0.5347	0.5402	0.5536	0.5703	0.5802	0.5500
12.5	0.5657	0.5528	0.5403	0.5344	0.5353	0.5374	0.5364	0.5342	0.5367	0.5468	0.5610	0.5697	0.5459
7.5	0.5570	0.5462	0.5367	0.5342	0.5377	0.5411	0.5396	0.5352	0.5346	0.5415	0.5530	0.5605	0.5431
2.5	0.5497	0.5410	0.5346	0.5354	0.5416	0.5462	0.5442	0.5378	0.5340	0.5375	0.5464	0.5527	0.5418
-2.5	0.5438	0.5372	0.5340	0.5382	0.5470	0.5528	0.5503	0.5418	0.5349	0.5351	0.5412	0.5461	0.5419
-7.5	0.5393	0.5349	0.5349	0.5424	0.5537	0.5607	0.5577	0.5472	0.5373	0.5341	0.5374	0.5410	0.5434
-12.5	0.5362	0.5341	0.5373	0.5481	0.5619	0.5699	0.5665	0.5540	0.5412	0.5346	0.5351	0.5374	0.5464
-17.5	0.5347	0.5348	0.5411	0.5552	0.5712	0.5803	0.5765	0.5622	0.5465	0.5366	0.5343	0.5352	0.5508
-22.5	0.5346	0.5370	0.5464	0.5635	0.5819	0.5919	0.5877	0.5717	0.5532	0.5401	0.5350	0.5346	0.5566
-27.5	0.5361	0.5407	0.5531	0.5732	0.5936	0.6046	0.6000	0.5824	0.5612	0.5450	0.5372	0.5354	0.5637
-32.5	0.5390	0.5458	0.5611	0.5840	0.6064	0.6182	0.6133	0.5942	0.5705	0.5514	0.5409	0.5378	0.5720
-37.5	0.5435	0.5523	0.5704	0.5960	0.6202	0.6327	0.6275	0.6070	0.5811	0.5591	0.5461	0.5416	0.5816
-42.5	0.5494	0.5602	0.5810	0.6090	0.6348	0.6480	0.6425	0.6209	0.5928	0.5681	0.5527	0.5470	0.5924
-47.5	0.5567	0.5694	0.5926	0.6229	0.6502	0.6639	0.6582	0.6354	0.6055	0.5783	0.5606	0.5538	0.6042
-52.5	0.5654	0.5799	0.6054	0.6376	0.6661	0.6804	0.6745	0.6508	0.6192	0.5898	0.5699	0.5621	0.6169
-57.5	0.5756	0.5915	0.6190	0.6531	0.6827	0.6973	0.6913	0.6669	0.6337	0.6023	0.5806	0.5718	0.6307
-62.5	0.5871	0.6043	0.6335	0.6691	0.6996	0.7145	0.7084	0.6833	0.6489	0.6158	0.5925	0.5831	0.6452
-67.5	0.6005	0.6181	0.6488	0.6857	0.7168	0.1215	0.5369	0.7002	0.6648	0.6302	0.6058	0.5968	0.5944
-72.5	0.6159	0.6331	0.6647	0.7026	0.2339	0.0	0.0	0.6466	0.6812	0.6454	0.6213	0.6112	0.5036
-77.5	0.6284	0.6498	0.6811	0.5486	0.0	0.0	0.0	0.2568	0.6980	0.6617	0.6362	0.6217	0.4466
-82.5	0.6366	0.6647	0.6980	0.2172	0.0	0.0	0.0	0.0	0.6418	0.6787	0.6463	0.6286	0.3991
-87.5	0.6406	0.6727	0.6203	0.0	0.0	0.0	0.0	0.0	0.3125	0.6913	0.6514	0.6320	0.3503

TABLE 7

AVERAGED ZONAL MONTHLY AND ANNUAL VALUES OF INTEPCEPT OF Ac

MATRIX ACCRST 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.3940	0.6860	0.6486	0.6316	0.6394	0.6702	0.6878	0.0	0.0	0.0	0.3636
82.5	0.0	0.0	0.6869	0.6747	0.6439	0.6282	0.6354	0.6626	0.6955	0.2796	0.0	0.0	0.4102
77.5	0.0	0.3237	0.6935	0.6581	0.6343	0.6214	0.6275	0.6482	0.6786	0.5988	0.0	0.0	0.4574
72.5	0.0	0.7141	0.6768	0.6417	0.6199	0.6110	0.6153	0.6316	0.6622	0.7000	0.2657	0.0	0.5100
67.5	0.5592	0.6970	0.6605	0.6265	0.6044	0.5967	0.5999	0.6166	0.6464	0.6831	0.7157	0.1411	0.5945
62.5	0.7070	0.6802	0.6448	0.6123	0.5911	0.5829	0.5865	0.6028	0.6313	0.6667	0.6985	0.7144	0.6431
57.5	0.6899	0.6638	0.6298	0.5990	0.5793	0.5716	0.5750	0.5902	0.6169	0.6507	0.6816	0.6972	0.6287
52.5	0.6732	0.6479	0.6155	0.5868	0.5688	0.5619	0.5649	0.5787	0.6033	0.6353	0.6652	0.6803	0.6151
47.5	0.6570	0.6327	0.6020	0.5756	0.5596	0.5537	0.5563	0.5684	0.5908	0.6207	0.6492	0.6638	0.6024
42.5	0.6414	0.6182	0.5896	0.5657	0.5518	0.5469	0.5490	0.5593	0.5793	0.6070	0.6339	0.6479	0.5908
37.5	0.6264	0.6046	0.5782	0.5570	0.5454	0.5416	0.5432	0.5515	0.5689	0.5941	0.6193	0.6326	0.5802
32.5	0.6123	0.5919	0.5680	0.5496	0.5404	0.5377	0.5388	0.5452	0.5598	0.5823	0.6056	0.6181	0.5708
27.5	0.5990	0.5803	0.5590	0.5436	0.5369	0.5354	0.5360	0.5402	0.5520	0.5716	0.5929	0.6045	0.5626
22.5	0.5869	0.5698	0.5513	0.5391	0.5349	0.5346	0.5346	0.5367	0.5455	0.5622	0.5812	0.5918	0.5557
17.5	0.5757	0.5606	0.5450	0.5360	0.5344	0.5353	0.5347	0.5347	0.5404	0.5540	0.5706	0.5802	0.5501
12.5	0.5658	0.5527	0.5400	0.5343	0.5354	0.5374	0.5364	0.5342	0.5368	0.5472	0.5613	0.5698	0.5459
7.5	0.5571	0.5461	0.5366	0.5342	0.5378	0.5411	0.5395	0.5352	0.5347	0.5417	0.5533	0.5606	0.5432
2.5	0.5498	0.5409	0.5346	0.5356	0.5418	0.5463	0.5441	0.5376	0.5340	0.5377	0.5466	0.5527	0.5418
-2.5	0.5436	0.5372	0.5340	0.5384	0.5472	0.5528	0.5501	0.5416	0.5348	0.5352	0.5413	0.5462	0.5419
-7.5	0.5393	0.5349	0.5350	0.5427	0.5540	0.5607	0.5575	0.5469	0.5371	0.5341	0.5375	0.5411	0.5434
-12.5	0.5362	0.5341	0.5375	0.5484	0.5621	0.5699	0.5663	0.5537	0.5409	0.5346	0.5352	0.5374	0.5464
-17.5	0.5347	0.5349	0.5414	0.5556	0.5716	0.5804	0.5762	0.5618	0.5461	0.5365	0.5343	0.5352	0.5508
-22.5	0.5346	0.5371	0.5469	0.5640	0.5822	0.5920	0.5874	0.5712	0.5528	0.5399	0.5350	0.5346	0.5565
-27.5	0.5361	0.5408	0.5535	0.5737	0.5940	0.6047	0.5997	0.5818	0.5607	0.5447	0.5371	0.5354	0.5636
-32.5	0.5390	0.5459	0.5616	0.5846	0.6069	0.6183	0.6130	0.5936	0.5700	0.5510	0.5408	0.5378	0.5719
-37.5	0.5434	0.5525	0.5710	0.5967	0.6207	0.6328	0.6272	0.6064	0.5805	0.5586	0.5459	0.5416	0.5815
-42.5	0.5493	0.5604	0.5816	0.6097	0.6353	0.6481	0.6422	0.6201	0.5921	0.5676	0.5524	0.5470	0.5922
-47.5	0.5567	0.5696	0.5933	0.6237	0.6507	0.6640	0.6579	0.6347	0.6047	0.5778	0.5603	0.5538	0.6040
-52.5	0.5654	0.5801	0.6061	0.6384	0.6667	0.6805	0.6741	0.6501	0.6184	0.5891	0.5696	0.5620	0.6168
-57.5	0.5755	0.5918	0.6198	0.6539	0.6832	0.6974	0.6909	0.6660	0.6328	0.6016	0.5802	0.5717	0.6305
-62.5	0.5870	0.6045	0.6344	0.6700	0.7002	0.7146	0.7079	0.6825	0.6481	0.6150	0.5921	0.5830	0.6450
-67.5	0.6004	0.6184	0.6497	0.6866	0.7174	0.0972	0.5601	0.6994	0.6639	0.6294	0.6054	0.5968	0.5945
-72.5	0.6158	0.6334	0.6656	0.7035	0.2106	0.0	0.0	0.6458	0.6803	0.6446	0.6209	0.6111	0.5019
-77.5	0.6283	0.6500	0.6820	0.5250	0.0	0.0	0.0	0.2800	0.6970	0.6610	0.6357	0.6216	0.4471
-82.5	0.6364	0.6650	0.6989	0.1931	0.0	0.0	0.0	0.0	0.6409	0.6778	0.6457	0.6285	0.3977
-87.5	0.6405	0.6731	0.5976	0.0	0.0	0.0	0.0	0.0	0.3364	0.6902	0.6506	0.6319	0.3511

$$A_{s_{dl}}(0,\mu_o(t)) = 0.35057 - 1.0933\,\mu_{dl}^1 + 1.6599\mu_{dl}^2 - 1.1897\mu^3_{dl} + 0.32105\mu^4_{dl} \quad (15)$$

and* $$A_c(0,\mu_o(t),\tau_c) = 0.73 - 0.25\,\mu^1_{o_{dl}} \quad (16)$$

with $A_c\,(0,1,3.35) = 0.2704$ in this section. The solar zenith angle 0_o is here measured in degrees. The μ_o independent terms of Eqs. 15 and 16 are identically equal to the Dave and Braslau values for $0_o = 0,$. The coefficients of Eqs. 15 and 16 were obtained by performing a least squares difference minimization fit of the polynomial to the tabular values of Dave and Braslau. The solar zenith angle dependent values of $A_s\,(\theta,\,_o)$ and $A_c\,(0,\mu_o,\,\tau_c)$ using Eqs. 15 and 16 are shown in Table A.

The slope functions m_s and m_c of Eqs. 1 and 2 are determined by using the above intercept values and making a best fit to the surface albedo dependent results of Dave and Braslau. The values obtained by this fitting procedure are shown in Table A for these three angles. The three angles for which this best fit is considered are $\theta_o = 0$, $\theta_o = 60$, $\theta_o = 80$. Refer NASA TM#78057 NACK and Curran, figure 7 on page 28.

*This expression is derived from asymptotic equation of Hc Van De Hulst for finite clouds

Table A

The Intercepts and Slopes of Linear Transformations

θ_o	$\cos\theta_o$	Intercept A_s	Intercept A_c	Slope m_s	Slope m_c
0	1.000	0.0483	0.1940	0.7213	0.5079
5	0.9962	0.0486	0.1952	0.7213	0.5037
10	0.9848	0.0494	0.1989	0.7213	0.4977
15	0.9659	0.0506	0.2050	0.7212	0.4900
20	0.9397	0.0523	0.2136	0.7209	0.4804
25	0.9063	0.0544	0.2247	0.7203	0.4691
30	0.8660	0.0568	0.2382	0.7192	0.4560
35	0.8192	0.0595	0.2541	0.7171	0.4411
40	0.7660	0.0628	0.2725	0.7137	0.4245
45	0.7071	0.0668	0.2933	0.7083	0.4060
50	0.6428	0.0722	0.3167	0.7000	0.3858
55	0.5736	0.0796	0.3424	0.6877	0.3638
60	0.5000	0.0903	0.3706	0.6700	0.3400
65	0.4226	0.1057	0.4013	0.6451	0.3144
70	0.3420	0.1280	0.4344	0.6108	0.2870
75	0.2588	0.1598	0.4700	0.5644	0.2579
80	0.1736	0.2046	0.5080	0.5025	0.2270
85	0.0872	0.2666	0.5485	0.4212	0.1943
90	0.0000	0.3509	0.5914	0.3157	0.1598

The functional relationships which were used to fit the μ_o dependence of the slope functions of these three angles are given by:

$$m_{s_{dl}}(\mu_o(t)) = 0.31876 + 1.2638\,\mu_{odl} - 1.3681\,\mu_{odl}^2 + 1.50833\,\mu_{dl}^3 \tag{17}$$

$$m_{c_{dl}}(\mu_o(t)) = 0.16326 + 0.3633\,\mu_{o_{dl}} - 0.02501\,\mu_{dl}^2 \tag{18}$$

Albedo Computations

utlilizing the equation (6), (7), (15), (16), (17), and (18)

$$A_{s_{dl}}(a,\mu_o(t)) = \frac{1}{2T_{dl}} \int_{-T_{dl}}^{+T_{dl}} \left[m_s(\mu_o) + A_s(0,\mu_o) \right] \frac{\mu_o(t)}{\mu(t)} dt \tag{19}$$

$$A_{c_{dl}}(a,\mu_{dl}(t),\ \tau_c) = \frac{1}{2T_{dl}} \int_{-T_{dl}}^{T_{dl}} \left[m_c(\mu_o) g(\tau_c) + A_{c_{dl}}(0,\mu_o,\tau_c) \right] \frac{\mu_o(t)}{\mu_o(t)}\ dt \tag{20}$$

The values of $A_{s_{ml}}$ and $A_{c_{ml}}$ can be derived as

$$A_{s_{ml}}(a,\mu_o(t)) = \frac{1}{n} \sum_{d=1}^{n} A_{s_{dl}}(a,\mu_o(t)) \tag{21}$$

$$A_{c_{ml}}(a,\mu_{dl}(t),\ \tau_c) = \frac{1}{n} \sum_{d=1}^{n} A_{c_{dl}}(a,2(t_c),\ \mu_o(t)) \tag{22}$$

using the cloud fraction of Curran et. al given on page A8

Monthly zonal averaged albedos have been derived as:

$$A_{ml}(A_s,A_c,\ \tau_c) = (1-f_{c_{ml}})\ A_{s_{ml}} + A_{c_{ml}} f_{c_{ml}} \tag{23}$$

Annual zonal average values A_{sl}, A_{cl} A_l of A_s, A_c, A can be derived as:

$$A_{sl} = \frac{1}{12} \sum_{m=1}^{12} A_{s_{ml}} \quad (24)$$

$$A_{c_l} = \frac{1}{12} \sum_{m=1}^{12} A_{c_{ml}} \quad (25)$$

$$A_l = \frac{1}{12} \sum_{m=1}^{12} A_{c_{ml}} \quad (26)$$

To compute the global, monthly and annual values of albedos A_s, A_c and A we use the weighting function $(\text{Sin } l_i - \text{Sin } (l_i+1))$ such that;

$$A_{s_{gm}} = \sum_{i=1}^{12} A_{sl}[\text{Sin}(l_i) - \text{Sin}(l_i+1)] \quad (27)$$

$$A_{c_{gm}} = \sum_{i=1}^{35} A_{c_{ml}}[(\text{Sin}(l)-\text{Sin}(l_i+1)] \quad (28)$$

$$A_{gm} = \sum_{i=1}^{35} A_g(m)[\text{Sin}(l_i)-\text{Sin}(l_i+1)] \quad (29)$$

The annual global values of A, A_s and A_c are

$$A_g = \frac{1}{12} \sum_{m=1}^{12} A_{gm} \quad (30)$$

$$A_{sg} = \frac{1}{12} \sum_{m=1}^{12} A_{sgm} \quad (31)$$

$$A_{cg} = \frac{1}{12} \sum_{m=1}^{12} A_{cgm} \quad (32)$$

Where

A_{sgm} - average monthly global values of A_s

A_{cgm} - average monthly global values of A_c

A_{gm} - average monthly global values of A

A_g - average annual global values of A

A_{sg} - average annual global values of A_s

A_{cg} - average annual global values of A_c

Conclusion

Thus it has been shown how the average zonal, albedos at the top of the atmosphere at any lattitude, for any day or month, can be computed. The average annual or northern global, southern global or global values of albedos can be derived.

This model of computations of albedos at the top of the atmosphere utilizes the solar zenith angle, properties of clear and cloudy atmospheres.

Equation 19, 20 compute the average daily zonal values of A_s and A_c. Equations 21, 22, 23 derive the average monthly zonal values of A_s, A_c and A. Equations 24, 25, 26 derive the average annual zonal values of A_s, A_c and A. Equations 27, 28, 29 compute the average monthly global values and equations 30, 31, 32 derive the annual global values of A, A_s and A_c.

The average annual global value of albedo of the year 1976 is 35.11%. This is approximately higher by 4% as given by Jacobwitze et al., as expected.

TABLE 8

AVERAGED ZONAL MONTHLY VALUES OF SLOPES OF ALBEDOS
THE TOP OF THE CLOUD FREE ATMOSPHERE

MATRII ASLOPE 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.2021	0.4942	0.5994	0.6343	0.6211	0.5493	0.4034	0.0	0.0	0.0	0.2934
82.5	0.0	0.0	0.3813	0.5276	0.6043	0.6353	0.6234	0.5640	0.4671	0.1499	0.0	0.0	0.3313
77.5	0.0	0.1524	0.4677	0.5702	0.6157	0.6383	0.6291	0.5927	0.5220	0.3423	0.0	0.0	0.3788
72.5	0.0	0.3898	0.5217	0.6044	0.6353	0.6454	0.6407	0.6225	0.5653	0.4514	0.1387	0.0	0.4344
67.5	0.2862	0.4584	0.5650	0.6295	0.6550	0.6596	0.6586	0.6439	0.5992	0.5087	0.3879	0.0633	0.5094
62.5	0.4229	0.5146	0.5990	0.6483	0.6677	0.6728	0.6710	0.6591	0.6253	0.5548	0.4571	0.3927	0.5739
57.5	0.4859	0.5596	0.6252	0.6622	0.6766	0.6805	0.6791	0.6701	0.6451	0.5911	0.5136	0.4611	0.6043
52.5	0.5369	0.5950	0.6450	0.6723	0.6829	0.6859	0.6848	0.6782	0.6598	0.6193	0.5589	0.5170	0.6281
47.5	0.5774	0.6223	0.6598	0.6798	0.6876	0.6899	0.6890	0.6841	0.6707	0.6407	0.5945	0.5617	0.6465
42.5	0.6089	0.6430	0.6707	0.6854	0.6911	0.6928	0.6922	0.6895	0.6787	0.6566	0.6220	0.5968	0.6606
37.5	0.6329	0.6584	0.6787	0.6895	0.6938	0.6950	0.6946	0.6919	0.6845	0.6684	0.6428	0.6238	0.6712
32.5	0.6510	0.6697	0.6846	0.6926	0.6957	0.6966	0.6963	0.6943	0.6889	0.6771	0.6563	0.6442	0.6791
27.5	0.6643	0.6780	0.6889	0.6949	0.6971	0.6975	0.6974	0.6962	0.6921	0.6834	0.6696	0.6593	0.6849
22.5	0.6740	0.6841	0.6922	0.6966	0.6979	0.6979	0.6980	0.6974	0.6946	0.6881	0.6779	0.6704	0.6891
17.5	0.6811	0.6886	0.6946	0.6977	0.6982	0.6978	0.6980	0.6982	0.6964	0.6915	0.6840	0.6785	0.6921
12.5	0.6863	0.6919	0.6964	0.6984	0.6980	0.6972	0.6975	0.6984	0.6977	0.6941	0.6885	0.6843	0.6941
7.5	0.6902	0.6944	0.6977	0.6985	0.6972	0.6960	0.6965	0.6981	0.6984	0.6960	0.6918	0.6887	0.6953
2.5	0.6930	0.6962	0.6984	0.6991	0.6959	0.6943	0.6950	0.6973	0.6986	0.6974	0.6943	0.6919	0.6958
-2.5	0.6951	0.6975	0.6986	0.6972	0.6940	0.6919	0.6928	0.6959	0.6983	0.6982	0.6961	0.6943	0.6958
-7.5	0.6967	0.6982	0.6983	0.6957	0.6915	0.6886	0.6899	0.6940	0.6975	0.6985	0.6973	0.6960	0.6952
-12.5	0.6976	0.6984	0.6974	0.6937	0.6881	0.6843	0.6860	0.6914	0.6961	0.6983	0.6980	0.6972	0.6938
-17.5	0.6981	0.6981	0.6961	0.6909	0.6835	0.6784	0.6806	0.6879	0.6942	0.6976	0.6982	0.6978	0.6917
-22.5	0.6980	0.6973	0.6942	0.6872	0.6773	0.6702	0.6733	0.6832	0.6916	0.6963	0.6979	0.6980	0.6887
-27.5	0.6974	0.6960	0.6915	0.6823	0.6687	0.6591	0.6633	0.6768	0.6882	0.6945	0.6970	0.6975	0.6843
-32.5	0.6962	0.6940	0.6881	0.6756	0.6570	0.6439	0.6497	0.6681	0.6836	0.6920	0.6956	0.6966	0.6783
-37.5	0.6945	0.6914	0.6834	0.6664	0.6411	0.6235	0.6312	0.6561	0.6773	0.6888	0.6936	0.6950	0.6701
-42.5	0.6920	0.6880	0.6772	0.6538	0.6197	0.5964	0.6066	0.6399	0.6688	0.6844	0.6909	0.6928	0.6590
-47.5	0.6888	0.6824	0.6687	0.6369	0.5915	0.5612	0.5744	0.6182	0.6572	0.6785	0.6873	0.6898	0.6444
-52.5	0.6845	0.6772	0.6571	0.6142	0.5550	0.5163	0.5331	0.5896	0.6415	0.6706	0.6825	0.6859	0.6253
-57.5	0.6787	0.6688	0.6414	0.5845	0.5086	0.4603	0.4811	0.5527	0.6205	0.6597	0.6760	0.6804	0.6007
-62.5	0.6705	0.6573	0.6204	0.5463	0.4509	0.3916	0.4171	0.5059	0.5928	0.6450	0.6670	0.6727	0.5693
-67.5	0.6581	0.6415	0.5927	0.4980	0.3805	0.0540	0.2592	0.4478	0.5570	0.6252	0.6541	0.6596	0.5018
-72.5	0.6398	0.6197	0.5570	0.4382	0.1104	0.0	0.0	0.3469	0.5117	0.5988	0.6342	0.6452	0.4239
-77.5	0.6269	0.5887	0.5117	0.2956	0.0	0.0	0.0	0.1239	0.4553	0.5635	0.6132	0.6380	0.3665
-82.5	0.6203	0.5567	0.4548	0.1045	0.0	0.0	0.0	0.0	0.3559	0.5185	0.6004	0.6349	0.3192
-87.5	0.6176	0.5395	0.3479	0.0	0.0	0.0	0.0	0.0	0.1565	0.4795	0.5948	0.6338	0.2797

TABLE 9

Averaged Zonal Monthly Values of Slopes of albedos At The Top of The Cloud Free Atmosphere

MATRIX ASLOPE 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.2045	0.4979	0.6010	0.6346	0.6202	0.5466	0.3887	0.0	0.0	0.0	0.2917
82.5	0.0	0.0	0.3956	0.5299	0.6057	0.6355	0.6226	0.5620	0.4640	0.1378	0.0	0.0	0.3304
77.5	0.0	0.1601	0.4712	0.5717	0.6166	0.6385	0.6285	0.5916	0.5193	0.3286	0.0	0.0	0.3778
72.5	0.0	0.3911	0.5245	0.6057	0.6357	0.6455	0.6404	0.6217	0.5632	0.4479	0.1267	0.0	0.4332
67.5	0.2753	0.4595	0.5672	0.6306	0.6553	0.6596	0.6585	0.6432	0.5975	0.5059	0.3851	0.0629	0.5080
62.5	0.4224	0.5154	0.6007	0.6491	0.6680	0.6728	0.6709	0.6586	0.6241	0.5525	0.4547	0.3922	0.5734
57.5	0.4854	0.5602	0.6265	0.6627	0.6767	0.6805	0.6790	0.6698	0.6441	0.5894	0.5117	0.4607	0.6039
52.5	0.5365	0.5955	0.6460	0.6728	0.6831	0.6859	0.6847	0.6779	0.6591	0.6179	0.5574	0.5167	0.6278
47.5	0.5771	0.6227	0.6605	0.6801	0.6877	0.6899	0.6890	0.6839	0.6702	0.6397	0.5934	0.5615	0.6463
42.5	0.6086	0.6433	0.6712	0.6856	0.6912	0.6928	0.6922	0.6884	0.6783	0.6559	0.6211	0.5966	0.6604
37.5	0.6328	0.6586	0.6791	0.6896	0.6938	0.6950	0.6945	0.6917	0.6843	0.6679	0.6421	0.6237	0.6711
32.5	0.6509	0.6699	0.6849	0.6927	0.6958	0.6966	0.6963	0.6942	0.6887	0.6767	0.6578	0.6441	0.6790
27.5	0.6642	0.6781	0.6892	0.6950	0.6971	0.6975	0.6974	0.6961	0.6920	0.6831	0.6693	0.6592	0.6848
22.5	0.6740	0.6842	0.6924	0.6967	0.6979	0.6979	0.6980	0.6974	0.6945	0.6878	0.6777	0.6703	0.6891
17.5	0.6811	0.6886	0.6948	0.6978	0.6982	0.6978	0.6980	0.6982	0.6962	0.6914	0.6838	0.6784	0.6920
12.5	0.6863	0.6919	0.6965	0.6984	0.6979	0.6972	0.6976	0.6984	0.6976	0.6940	0.6883	0.6843	0.6940
7.5	0.6901	0.6944	0.6977	0.6985	0.6972	0.6960	0.6966	0.6981	0.6983	0.6960	0.6917	0.6887	0.6953
2.5	0.6930	0.6962	0.6984	0.6980	0.6959	0.6942	0.6950	0.6973	0.6986	0.6973	0.6942	0.6919	0.6958
-2.5	0.6951	0.6975	0.6986	0.6971	0.6940	0.6918	0.6929	0.6960	0.6983	0.6982	0.6960	0.6943	0.6958
-7.5	0.6966	0.6982	0.6982	0.6956	0.6914	0.6886	0.6900	0.6941	0.6975	0.6985	0.6973	0.6960	0.6952
-12.5	0.6978	0.6984	0.6974	0.6935	0.6880	0.6842	0.6861	0.6915	0.6962	0.6983	0.6980	0.6972	0.6939
-17.5	0.6981	0.6981	0.6960	0.6907	0.6833	0.6783	0.6808	0.6881	0.6943	0.6976	0.6982	0.6978	0.6918
-22.5	0.6980	0.6973	0.6940	0.6870	0.6770	0.6702	0.6735	0.6834	0.6918	0.6964	0.6979	0.6980	0.6887
-27.5	0.6974	0.6959	0.6914	0.6820	0.6684	0.6590	0.6636	0.6771	0.6884	0.6946	0.6971	0.6975	0.6843
-32.5	0.6962	0.6940	0.6879	0.6752	0.6565	0.6438	0.6500	0.6685	0.6839	0.6922	0.6957	0.6966	0.6783
-37.5	0.6945	0.6914	0.6831	0.6658	0.6404	0.6233	0.6317	0.6567	0.6777	0.6890	0.6937	0.6950	0.6701
-42.5	0.6921	0.6879	0.6768	0.6531	0.6189	0.5962	0.6072	0.6408	0.6694	0.6847	0.6910	0.6928	0.6591
-47.5	0.6889	0.6833	0.6681	0.6358	0.5904	0.5609	0.5752	0.6193	0.6580	0.6789	0.6874	0.6899	0.6446
-52.5	0.6846	0.6771	0.6563	0.6129	0.5536	0.5160	0.5341	0.5911	0.6425	0.6710	0.6827	0.6859	0.6255
-57.5	0.6787	0.6686	0.6403	0.5827	0.5069	0.4599	0.4825	0.5546	0.6218	0.6604	0.6762	0.6805	0.6009
-62.5	0.6705	0.6570	0.6190	0.5440	0.4487	0.3912	0.4187	0.5083	0.5946	0.6459	0.6673	0.6727	0.5696
-67.5	0.6581	0.6412	0.5909	0.4951	0.3778	0.0431	0.2711	0.4507	0.5593	0.6263	0.6545	0.6596	0.5023
-72.5	0.6398	0.6193	0.5547	0.4347	0.0989	0.0	0.0	0.3501	0.5145	0.6003	0.6346	0.6453	0.4236
-77.5	0.6271	0.5882	0.5088	0.2817	0.0	0.0	0.0	0.1358	0.4588	0.5652	0.6141	0.6382	0.3673
-82.5	0.6206	0.5559	0.4514	0.0925	0.0	0.0	0.0	0.0	0.3596	0.5209	0.6019	0.6351	0.3192
-87.5	0.6180	0.5382	0.3338	0.0	0.0	0.0	0.0	0.0	0.1692	0.4833	0.5965	0.6341	0.2807

TABLE 10

AVERAGE MONTHLY ZONAL VALUES OF SLOPES OF ALBEDOS AT THE TOP CLOUDY ATMOSPHERE

NATRII ACLOPE 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0960	0.2265	0.2831	0.3099	0.2990	0.2531	0.1909	0.0	0.0	0.0	0.1390
82.5	0.0	0.0	0.1800	0.2438	0.2906	0.3153	0.3051	0.2644	0.2152	0.0734	0.0	0.0	0.1582
77.5	0.0	0.0747	0.2155	0.2690	0.3057	0.3261	0.3175	0.2860	0.2405	0.1630	0.0	0.0	0.1838
72.5	0.0	0.1860	0.2404	0.2939	0.3281	0.3425	0.3363	0.3114	0.2651	0.2087	0.0686	0.0	0.2150
67.5	0.1405	0.2112	0.2649	0.3172	0.3522	0.3648	0.3602	0.3346	0.2891	0.2337	0.1851	0.0320	0.2572
62.5	0.1971	0.2363	0.2889	0.3393	0.3730	0.3865	0.3812	0.3560	0.3123	0.2564	0.2104	0.1863	0.2941
57.5	0.2224	0.2610	0.3120	0.3601	0.3917	0.4043	0.3994	0.3758	0.3344	0.2826	0.2355	0.2116	0.3161
52.5	0.2473	0.2851	0.3342	0.3794	0.4084	0.4198	0.4153	0.3939	0.3553	0.3060	0.2602	0.2367	0.3370
47.5	0.2718	0.3084	0.3552	0.3971	0.4231	0.4330	0.4291	0.4102	0.3751	0.3284	0.2844	0.2615	0.3567
42.5	0.2957	0.3308	0.3748	0.4130	0.4357	0.4439	0.4407	0.4246	0.3931	0.3498	0.3078	0.2856	0.3748
37.5	0.3186	0.3520	0.3929	0.4270	0.4461	0.4525	0.4501	0.4369	0.4094	0.3698	0.3302	0.3090	0.3914
32.5	0.3405	0.3719	0.4092	0.4389	0.4542	0.4587	0.4571	0.4471	0.4239	0.3883	0.3515	0.3314	0.4062
27.5	0.3612	0.3902	0.4237	0.4487	0.4599	0.4625	0.4616	0.4549	0.4363	0.4051	0.3714	0.3526	0.4191
22.5	0.3804	0.4068	0.4361	0.4562	0.4632	0.4638	0.4638	0.4605	0.4466	0.4201	0.3897	0.3724	0.4301
17.5	0.3979	0.4216	0.4465	0.4613	0.4642	0.4627	0.4635	0.4636	0.4547	0.4331	0.4064	0.3907	0.4389
12.5	0.4137	0.4344	0.4545	0.4641	0.4626	0.4592	0.4609	0.4644	0.4604	0.4439	0.4212	0.4072	0.4456
7.5	0.4276	0.4450	0.4603	0.4644	0.4587	0.4532	0.4557	0.4627	0.4638	0.4526	0.4340	0.4219	0.4500
2.5	0.4393	0.4534	0.4637	0.4624	0.4523	0.4449	0.4482	0.4586	0.4647	0.4590	0.4447	0.4346	0.4521
-2.5	0.4489	0.4595	0.4646	0.4579	0.4437	0.4344	0.4384	0.4521	0.4632	0.4630	0.4531	0.4451	0.4519
-7.5	0.4562	0.4632	0.4632	0.4510	0.4328	0.4217	0.4265	0.4433	0.4593	0.4645	0.4592	0.4533	0.4494
-12.5	0.4611	0.4645	0.4594	0.4419	0.4198	0.4070	0.4124	0.4324	0.4531	0.4637	0.4629	0.4592	0.4447
-17.5	0.4637	0.4634	0.4531	0.4306	0.4049	0.3904	0.3965	0.4192	0.4445	0.4605	0.4642	0.4628	0.4377
-22.5	0.4637	0.4598	0.4446	0.4172	0.3880	0.3721	0.3788	0.4042	0.4338	0.4548	0.4631	0.4639	0.4285
-27.5	0.4614	0.4539	0.4339	0.4018	0.3695	0.3523	0.3595	0.3872	0.4209	0.4469	0.4595	0.4625	0.4172
-32.5	0.4566	0.4456	0.4210	0.3846	0.3494	0.3311	0.3387	0.3685	0.4060	0.4367	0.4535	0.4586	0.4040
-37.5	0.4494	0.4351	0.4062	0.3658	0.3281	0.3087	0.3167	0.3485	0.3893	0.4243	0.4452	0.4524	0.3889
-42.5	0.4399	0.4225	0.3895	0.3455	0.3055	0.2853	0.2937	0.3271	0.3709	0.4099	0.4346	0.4438	0.3721
-47.5	0.4281	0.4078	0.3711	0.3239	0.2821	0.2611	0.2698	0.3046	0.3509	0.3936	0.4219	0.4328	0.3537
-52.5	0.4142	0.3912	0.3512	0.3012	0.2578	0.2364	0.2452	0.2811	0.3297	0.3756	0.4070	0.4196	0.3339
-57.5	0.3981	0.3728	0.3299	0.2776	0.2330	0.2112	0.2202	0.2569	0.3073	0.3560	0.3902	0.4041	0.3128
-62.5	0.3799	0.3529	0.3075	0.2533	0.2079	0.1859	0.1949	0.2321	0.2839	0.3350	0.3714	0.3863	0.2906
-67.5	0.3599	0.3314	0.2842	0.2286	0.1826	0.0275	0.1279	0.2070	0.2599	0.3127	0.3505	0.3647	0.2527
-72.5	0.3349	0.3082	0.2601	0.2035	0.0549	0.0	0.0	0.1661	0.2352	0.2893	0.3264	0.3422	0.2095
-77.5	0.3154	0.2827	0.2355	0.1414	0.0	0.0	0.0	0.0612	0.2103	0.2645	0.3035	0.3257	0.1777
-82.5	0.3027	0.2600	0.2103	0.0516	0.0	0.0	0.0	0.0	0.1692	0.2391	0.2878	0.3149	0.1524
-87.5	0.2963	0.2478	0.1649	0.0	0.0	0.0	0.0	0.0	0.0763	0.2203	0.2800	0.3095	0.1325

TABLE 11

AVERAGE MONTHLY ZONAL VALUES OF THE SLOPES OF ALBEDOS AT THE TOP OF CLOUDY ATMOSPHERE

MATRIX ACLOPE 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0987	0.2281	0.2842	0.3101	0.2983	0.2516	0.1840	0.0	0.0	0.0	0.1382
82.5	0.0	0.0	0.1866	0.2450	0.2916	0.3155	0.3045	0.2632	0.2139	0.0676	0.0	0.0	0.1578
77.5	0.0	0.0784	0.2170	0.2700	0.3064	0.3262	0.3169	0.2851	0.2392	0.1565	0.0	0.0	0.1833
72.5	0.0	0.1864	0.2419	0.2950	0.3286	0.3426	0.3359	0.3105	0.2638	0.2073	0.0628	0.0	0.2144
67.5	0.1350	0.2117	0.2663	0.3183	0.3528	0.3649	0.3599	0.3337	0.2878	0.2324	0.1841	0.0319	0.2565
62.5	0.1969	0.2367	0.2902	0.3404	0.3736	0.3866	0.3809	0.3551	0.3110	0.2571	0.2095	0.1861	0.2938
57.5	0.2222	0.2614	0.3133	0.3611	0.3922	0.4044	0.3990	0.3750	0.3332	0.2813	0.2346	0.2114	0.3159
52.5	0.2471	0.2855	0.3354	0.3803	0.4089	0.4199	0.4150	0.3931	0.3543	0.3047	0.2593	0.2366	0.3368
47.5	0.2716	0.3088	0.3563	0.3979	0.4235	0.4330	0.4289	0.4095	0.3740	0.3272	0.2835	0.2613	0.3564
42.5	0.2955	0.3312	0.3759	0.4138	0.4360	0.4439	0.4405	0.4240	0.3921	0.3486	0.3069	0.2855	0.3746
37.5	0.3185	0.3524	0.3939	0.4277	0.4463	0.4525	0.4499	0.4364	0.4086	0.3687	0.3294	0.3088	0.3911
32.5	0.3404	0.3722	0.4101	0.4395	0.4544	0.4587	0.4569	0.4467	0.4231	0.3873	0.3507	0.3312	0.4060
27.5	0.3610	0.3905	0.4245	0.4491	0.4600	0.4625	0.4616	0.4546	0.4357	0.4042	0.3707	0.3524	0.4189
22.5	0.3802	0.4071	0.4368	0.4565	0.4633	0.4638	0.4638	0.4603	0.4461	0.4193	0.3891	0.3723	0.4299
17.5	0.3978	0.4218	0.4470	0.4615	0.4641	0.4627	0.4636	0.4636	0.4543	0.4324	0.4058	0.3906	0.4388
12.5	0.4136	0.4346	0.4549	0.4642	0.4625	0.4591	0.4609	0.4644	0.4601	0.4434	0.4207	0.4071	0.4455
7.5	0.4275	0.4452	0.4606	0.4644	0.4585	0.4532	0.4558	0.4628	0.4636	0.4522	0.4336	0.4218	0.4499
2.5	0.4392	0.4535	0.4638	0.4622	0.4521	0.4449	0.4484	0.4588	0.4647	0.4587	0.4443	0.4345	0.4521
-2.5	0.4488	0.4596	0.4646	0.4576	0.4434	0.4343	0.4387	0.4525	0.4634	0.4628	0.4528	0.4450	0.4519
-7.5	0.4561	0.4632	0.4630	0.4506	0.4324	0.4216	0.4265	0.4438	0.4596	0.4645	0.4590	0.4533	0.4494
-12.5	0.4611	0.4645	0.4591	0.4414	0.4194	0.4069	0.4128	0.4329	0.4535	0.4638	0.4628	0.4592	0.4447
-17.5	0.4636	0.4633	0.4527	0.4299	0.4043	0.3903	0.3969	0.4199	0.4451	0.4607	0.4642	0.4627	0.4377
-22.5	0.4637	0.4597	0.4441	0.4164	0.3874	0.3720	0.3792	0.4049	0.4344	0.4552	0.4631	0.4638	0.4286
-27.5	0.4614	0.4537	0.4332	0.4009	0.3698	0.3522	0.3599	0.3891	0.4217	0.4474	0.4596	0.4625	0.4173
-32.5	0.4566	0.4454	0.4202	0.3837	0.3487	0.3309	0.3392	0.3695	0.4069	0.4373	0.4538	0.4587	0.4041
-37.5	0.4495	0.4349	0.4052	0.3647	0.3273	0.3085	0.3172	0.3495	0.3903	0.4250	0.4455	0.4524	0.3891
-42.5	0.4400	0.4222	0.3884	0.3444	0.3047	0.2851	0.2942	0.3281	0.3719	0.4107	0.4350	0.4438	0.3723
-47.5	0.4282	0.4075	0.3700	0.3227	0.2812	0.2610	0.2703	0.3056	0.3521	0.3945	0.4223	0.4329	0.3539
-52.5	0.4143	0.3909	0.3500	0.3000	0.2570	0.2362	0.2458	0.2822	0.3309	0.3766	0.4075	0.4197	0.3341
-57.5	0.3982	0.3725	0.3287	0.2763	0.2322	0.2111	0.2208	0.2590	0.3086	0.3571	0.3907	0.4042	0.3131
-62.5	0.3800	0.3525	0.3062	0.2520	0.2070	0.1858	0.1955	0.2333	0.2853	0.3361	0.3720	0.3864	0.2909
-67.5	0.3590	0.3310	0.2828	0.2272	0.1817	0.0219	0.1337	0.2082	0.2612	0.3139	0.3511	0.3648	0.2530
-72.5	0.3350	0.3078	0.2587	0.2021	0.0493	0.0	0.0	0.1672	0.2367	0.2905	0.3271	0.3424	0.2094
-77.5	0.3156	0.2824	0.2341	0.1349	0.0	0.0	0.0	0.0669	0.2117	0.2657	0.3043	0.3259	0.1781
-82.5	0.3029	0.2596	0.2089	0.0458	0.0	0.0	0.0	0.0	0.1705	0.2403	0.2889	0.3151	0.1524
-87.5	0.2966	0.2472	0.1584	0.0	0.0	0.0	0.0	0.0	0.0824	0.2219	0.2812	0.3097	0.1330

TABLE 12

AVERAGE ZONAL VALUES OF ALBEDOS AT THE TOP OF THE CLOUD FREE ATMOSPHERE

MATRIX AS 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.3208	0.5805	0.5851	0.5899	0.5874	0.5817	0.5831	0.0	0.0	0.0	0.3203
82.5	0.0	0.0	0.5452	0.5818	0.5865	0.5832	0.5758	0.5610	0.5575	0.2442	0.0	0.0	0.3550
77.5	0.0	0.2511	0.5762	0.5729	0.5764	0.5652	0.5396	0.5036	0.4927	0.4604	0.0	0.0	0.3789
72.5	0.0	0.5564	0.5345	0.5208	0.5087	0.4761	0.4061	0.3779	0.3746	0.4998	0.2167	0.0	0.3709
67.5	0.4555	0.5532	0.5498	0.5397	0.4753	0.4025	0.2775	0.2635	0.2811	0.4843	0.5449	0.1102	0.4099
62.5	0.5434	0.5347	0.5207	0.4951	0.3806	0.2985	0.2321	0.2310	0.2456	0.4387	0.5074	0.5358	0.4129
57.5	0.4831	0.4600	0.4457	0.3895	0.2902	0.2203	0.1872	0.1857	0.1984	0.3375	0.4268	0.4742	0.3408
52.5	0.4421	0.4254	0.3725	0.3122	0.2259	0.1897	0.1768	0.1811	0.1910	0.2915	0.3818	0.4360	0.3015
47.5	0.4112	0.3899	0.3494	0.2889	0.2093	0.1663	0.1670	0.1706	0.1854	0.2581	0.3541	0.4033	0.2789
42.5	0.3256	0.3086	0.2055	0.1678	0.1586	0.1571	0.1577	0.1607	0.1673	0.1860	0.2282	0.2877	0.2089
37.5	0.2042	0.1852	0.1673	0.1600	0.1496	0.1485	0.1489	0.1513	0.1636	0.1732	0.1994	0.2149	0.1721
32.5	0.1889	0.1725	0.1636	0.1508	0.1480	0.1473	0.1476	0.1493	0.1537	0.1683	0.1787	0.1923	0.1634
27.5	0.1822	0.1678	0.1536	0.1489	0.1469	0.1465	0.1467	0.1478	0.1512	0.1576	0.1726	0.1848	0.1588
22.5	0.1624	0.1571	0.1442	0.1405	0.1393	0.1393	0.1393	0.1398	0.1422	0.1475	0.1611	0.1655	0.1482
17.5	0.1523	0.1471	0.1422	0.1396	0.1391	0.1394	0.1393	0.1392	0.1407	0.1448	0.1504	0.1540	0.1440
12.5	0.1419	0.1376	0.1338	0.1321	0.1324	0.1330	0.1327	0.1320	0.1327	0.1357	0.1403	0.1502	0.1362
7.5	0.1390	0.1355	0.1327	0.1320	0.1331	0.1341	0.1336	0.1323	0.1321	0.1341	0.1377	0.1470	0.1353
2.5	0.1367	0.1340	0.1321	0.1323	0.1342	0.1356	0.1350	0.1330	0.1319	0.1329	0.1356	0.1376	0.1342
-2.5	0.1348	0.1329	0.1319	0.1331	0.1358	0.1376	0.1369	0.1342	0.1322	0.1322	0.1341	0.1356	0.1343
-7.5	0.1335	0.1322	0.1322	0.1344	0.1379	0.1471	0.1392	0.1359	0.1329	0.1320	0.1330	0.1341	0.1354
-12.5	0.1257	0.1250	0.1259	0.1292	0.1337	0.1434	0.1353	0.1311	0.1271	0.1251	0.1253	0.1260	0.1294
-17.5	0.1322	0.1322	0.1341	0.1384	0.1507	0.1541	0.1526	0.1476	0.1357	0.1327	0.1321	0.1324	0.1396
-22.5	0.1323	0.1329	0.1357	0.1412	0.1547	0.1589	0.1571	0.1509	0.1378	0.1338	0.1324	0.1323	0.1417
-27.5	0.1328	0.1340	0.1378	0.1447	0.1598	0.1717	0.1694	0.1550	0.1404	0.1353	0.1331	0.1326	0.1456
-32.5	0.1267	0.1287	0.1336	0.1490	0.1662	0.1731	0.1701	0.1601	0.1437	0.1304	0.1273	0.1264	0.1447
-37.5	0.1212	0.1239	0.1370	0.1544	0.1810	0.1963	0.1861	0.1666	0.1478	0.1330	0.1220	0.1207	0.1493
-42.5	0.1163	0.1198	0.1343	0.1548	0.1921	0.2104	0.1990	0.1688	0.1462	0.1294	0.1173	0.1156	0.1505
-47.5	0.1258	0.1301	0.1463	0.1832	0.2249	0.2519	0.2452	0.1991	0.1595	0.1334	0.1271	0.1180	0.1706
-52.5	0.1291	0.1343	0.1530	0.1950	0.2442	0.2761	0.2669	0.2141	0.1690	0.1385	0.1306	0.1211	0.1812
-57.5	0.1400	0.1529	0.1745	0.2286	0.3009	0.3409	0.3396	0.3174	0.2849	0.2505	0.2026	0.1523	0.2409
-62.5	0.1653	0.1661	0.1981	0.2874	0.4003	0.4734	0.4983	0.4897	0.4733	0.4629	0.3808	0.2447	0.3543
-67.5	0.3698	0.2901	0.3430	0.4612	0.5385	0.0917	0.4248	0.5675	0.5664	0.5646	0.5539	0.4684	0.4381
-72.5	0.5535	0.5210	0.5442	0.5770	0.1894	0.0	0.0	0.5275	0.5811	0.5867	0.5912	0.5858	0.4374
-77.5	0.5772	0.5695	0.5812	0.4477	0.0	0.0	0.0	0.2081	0.5810	0.5838	0.5895	0.5907	0.3923
-82.5	0.5879	0.5932	0.5811	0.1760	0.0	0.0	0.0	0.0	0.5251	0.5815	0.5861	0.5895	0.3493
-87.5	0.5870	0.5813	0.5080	0.0	0.0	0.0	0.0	0.0	0.2537	0.5806	0.5847	0.5889	0.3058
AVG	0.19885	0.20397	0.20600	0.20460	0.19571	0.18557	0.18365	0.18725	0.18997	0.20244	0.20303	0.19628	0.19638

TABLE 13

AVERAGE ZONAL VALUES OF ALBEDOS AT THE TOP OF THE

CLOUD FREE ATMOSPHERE

MATRIX AS 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.3206	0.5805	0.5853	0.5890	0.5872	0.5816	0.5637	0.0	0.0	0.0	0.3178
82.5	0.0	0.0	0.5640	0.5819	0.5866	0.5832	0.5757	0.5610	0.5577	0.2254	0.0	0.0	0.3540
77.5	0.0	0.2626	0.5761	0.5730	0.5765	0.5652	0.5396	0.5036	0.4931	0.4435	0.0	0.0	0.3781
72.5	0.0	0.5563	0.5343	0.5208	0.5087	0.4761	0.4062	0.3780	0.3752	0.5005	0.1987	0.0	0.3700
67.5	0.4372	0.5531	0.5498	0.5398	0.4753	0.4025	0.2776	0.2637	0.2817	0.4848	0.5453	0.1102	0.4090
62.5	0.5435	0.5346	0.5207	0.4950	0.3805	0.2984	0.2322	0.2312	0.2461	0.4391	0.5079	0.5359	0.4134
57.5	0.4832	0.4599	0.4455	0.3884	0.2902	0.2203	0.1873	0.1859	0.1988	0.3381	0.4273	0.4743	0.3413
52.5	0.4421	0.4254	0.3723	0.3121	0.2258	0.1897	0.1768	0.1813	0.1914	0.2920	0.3822	0.4361	0.3019
47.5	0.4112	0.3898	0.3492	0.2888	0.2092	0.1663	0.1670	0.1707	0.1857	0.2585	0.3545	0.4034	0.2793
42.5	0.3257	0.3086	0.2052	0.1697	0.1585	0.1571	0.1577	0.1608	0.1676	0.1864	0.2286	0.2878	0.2092
37.5	0.2043	0.1851	0.1671	0.1599	0.1495	0.1485	0.1489	0.1513	0.1638	0.1735	0.1997	0.2150	0.1722
32.5	0.1890	0.1725	0.1634	0.1506	0.1480	0.1473	0.1476	0.1493	0.1538	0.1686	0.1789	0.1924	0.1635
27.5	0.1822	0.1677	0.1535	0.1488	0.1469	0.1465	0.1467	0.1478	0.1513	0.1578	0.1728	0.1848	0.1589
22.5	0.1635	0.1571	0.1441	0.1405	0.1393	0.1393	0.1393	0.1398	0.1423	0.1476	0.1612	0.1656	0.1483
17.5	0.1523	0.1471	0.1421	0.1395	0.1391	0.1394	0.1392	0.1392	0.1408	0.1449	0.1505	0.1540	0.1440
12.5	0.1419	0.1376	0.1337	0.1321	0.1324	0.1330	0.1327	0.1320	0.1328	0.1359	0.1404	0.1502	0.1362
7.5	0.1390	0.1355	0.1327	0.1320	0.1331	0.1341	0.1336	0.1323	0.1321	0.1342	0.1378	0.1471	0.1353
2.5	0.1367	0.1340	0.1321	0.1324	0.1342	0.1356	0.1349	0.1330	0.1319	0.1330	0.1357	0.1376	0.1343
-2.5	0.1349	0.1329	0.1319	0.1332	0.1359	0.1376	0.1368	0.1341	0.1322	0.1323	0.1341	0.1356	0.1343
-7.5	0.1335	0.1322	0.1322	0.1345	0.1380	0.1471	0.1391	0.1358	0.1328	0.1320	0.1330	0.1341	0.1354
-12.5	0.1257	0.1250	0.1260	0.1293	0.1338	0.1434	0.1352	0.1310	0.1270	0.1251	0.1254	0.1260	0.1294
-17.5	0.1322	0.1322	0.1341	0.1385	0.1508	0.1541	0.1525	0.1475	0.1355	0.1327	0.1321	0.1324	0.1396
-22.5	0.1323	0.1329	0.1358	0.1414	0.1549	0.1589	0.1570	0.1507	0.1376	0.1337	0.1324	0.1323	0.1417
-27.5	0.1328	0.1341	0.1379	0.1449	0.1599	0.1717	0.1692	0.1548	0.1403	0.1352	0.1330	0.1326	0.1456
-32.5	0.1287	0.1287	0.1338	0.1492	0.1664	0.1732	0.1699	0.1598	0.1435	0.1303	0.1272	0.1264	0.1446
-37.5	0.1212	0.1240	0.1372	0.1547	0.1814	0.1964	0.1859	0.1663	0.1476	0.1329	0.1219	0.1207	0.1492
-42.5	0.1163	0.1198	0.1346	0.1552	0.1925	0.2105	0.1986	0.1684	0.1459	0.1292	0.1172	0.1156	0.1504
-47.5	0.1258	0.1301	0.1467	0.1839	0.2254	0.2521	0.2448	0.1985	0.1591	0.1332	0.1270	0.1180	0.1705
-52.5	0.1290	0.1344	0.1534	0.1958	0.2450	0.2763	0.2663	0.2133	0.1675	0.1382	0.1305	0.1211	0.1810
-57.5	0.1399	0.1531	0.1751	0.2295	0.3019	0.3411	0.3390	0.3166	0.2844	0.2502	0.2025	0.1523	0.2407
-62.5	0.1653	0.1662	0.1988	0.2885	0.4012	0.4735	0.4979	0.4893	0.4732	0.4628	0.3807	0.2447	0.3540
-67.5	0.3698	0.2902	0.3436	0.4619	0.5390	0.0734	0.4432	0.5674	0.5665	0.5647	0.5539	0.4684	0.4379
-72.5	0.5535	0.5210	0.5442	0.5771	0.1705	0.0	0.0	0.5273	0.5812	0.5869	0.5912	0.5858	0.4361
-77.5	0.5772	0.5684	0.5811	0.4282	0.0	0.0	0.0	0.2270	0.5809	0.5839	0.5886	0.5907	0.3928
-82.5	0.5890	0.5832	0.5812	0.1565	0.0	0.0	0.0	0.0	0.5249	0.5815	0.5862	0.5895	0.3483
-87.5	0.5870	0.5813	0.4892	0.0	0.0	0.0	0.0	0.0	0.2732	0.5806	0.5849	0.5889	0.3066
AVG	0.19857	0.20407	0.20611	0.20443	0.19560	0.18530	0.18386	0.18732	0.18998	0.20226	0.20290	0.19631	0.19635

AVERAGE ZONAL VALUES OF ALBEDOS AT THE TOP OF THE

CLOUD FREE ATMOSPHERE
1975-1976

Figure 2

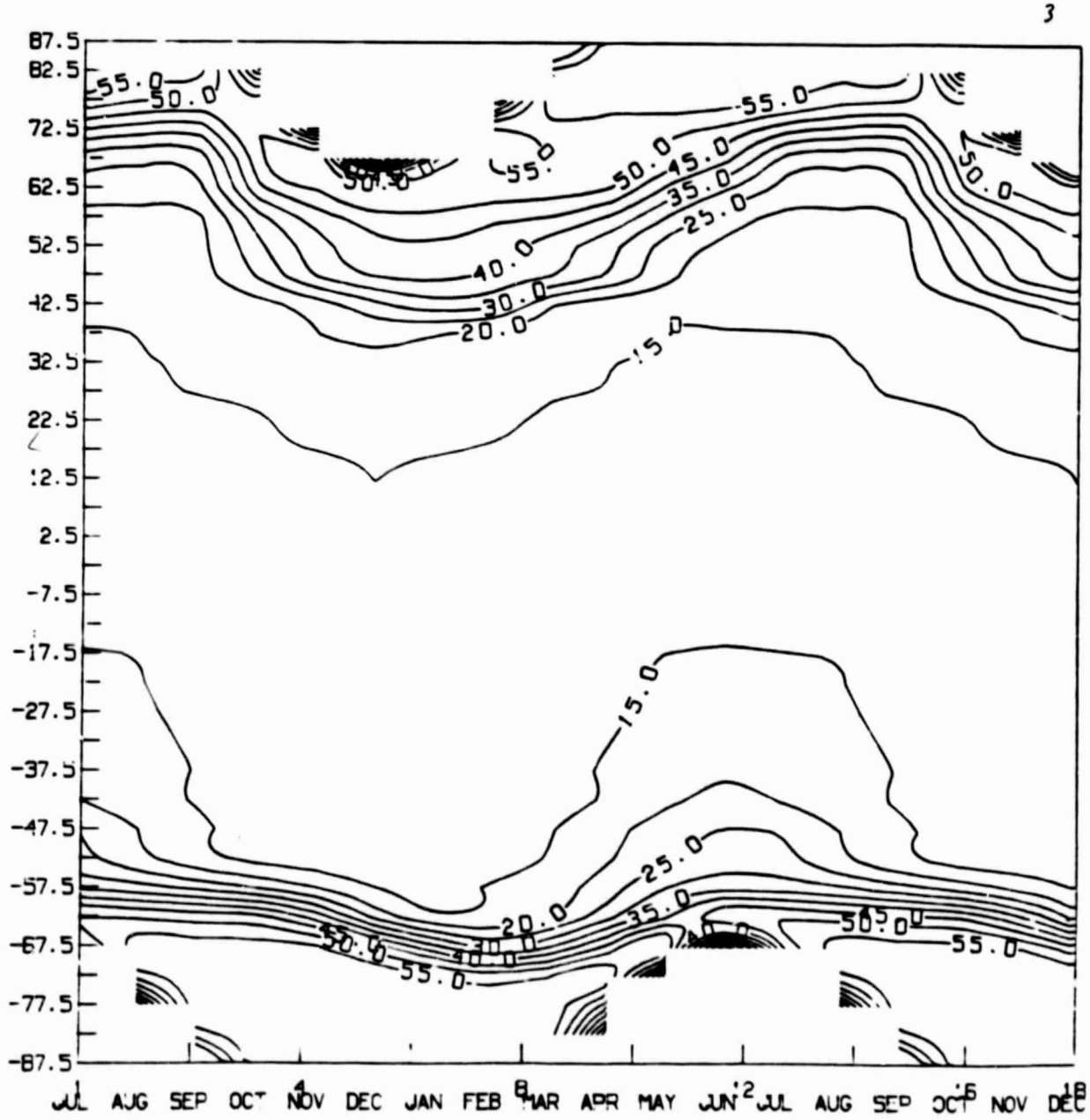


TABLE 14

AVERAGE MONTHLY AND ANNUAL VALUES OF ALBEDOS AT THE TOP OF CLOUDY ATMOSPHERE

MATRIX AC 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.4256	0.7588	0.7391	0.7299	0.7336	0.7495	0.7716	0.0	0.0	0.0	0.4107
82.5	0.0	0.0	0.7213	0.7528	0.7366	0.7269	0.7291	0.7411	0.7583	0.3257	0.0	0.0	0.4603
77.5	0.0	0.3333	0.7618	0.7418	0.7291	0.7193	0.7170	0.7213	0.7366	0.6636	0.0	0.0	0.5113
72.5	0.0	0.7679	0.7448	0.7219	0.7062	0.6935	0.6804	0.6850	0.7039	0.7493	0.3077	0.0	0.5612
67.5	0.6236	0.7589	0.7387	0.7170	0.6896	0.6676	0.6407	0.6499	0.6749	0.7375	0.7659	0.1503	0.6497
62.5	0.7618	0.7464	0.7238	0.6990	0.6592	0.6335	0.6201	0.6324	0.6568	0.7193	0.7503	0.7638	0.6969
57.5	0.7415	0.7225	0.6992	0.6666	0.6292	0.6058	0.6001	0.6119	0.6359	0.6892	0.7258	0.7435	0.6723
52.5	0.7243	0.7060	0.6741	0.6403	0.6053	0.5903	0.5893	0.6015	0.6236	0.6694	0.7074	0.7272	0.6546
47.5	0.7086	0.6890	0.6598	0.6265	0.5938	0.5775	0.5797	0.5905	0.6123	0.6519	0.6919	0.7112	0.6408
42.5	0.6812	0.6618	0.6172	0.5888	0.5741	0.5694	0.5712	0.5804	0.5986	0.6254	0.6554	0.6780	0.6166
37.5	0.6451	0.6241	0.5987	0.5790	0.5663	0.5626	0.5640	0.5715	0.5891	0.6122	0.6383	0.6521	0.6002
32.5	0.6308	0.6110	0.5893	0.5704	0.5616	0.5591	0.5600	0.5657	0.5790	0.6014	0.6229	0.6362	0.5905
27.5	0.6187	0.6003	0.5791	0.5648	0.5584	0.5569	0.5574	0.5612	0.5719	0.5899	0.6112	0.6238	0.5827
22.5	0.6044	0.5889	0.5701	0.5585	0.5545	0.5542	0.5542	0.5561	0.5640	0.5795	0.5989	0.6091	0.5743
17.5	0.5924	0.5786	0.5641	0.5556	0.5540	0.5548	0.5543	0.5542	0.5594	0.5719	0.5874	0.5967	0.5686
12.5	0.5814	0.5693	0.5576	0.5520	0.5529	0.5549	0.5539	0.5519	0.5542	0.5637	0.5770	0.5869	0.5630
7.5	0.5733	0.5631	0.5542	0.5518	0.5552	0.5583	0.5569	0.5526	0.5522	0.5587	0.5695	0.5784	0.5604
2.5	0.5684	0.5582	0.5523	0.5530	0.5589	0.5631	0.5613	0.5552	0.5517	0.5550	0.5633	0.5692	0.5590
-2.5	0.5608	0.5547	0.5517	0.5556	0.5639	0.5693	0.5669	0.5590	0.5525	0.5527	0.5584	0.5631	0.5591
-7.5	0.5566	0.5525	0.5525	0.5596	0.5702	0.5785	0.5739	0.5641	0.5548	0.5518	0.5549	0.5583	0.5607
-12.5	0.5518	0.5498	0.5528	0.5630	0.5760	0.5854	0.5804	0.5687	0.5565	0.5503	0.5508	0.5529	0.5616
-17.5	0.5523	0.5524	0.5584	0.5715	0.5883	0.5969	0.5932	0.5799	0.5634	0.5541	0.5520	0.5528	0.5680
-22.5	0.5522	0.5545	0.5633	0.5794	0.5983	0.6076	0.6037	0.5888	0.5697	0.5574	0.5526	0.5522	0.5734
-27.5	0.5536	0.5579	0.5696	0.5885	0.6092	0.6210	0.6167	0.5987	0.5772	0.5620	0.5547	0.5530	0.5803
-32.5	0.5545	0.5609	0.5754	0.5987	0.6212	0.6322	0.6276	0.6097	0.5860	0.5661	0.5563	0.5533	0.5869
-37.5	0.5569	0.5652	0.5842	0.6099	0.6354	0.6484	0.6422	0.6217	0.5959	0.5734	0.5592	0.5550	0.5958
-42.5	0.5605	0.5709	0.5925	0.6207	0.6490	0.6625	0.6562	0.6332	0.6053	0.5802	0.5637	0.5582	0.6046
-47.5	0.5694	0.5815	0.6052	0.6380	0.6668	0.6816	0.6765	0.6509	0.6188	0.5900	0.5731	0.5648	0.6182
-52.5	0.5777	0.5915	0.6172	0.6516	0.6814	0.6964	0.6911	0.6651	0.6317	0.6009	0.5820	0.5727	0.6301
-57.5	0.5890	0.6057	0.6330	0.6695	0.7023	0.7178	0.7145	0.6961	0.6674	0.6369	0.6095	0.5889	0.6527
-62.5	0.6048	0.6192	0.6491	0.6916	0.7303	0.7514	0.7536	0.7392	0.7161	0.6936	0.6600	0.6206	0.6861
-67.5	0.6626	0.6573	0.6896	0.7349	0.7654	0.1288	0.5753	0.7632	0.7439	0.7240	0.7080	0.6831	0.6538
-72.5	0.7136	0.7164	0.7394	0.7662	0.2513	0.0	0.0	0.6992	0.7557	0.7371	0.7248	0.7182	0.5674
-77.5	0.7257	0.7358	0.7557	0.5934	0.0	0.0	0.0	0.2762	0.7646	0.7456	0.7324	0.7249	0.5024
-82.5	0.7325	0.7471	0.7646	0.2335	0.0	0.0	0.0	0.0	0.6954	0.7544	0.7376	0.7284	0.4474
-87.5	0.7345	0.7513	0.6725	0.0	0.0	0.0	0.0	0.0	0.3367	0.7610	0.7401	0.7301	0.3923
AVG	0.58515	0.59566	0.60138	0.59858	0.58909	0.57761	0.58214	0.59163	0.59792	0.59857	0.59034	0.57941	0.59056

Assuming Ac $(0,1,\tau) = 0.48$ from Eq. (16).

AVERAGE MONTHLY AND ANNUAL VALUES OF ALBEDOS AT THE TOP OF CLOUDY ATMOSPHERE

TABLE 15

MATRIX AC 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.4253	0.7583	0.7387	0.7299	0.7339	0.7500	0.7461	0.0	0.0	0.0	0.4074
82.5	0.0	0.0	0.7460	0.7524	0.7363	0.7269	0.7293	0.7416	0.7588	0.3007	0.0	0.0	0.4590
77.5	0.0	0.3485	0.7613	0.7414	0.7288	0.7193	0.7172	0.7217	0.7372	0.6392	0.0	0.0	0.5100
72.5	0.0	0.7677	0.7442	0.7215	0.7060	0.6935	0.6806	0.6854	0.7046	0.7499	0.2821	0.0	0.5597
67.5	0.5986	0.7587	0.7382	0.7166	0.6893	0.6676	0.6409	0.6504	0.6756	0.7381	0.7663	0.1504	0.6480
62.5	0.7619	0.7462	0.7233	0.6986	0.6589	0.6335	0.6203	0.6328	0.6575	0.7199	0.7507	0.7639	0.6972
57.5	0.7416	0.7223	0.6986	0.6661	0.6290	0.6058	0.6003	0.6124	0.6366	0.6899	0.7262	0.7436	0.6726
52.5	0.7244	0.7058	0.6736	0.6398	0.6050	0.5903	0.5895	0.6019	0.6243	0.6701	0.7079	0.7273	0.6549
47.5	0.7086	0.6888	0.6592	0.6261	0.5936	0.5775	0.5798	0.5908	0.6129	0.6525	0.6923	0.7113	0.6410
42.5	0.6813	0.6616	0.6166	0.5884	0.5739	0.5694	0.5713	0.5808	0.5992	0.6261	0.6559	0.6781	0.6168
37.5	0.6452	0.6239	0.5982	0.5787	0.5661	0.5626	0.5641	0.5718	0.5896	0.6128	0.6388	0.6522	0.6003
32.5	0.6309	0.6108	0.5889	0.5700	0.5615	0.5590	0.5601	0.5659	0.5795	0.6020	0.6234	0.6363	0.5907
27.5	0.6188	0.6001	0.5787	0.5645	0.5583	0.5569	0.5574	0.5614	0.5722	0.5904	0.6117	0.6238	0.5828
22.5	0.6045	0.5888	0.5697	0.5584	0.5545	0.5542	0.5542	0.5562	0.5643	0.5799	0.5993	0.6091	0.5744
17.5	0.5925	0.5784	0.5638	0.5555	0.5540	0.5548	0.5543	0.5543	0.5596	0.5723	0.5878	0.5967	0.5687
12.5	0.5815	0.5692	0.5573	0.5520	0.5529	0.5549	0.5539	0.5518	0.5543	0.5640	0.5773	0.5870	0.5630
7.5	0.5733	0.5630	0.5541	0.5519	0.5553	0.5584	0.5568	0.5528	0.5523	0.5589	0.5698	0.5784	0.5604
2.5	0.5665	0.5591	0.5522	0.5531	0.5590	0.5632	0.5611	0.5551	0.5517	0.5552	0.5635	0.5692	0.5590
-2.5	0.5609	0.5546	0.5517	0.5558	0.5641	0.5693	0.5668	0.5588	0.5524	0.5528	0.5586	0.5631	0.5591
-7.5	0.5566	0.5525	0.5526	0.5598	0.5704	0.5785	0.5737	0.5639	0.5546	0.5518	0.5550	0.5583	0.5607
-12.5	0.5518	0.5498	0.5530	0.5634	0.5763	0.5854	0.5802	0.5683	0.5562	0.5502	0.5508	0.5529	0.5616
-17.5	0.5523	0.5525	0.5586	0.5719	0.5887	0.5969	0.5930	0.5796	0.5631	0.5540	0.5520	0.5528	0.5680
-22.5	0.5522	0.5546	0.5637	0.5799	0.5991	0.6077	0.6034	0.5893	0.5693	0.5572	0.5526	0.5522	0.5734
-27.5	0.5536	0.5580	0.5700	0.5890	0.6096	0.6210	0.6164	0.5982	0.5769	0.5617	0.5546	0.5530	0.5802
-32.5	0.5544	0.5610	0.5758	0.5992	0.6216	0.6323	0.6273	0.6092	0.5855	0.5658	0.5561	0.5533	0.5869
-37.5	0.5567	0.5653	0.5847	0.6105	0.6359	0.6485	0.6419	0.6212	0.5953	0.5730	0.5591	0.5550	0.5957
-42.5	0.5605	0.5711	0.5931	0.6213	0.6495	0.6626	0.6559	0.6326	0.6047	0.5797	0.5634	0.5582	0.6045
-47.5	0.5693	0.5817	0.6058	0.6387	0.6673	0.6817	0.6761	0.6502	0.6181	0.5894	0.5728	0.5647	0.6181
-52.5	0.5776	0.5917	0.6179	0.6524	0.6819	0.6965	0.6907	0.6644	0.6310	0.6003	0.5817	0.5727	0.6300
-57.5	0.5899	0.6059	0.6337	0.6703	0.7029	0.7179	0.7142	0.6955	0.6667	0.6363	0.6083	0.5888	0.6525
-62.5	0.6047	0.6194	0.6499	0.6924	0.7308	0.7515	0.7534	0.7387	0.7156	0.6931	0.6597	0.6205	0.6859
-67.5	0.6626	0.6575	0.6903	0.7355	0.7657	0.1031	0.6002	0.7627	0.7434	0.7236	0.7078	0.6831	0.6538
-72.5	0.7135	0.7166	0.7399	0.7667	0.2263	0.0	0.0	0.6989	0.7553	0.7367	0.7246	0.7182	0.5656
-77.5	0.7256	0.7359	0.7562	0.5677	0.0	0.0	0.0	0.3012	0.7641	0.7452	0.7321	0.7249	0.5030
-82.5	0.7324	0.7473	0.7651	0.2076	0.0	0.0	0.0	0.0	0.6949	0.7540	0.7372	0.7283	0.4460
-87.5	0.7345	0.7515	0.6478	0.0	0.0	0.0	0.0	0.0	0.3625	0.7605	0.7397	0.7300	0.3932
AVG	0.58476	0.59578	0.60148	0.59831	0.58889	0.57721	0.58246	0.59175	0.59790	0.59808	0.59013	0.57944	0.59048

Assuming Ac $(0,1,\tau) = 0.48$ from Eq. (16).

AVERAGE MONTHLY AND ANNUAL VALUES OF ALBEDOS AT THE TOP OF

CLOUDY ATMOSPHERE

1975-1976

Figure 3

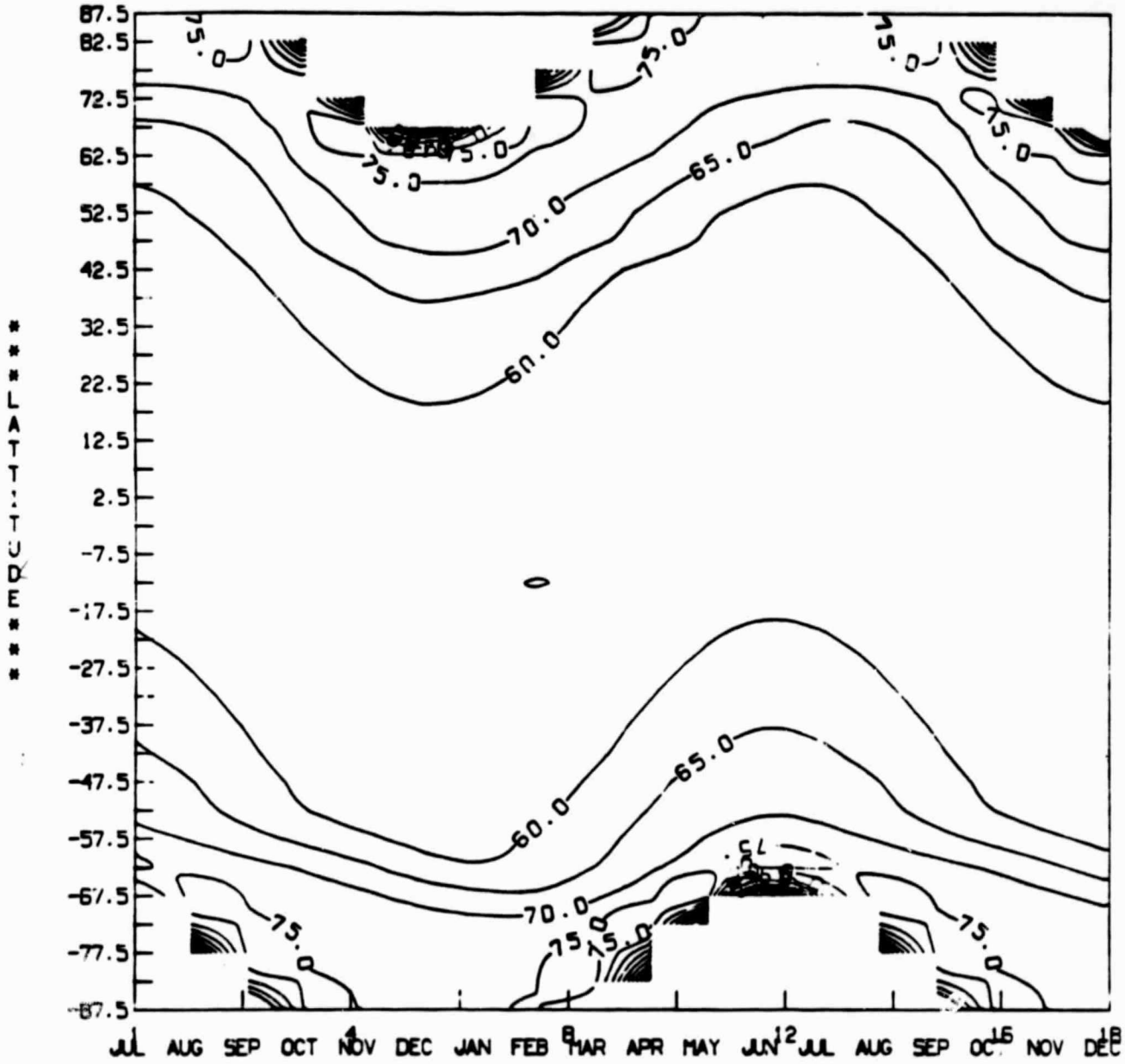


TABLE 16

AVERAGE MONTHLY, ZONAL AND GLOBAL VALUES OF
ALBEDOS AT THE TOP OF THE ATMOSPHERE

MATRIX ALBDO 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
87.5	0.0	0.0	0.0	0.0	0.0	0.0	0.6093	0.6069	0.6359	0.0	0.0	0.0
82.5	0.0	0.0	0.0	0.0	0.0	0.0	0.6003	0.5791	0.6278	0.2719	0.0	0.0
77.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5609	0.5334	0.6025	0.5234	0.0	0.0
72.5	0.0	0.0	0.0	0.0	0.0	0.0	0.4939	0.4792	0.5557	0.5871	0.2422	0.0
67.5	0.0	0.0	0.0	0.0	0.0	0.0	0.4446	0.4335	0.5016	0.5603	0.6112	0.1306
62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.4067	0.4116	0.4635	0.5229	0.5657	0.5792
57.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3854	0.3945	0.4040	0.4641	0.5254	0.5577
52.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3707	0.3787	0.3814	0.4238	0.4893	0.5204
47.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3485	0.3511	0.3604	0.3841	0.4487	0.4865
42.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3272	0.3244	0.3312	0.3486	0.4034	0.4360
37.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3025	0.2984	0.3040	0.3181	0.3662	0.3985
32.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2878	0.2867	0.2813	0.2939	0.3297	0.3654
27.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2863	0.2842	0.3110	0.2700	0.2998	0.3340
22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2845	0.2896	0.2646	0.2641	0.2793	0.3030
17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2887	0.3011	0.2789	0.2687	0.2596	0.2780
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2886	0.2958	0.2986	0.2727	0.2582	0.2681
7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2775	0.2795	0.2833	0.2742	0.2586	0.2678
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2629	0.2639	0.2704	0.2680	0.2597	0.2671
-2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2487	0.2446	0.2583	0.2584	0.2529	0.2638
-7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2435	0.2429	0.2594	0.2537	0.2553	0.2656
-12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2466	0.2405	0.2645	0.2527	0.2530	0.2669
-17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2672	0.2600	0.2811	0.2634	0.2581	0.2669
-22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2911	0.2823	0.3019	0.2778	0.2627	0.2667
-27.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3170	0.3059	0.3195	0.2975	0.2764	0.2797
-32.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3440	0.3399	0.3472	0.3221	0.3032	0.2972
-37.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3777	0.3669	0.3719	0.3576	0.3406	0.3292
-42.5	0.0	0.0	0.0	0.0	0.0	0.0	0.4184	0.4010	0.4033	0.3909	0.3762	0.3635
-47.5	0.0	0.0	0.0	0.0	0.0	0.0	0.4545	0.4521	0.4489	0.4439	0.4170	0.4039
-52.5	0.0	0.0	0.0	0.0	0.0	0.0	0.4833	0.5072	0.5065	0.5038	0.4691	0.4553
-57.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5271	0.5560	0.5718	0.5750	0.5315	0.5146
-62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.6081	0.6095	0.6311	0.6359	0.5957	0.5830
-67.5	0.0	0.0	0.0	0.0	0.0	0.0	0.4865	0.6614	0.6658	0.6746	0.6510	0.6423
-72.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6082	0.6789	0.6890	0.6793	0.6772
-77.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2408	0.6820	0.6889	0.6763	0.6726
-82.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6120	0.6835	0.6649	0.6576
-87.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3010	0.6961	0.6655	0.6553
* AVG	0.0	0.0	0.0	0.0	0.0	0.0	0.32815	0.34060	0.33971	0.35618	0.34853	0.34744

*Average monthly global value of albedo

TABLE 17

AVERAGED MONTHLY ANNUAL, ZONAL AND GLOBAL VALUES OF

ALBEDOS AT THE TOP OF THE ATMOSPHERE

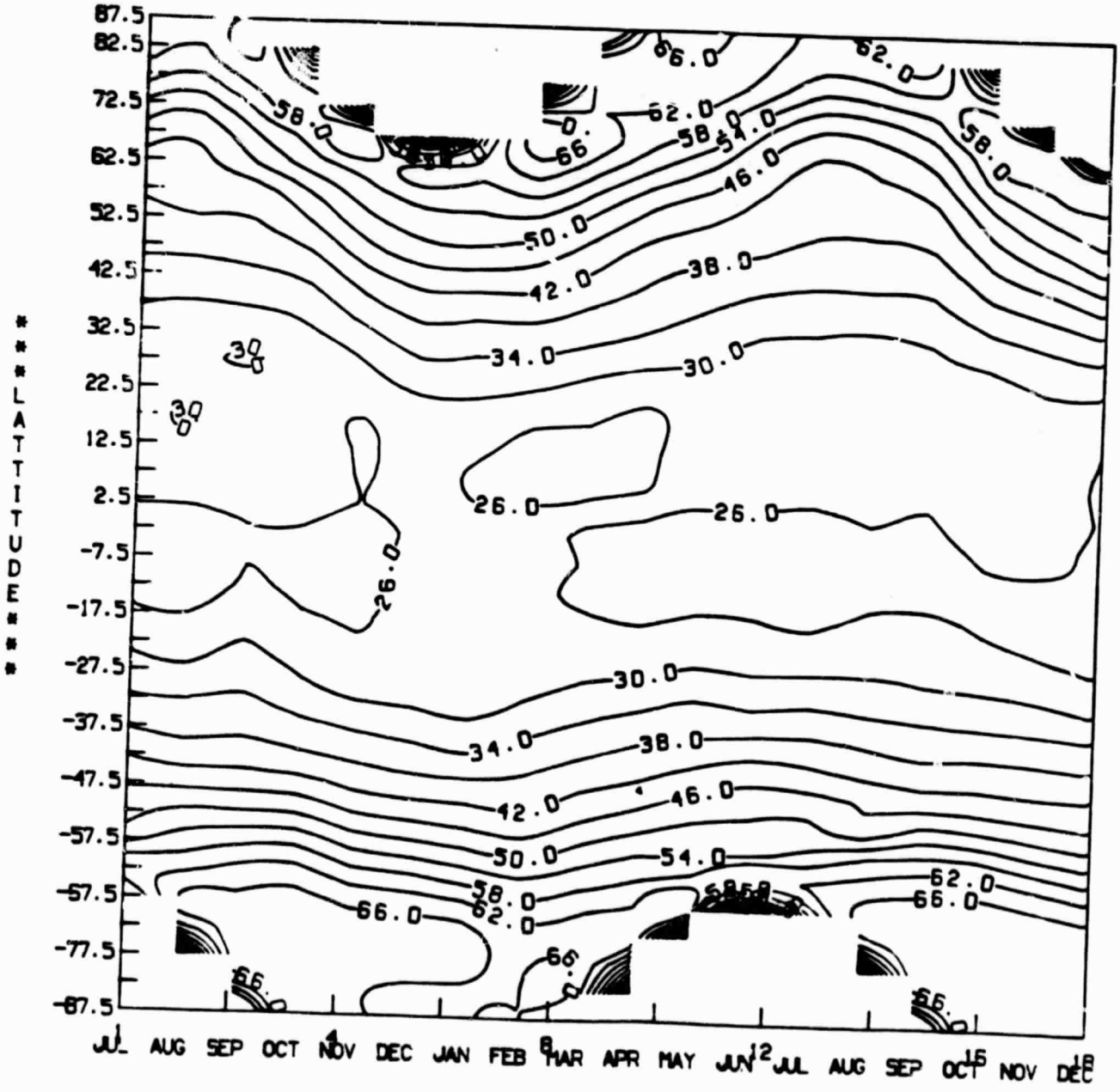
MATRIX ALBDO 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.3614	0.6640	0.6691	0.6341	0.6107	0.6355	0.6184	0.0	0.0	0.0	0.3498
82.5	0.0	0.0	0.6277	0.6535	0.6569	0.6234	0.5942	0.6062	0.6180	0.2465	0.0	0.0	0.3867
77.5	0.0	0.2893	0.6409	0.6421	0.6420	0.5976	0.5467	0.5647	0.5809	0.5061	0.0	0.0	0.4178
72.5	0.0	0.6240	0.6204	0.6151	0.6015	0.5305	0.4830	0.4979	0.5366	0.5978	0.2287	0.0	0.4433
67.5	0.5292	0.6827	0.6421	0.5858	0.5481	0.4741	0.4338	0.4494	0.4905	0.5836	0.6160	0.1231	0.5119
62.5	0.5894	0.6404	0.5896	0.5357	0.4919	0.4392	0.4029	0.4200	0.4518	0.5542	0.5929	0.6180	0.5268
57.5	0.5581	0.5806	0.5290	0.4745	0.4460	0.4130	0.3896	0.3991	0.4177	0.5034	0.5558	0.5847	0.4874
52.5	0.5268	0.5235	0.4777	0.4366	0.4154	0.3980	0.3831	0.3832	0.3949	0.4621	0.5158	0.5525	0.4556
47.5	0.4915	0.4765	0.4391	0.4001	0.3860	0.3760	0.3610	0.3640	0.3694	0.4240	0.4693	0.5173	0.4228
42.5	0.4395	0.4356	0.4068	0.3790	0.3621	0.3468	0.3397	0.3414	0.3445	0.3887	0.4166	0.4595	0.3883
37.5	0.3939	0.3957	0.3740	0.3567	0.3370	0.3183	0.3108	0.3111	0.3213	0.3536	0.3754	0.4030	0.3541
32.5	0.3614	0.3609	0.3463	0.3310	0.3134	0.2955	0.2961	0.2910	0.2985	0.3202	0.3389	0.3566	0.3257
27.5	0.3307	0.3277	0.3109	0.2985	0.2950	0.2820	0.2904	0.2802	0.2902	0.2919	0.3132	0.3165	0.3022
22.5	0.3046	0.2952	0.2803	0.2658	0.2722	0.2720	0.2803	0.2730	0.2816	0.2730	0.2883	0.2898	0.2813
17.5	0.2800	0.2635	0.2602	0.2518	0.2760	0.2765	0.2845	0.2845	0.2790	0.2731	0.2729	0.2647	0.2723
12.5	0.2650	0.2498	0.2523	0.2538	0.2796	0.2765	0.2843	0.2874	0.2719	0.2729	0.2715	0.2594	0.2688
7.5	0.2563	0.2467	0.2549	0.2580	0.2724	0.2699	0.2733	0.2752	0.2666	0.2828	0.2760	0.2549	0.2656
2.5	0.2613	0.2612	0.2623	0.2628	0.2574	0.2596	0.2543	0.2638	0.2578	0.2808	0.2726	0.2585	0.2627
-2.5	0.2669	0.2636	0.2579	0.2515	0.2429	0.2499	0.2400	0.2530	0.2498	0.2668	0.2657	0.2553	0.2552
-7.5	0.2689	0.2667	0.2583	0.2451	0.2418	0.2464	0.2348	0.2471	0.2467	0.2579	0.2596	0.2571	0.2525
-12.5	0.2663	0.2652	0.2541	0.2422	0.2489	0.2495	0.2376	0.2534	0.2558	0.2527	0.2530	0.2498	0.2523
-17.5	0.2667	0.2667	0.2657	0.2599	0.2690	0.2649	0.2592	0.2728	0.2724	0.2591	0.2539	0.2501	0.2633
-22.5	0.2625	0.2679	0.2770	0.2773	0.2880	0.2801	0.2820	0.2864	0.2887	0.2735	0.2626	0.2541	0.2750
-27.5	0.2674	0.2825	0.2978	0.3047	0.3173	0.3110	0.3123	0.3100	0.3018	0.2973	0.2890	0.2713	0.2969
-32.5	0.2850	0.3060	0.3239	0.3382	0.3531	0.3430	0.3483	0.3396	0.3336	0.3263	0.3202	0.3057	0.3269
-37.5	0.3172	0.3358	0.3565	0.3735	0.3813	0.3863	0.3865	0.3755	0.3625	0.3617	0.3580	0.3509	0.3622
-42.5	0.3517	0.3680	0.3868	0.4023	0.4210	0.4365	0.4272	0.4098	0.3982	0.3995	0.3939	0.3856	0.3984
-47.5	0.4008	0.3965	0.4222	0.4385	0.4641	0.4755	0.4734	0.4560	0.4437	0.4389	0.4302	0.4262	0.4390
-52.5	0.4431	0.4316	0.4600	0.4834	0.5028	0.5074	0.5125	0.4749	0.5104	0.4986	0.4824	0.4643	0.4810
-57.5	0.4991	0.4791	0.5099	0.5336	0.5344	0.5370	0.5491	0.5790	0.5864	0.5784	0.5474	0.5233	0.5382
-62.5	0.5807	0.5378	0.5597	0.5793	0.5957	0.6125	0.6205	0.6340	0.6477	0.6448	0.6206	0.5905	0.6005
-67.5	0.6275	0.5877	0.6071	0.6233	0.6524	0.0879	0.5170	0.6709	0.6797	0.6822	0.6724	0.6530	0.5892
-72.5	0.6735	0.6344	0.6460	0.6586	0.1939	0.0	0.0	0.6182	0.6926	0.6933	0.6926	0.6864	0.5152
-77.5	0.6707	0.6505	0.6599	0.4826	0.0	0.0	0.0	0.2693	0.6927	0.6887	0.6862	0.6806	0.4556
-82.5	0.6573	0.6554	0.6529	0.1795	0.0	0.0	0.0	0.0	0.6116	0.6798	0.6708	0.6631	0.3965
-87.5	0.6534	0.6630	0.5558	0.0	0.0	0.0	0.0	0.0	0.3214	0.6921	0.6700	0.6595	0.3507
* AVG	0.35037	0.36229	0.36632	0.35556	0.34591	0.32701	0.32970	0.34477	0.35656	0.36695	0.36054	0.34845	0.35114

*Average monthly global value of albedo

Average annual global albedo = 35.11%

AVERAGED MONTHLY, ZONAL AND GLOBAL VALUES OF
OF ALBEDOS AT THE TOP OF THE ATMOSPHERE
1975-1976
Figure 4



ALBEDOS AT THE TOP OF THE ATMOSPHERE

NORTHERN GLOBAL AVERAGES (1975)

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0.0	0.0	0.0	0.0	0.0	0.0	0.32597	0.32735	0.33567	0.33594	0.33645	0.33532

SOUTHERN GLOBAL AVERAGES

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0.0	0.0	0.0	0.0	0.0	0.0	0.33034	0.35384	0.38375	0.37642	0.36061	0.35955

ALBEDOS AT THE TOP OF THE ATMOSPHERE

NORTHERN GLOBAL AVERAGES (1976)

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
0.34758	0.37194	0.37035	0.35410	0.34897	0.33322	0.32659	0.32900	0.33474	0.35551	0.35020	0.33647	0.34645

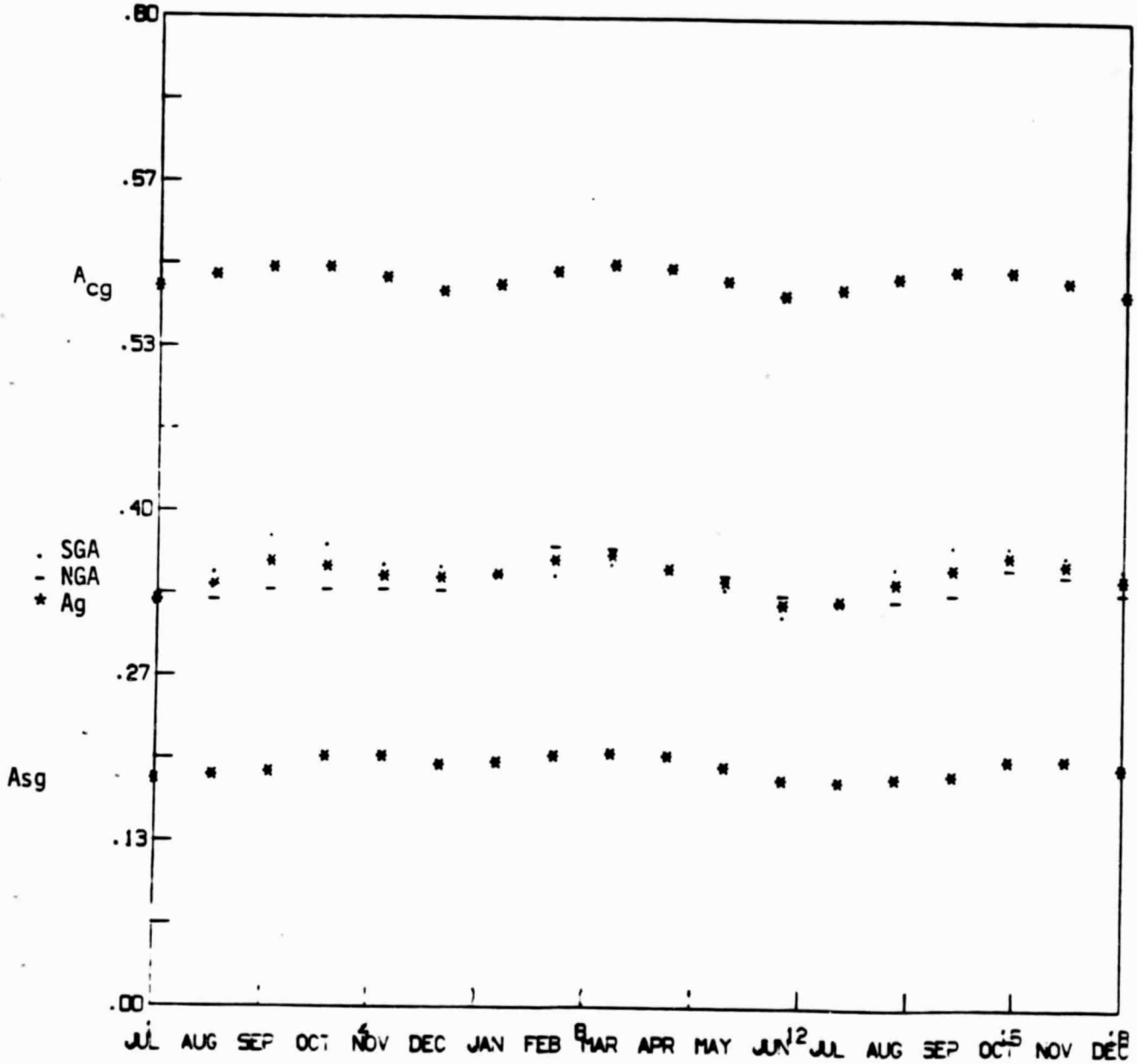
SOUTHERN GLOBAL AVERAGES

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
0.35317	0.35264	0.36229	0.35701	0.34284	0.32090	0.33281	0.36054	0.37838	0.37820	0.37098	0.36044	0.35584

AVERAGE ANNUAL, GLOBAL ALBEDOS (1976) = 35.11%

1975-1976

Figure 5



Acg = Average Monthly Global Albedos of Cloudy Atmosphere
A_{sg} = Average Monthyl Global Albedo of Cloud Free Atmosphere
SGA = Average Monthly Global albedo of Southern hemisphere
NGA = Average Monthly Global albedo of Northern Hemisphere
Ag = Average Monthly Global albedo.

AVERAGE MONTHLY ZONAL VALUES OF SURFACE ALBEDOS
1975-1976

Figure 6

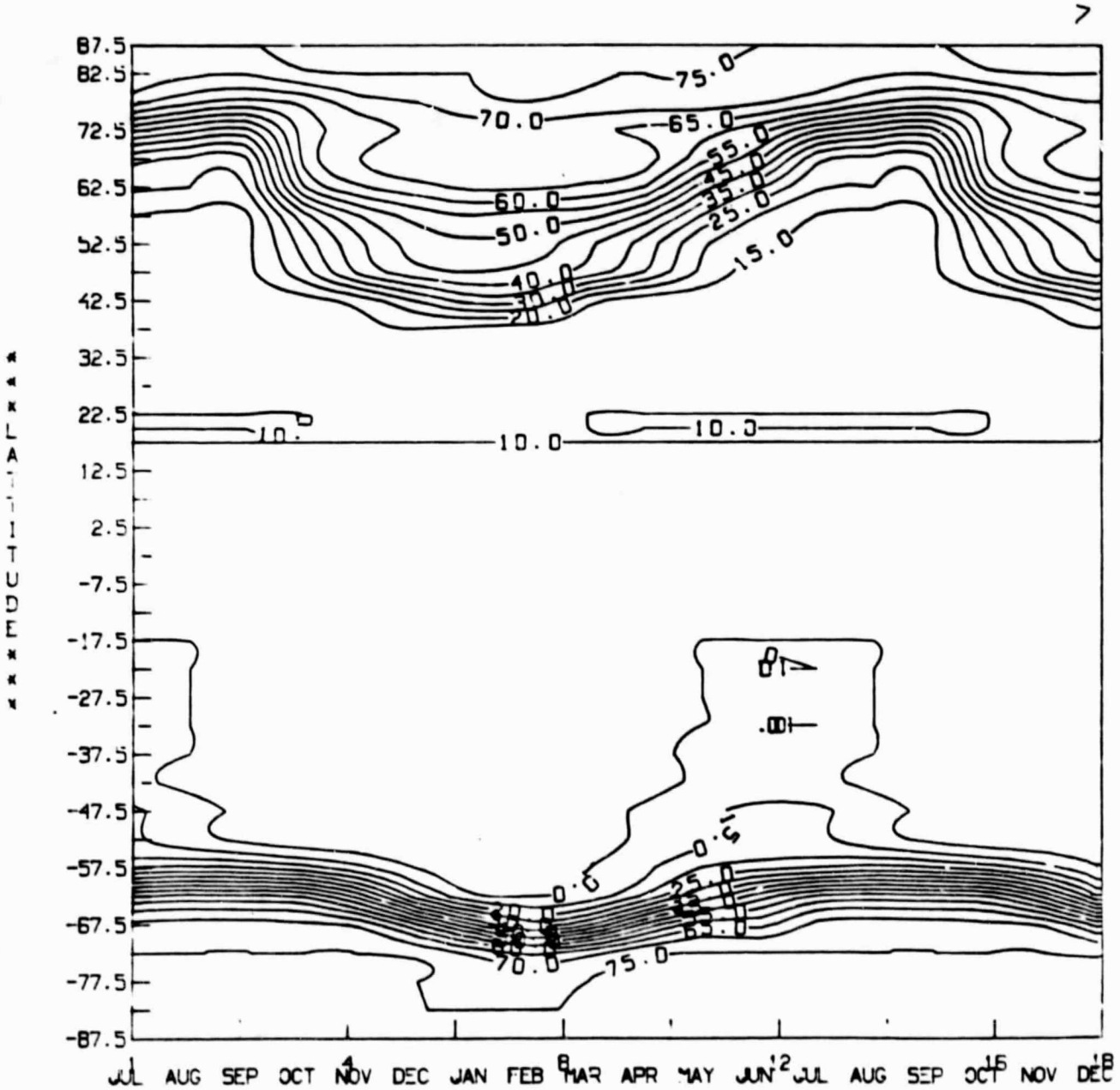


TABLE 19

AVERAGE MONTHLY ZONAL VALUES OF μ_o^1

MATRIX MUY1 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0231	0.1717	0.3226	0.3930	0.3644	0.2429	0.0755	0.0	0.0	0.0	0.1336
82.5	0.0	0.0	0.0744	0.2179	0.3419	0.4066	0.3801	0.2726	0.1414	0.0136	0.0	0.0	0.1549
77.5	0.0	0.0131	0.1422	0.2847	0.3808	0.4340	0.4117	0.3295	0.2093	0.0569	0.0	0.0	0.1895
72.5	0.0	0.0621	0.2090	0.3502	0.4388	0.4759	0.4599	0.3957	0.2747	0.1238	0.0092	0.0	0.2342
67.5	0.0242	0.1306	0.2741	0.4110	0.5010	0.5331	0.5214	0.4560	0.3378	0.1912	0.0598	0.0012	0.2875
62.5	0.0925	0.1980	0.3371	0.4680	0.5542	0.5883	0.5750	0.5109	0.3982	0.2569	0.1295	0.0630	0.3483
57.5	0.1608	0.2637	0.3976	0.5213	0.6016	0.6334	0.6209	0.5613	0.4556	0.3206	0.1960	0.1318	0.4060
52.5	0.2276	0.3272	0.4550	0.5706	0.6437	0.6722	0.6611	0.6072	0.5096	0.3819	0.2618	0.1993	0.4604
47.5	0.2925	0.3882	0.5089	0.6153	0.6805	0.7051	0.6956	0.6483	0.5596	0.4402	0.3255	0.2651	0.5110
42.5	0.3551	0.4463	0.5589	0.6554	0.7119	0.7323	0.7245	0.6843	0.6053	0.4951	0.3867	0.3288	0.5575
37.5	0.4149	0.5008	0.6047	0.6904	0.7378	0.7537	0.7477	0.7150	0.6465	0.5462	0.4448	0.3899	0.5998
32.5	0.4714	0.5516	0.6459	0.7202	0.7578	0.7690	0.7650	0.7403	0.6827	0.5932	0.4995	0.4479	0.6374
27.5	0.5243	0.5981	0.6822	0.7444	0.7721	0.7784	0.7764	0.7598	0.7137	0.6356	0.5503	0.5024	0.6701
22.5	0.5732	0.6400	0.7132	0.7629	0.7803	0.7818	0.7817	0.7736	0.7393	0.6731	0.5969	0.5530	0.6976
17.5	0.6176	0.6770	0.7389	0.7757	0.7826	0.7790	0.7810	0.7814	0.7592	0.7056	0.6389	0.5993	0.7198
12.5	0.6573	0.7089	0.7589	0.7825	0.7788	0.7703	0.7743	0.7832	0.7734	0.7326	0.6760	0.6410	0.7365
7.5	0.6919	0.7353	0.7731	0.7833	0.7691	0.7556	0.7617	0.7790	0.7817	0.7541	0.7079	0.6778	0.7475
2.5	0.7212	0.7561	0.7815	0.7782	0.7535	0.7351	0.7431	0.7689	0.7840	0.7698	0.7344	0.7094	0.7528
-2.5	0.7450	0.7711	0.7839	0.7671	0.7321	0.7090	0.7189	0.7529	0.7804	0.7797	0.7553	0.7354	0.7524
-7.5	0.7630	0.7803	0.7809	0.7502	0.7050	0.6773	0.6891	0.7312	0.7708	0.7836	0.7704	0.7559	0.7462
-12.5	0.7752	0.7835	0.7708	0.7276	0.6726	0.6405	0.6541	0.7038	0.7553	0.7815	0.7795	0.7705	0.7343
-17.5	0.7814	0.7807	0.7554	0.6994	0.6350	0.5987	0.6140	0.6711	0.7341	0.7735	0.7827	0.7791	0.7167
-22.5	0.7815	0.7719	0.7343	0.6659	0.5926	0.5523	0.5692	0.6333	0.7073	0.7596	0.7799	0.7818	0.6937
-27.5	0.7757	0.7572	0.7076	0.6273	0.5455	0.5016	0.5200	0.5906	0.6751	0.7399	0.7710	0.7784	0.6653
-32.5	0.7639	0.7368	0.6755	0.5939	0.4943	0.4471	0.4667	0.5433	0.6378	0.7145	0.7563	0.7689	0.6318
-37.5	0.7461	0.7107	0.6392	0.5360	0.4393	0.3890	0.4099	0.4920	0.5956	0.6837	0.7357	0.7534	0.5935
-42.5	0.7225	0.6791	0.5961	0.4841	0.3808	0.3279	0.3498	0.4369	0.5489	0.6477	0.7093	0.7320	0.5506
-47.5	0.6931	0.6422	0.5494	0.4284	0.3194	0.2642	0.2870	0.3782	0.4980	0.6066	0.6775	0.7048	0.5033
-52.5	0.6580	0.6004	0.4986	0.3694	0.2554	0.1984	0.2219	0.3168	0.4433	0.5610	0.6402	0.6717	0.4522
-57.5	0.6177	0.5539	0.4439	0.3076	0.1894	0.1308	0.1549	0.2528	0.3853	0.5110	0.5977	0.6329	0.3973
-62.5	0.5716	0.5029	0.3859	0.2434	0.1217	0.0620	0.0866	0.1868	0.3242	0.4570	0.5500	0.5878	0.3391
-67.5	0.5181	0.4476	0.3249	0.1773	0.0529	0.0007	0.0187	0.1192	0.2607	0.3994	0.4967	0.5327	0.2782
-72.5	0.4563	0.3875	0.2614	0.1096	0.0061	0.0	0.0	0.0511	0.1952	0.3383	0.4347	0.4752	0.2254
-77.5	0.4062	0.3209	0.1957	0.0443	0.0	0.0	0.0	0.0089	0.1281	0.2730	0.3751	0.4331	0.1815
-82.5	0.3736	0.2611	0.1280	0.0073	0.0	0.0	0.0	0.0	0.0609	0.2053	0.3346	0.4055	0.1476
-87.5	0.3574	0.2290	0.0621	0.0	0.0	0.0	0.0	0.0	0.0154	0.1550	0.3145	0.3919	0.1268

TABLE 20
AVERAGE MONTHLY ZONAL VALUES OF μ_o^2
MATRIX MUY2 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0014	0.0329	0.1061	0.1553	0.1342	0.0620	0.0083	0.0	0.0	0.0	0.0419
82.5	0.0	0.0	0.0084	0.0540	0.1249	0.1722	0.1519	0.0825	0.0238	0.0006	0.0	0.0	0.0518
77.5	0.0	0.0006	0.0242	0.0906	0.1619	0.2055	0.1867	0.1219	0.0495	0.0055	0.0	0.0	0.0709
72.5	0.0	0.0057	0.0494	0.1352	0.2154	0.2542	0.2377	0.1732	0.0836	0.0186	0.0003	0.0	0.0983
67.5	0.0011	0.0198	0.0833	0.1850	0.2765	0.3168	0.3010	0.2280	0.1253	0.0414	0.0048	0.0000	0.1325
62.5	0.0097	0.0436	0.1247	0.2390	0.3363	0.3804	0.3627	0.2850	0.1732	0.0731	0.0187	0.0043	0.1716
57.5	0.0283	0.0762	0.1725	0.2959	0.3949	0.4388	0.4212	0.3432	0.2261	0.1126	0.0422	0.0187	0.2149
52.5	0.0562	0.1166	0.2252	0.3537	0.4511	0.4928	0.4762	0.4009	0.2821	0.1589	0.0746	0.0428	0.2617
47.5	0.0926	0.1636	0.2812	0.4109	0.5035	0.5413	0.5264	0.4564	0.3397	0.2105	0.1149	0.0757	0.3104
42.5	0.1362	0.2157	0.3387	0.4657	0.5504	0.5830	0.5703	0.5090	0.3971	0.2658	0.1618	0.1164	0.3598
37.5	0.1859	0.2714	0.3961	0.5164	0.5904	0.6167	0.6067	0.5542	0.4526	0.3231	0.2139	0.1638	0.4083
32.5	0.2399	0.3290	0.4516	0.5616	0.6226	0.6416	0.6346	0.5937	0.5044	0.3807	0.2696	0.2162	0.4544
27.5	0.2968	0.3866	0.5034	0.5997	0.6457	0.6568	0.6532	0.6251	0.5511	0.4369	0.3272	0.2721	0.4967
22.5	0.3547	0.4426	0.5501	0.6298	0.6593	0.6620	0.6618	0.6476	0.5911	0.4899	0.3849	0.3299	0.5340
17.5	0.4119	0.4953	0.5902	0.6507	0.6628	0.6570	0.6603	0.6605	0.6232	0.5382	0.4410	0.3876	0.5652
12.5	0.4666	0.5430	0.6225	0.6621	0.6562	0.6420	0.6487	0.6634	0.6466	0.5802	0.4938	0.4437	0.5892
7.5	0.5172	0.5843	0.6460	0.6634	0.6397	0.6175	0.6274	0.6562	0.6604	0.6146	0.5416	0.4962	0.6054
2.5	0.5621	0.6179	0.6600	0.6546	0.6137	0.5942	0.5970	0.6391	0.6643	0.6406	0.5830	0.5437	0.6132
-2.5	0.5999	0.6428	0.6641	0.6360	0.5792	0.5431	0.5585	0.6127	0.6581	0.6571	0.6167	0.5847	0.6125
-7.5	0.6296	0.6583	0.6581	0.6083	0.5371	0.4955	0.5131	0.5778	0.6421	0.6638	0.6418	0.6179	0.6032
-12.5	0.6501	0.6638	0.6422	0.5721	0.4887	0.4429	0.4620	0.5353	0.6166	0.6604	0.6573	0.6423	0.5957
-17.5	0.6609	0.6593	0.6170	0.5287	0.4356	0.3869	0.4070	0.4867	0.5926	0.6471	0.6630	0.6572	0.5804
-22.5	0.6615	0.6448	0.5831	0.4793	0.3792	0.3291	0.3497	0.4334	0.5410	0.6242	0.6585	0.6620	0.5582
-27.5	0.6520	0.6208	0.5417	0.4255	0.3215	0.2713	0.2918	0.3771	0.4930	0.5925	0.6440	0.6567	0.4899
-32.5	0.6327	0.5880	0.4939	0.3698	0.2640	0.2154	0.2351	0.3193	0.4402	0.5528	0.6199	0.6413	0.4469
-37.5	0.6041	0.5474	0.4412	0.3111	0.2085	0.1630	0.1813	0.2620	0.3842	0.5064	0.5870	0.6163	0.4003
-42.5	0.5670	0.5002	0.3852	0.2540	0.1569	0.1158	0.1321	0.2068	0.3266	0.4548	0.5462	0.5825	0.3516
-47.5	0.5226	0.4478	0.3277	0.1993	0.1106	0.0751	0.0890	0.1554	0.2692	0.3994	0.4988	0.5407	0.3022
-52.5	0.4721	0.3919	0.2703	0.1486	0.0710	0.0423	0.0533	0.1094	0.2137	0.3420	0.4461	0.4921	0.2537
-57.5	0.4168	0.3341	0.2148	0.1036	0.0394	0.0184	0.0262	0.0702	0.1619	0.2843	0.3897	0.4381	0.2075
-62.5	0.3583	0.2760	0.1629	0.0656	0.0169	0.0042	0.0085	0.0390	0.1153	0.2280	0.3311	0.3797	0.1649
-67.5	0.2970	0.2195	0.1162	0.0357	0.0039	0.0000	0.0007	0.0169	0.0753	0.1748	0.2715	0.3162	0.1269
-72.5	0.2339	0.1658	0.0761	0.0148	0.0002	0.0	0.0	0.0043	0.0431	0.1263	0.2111	0.2535	0.0938
-77.5	0.1924	0.1155	0.0438	0.0037	0.0	0.0	0.0	0.0003	0.0198	0.0835	0.1574	0.2048	0.0675
-82.5	0.1472	0.0761	0.0201	0.0003	0.0	0.0	0.0	0.0	0.0060	0.0483	0.1200	0.1714	0.0491
-87.5	0.1293	0.0554	0.0063	0.0	0.0	0.0	0.0	0.0	0.0008	0.0277	0.1011	0.1545	0.0396

Table 21
AVERAGE MONTHLY ZONAL VALUES OF μ_o^3

MATRIX MU3 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0001	0.0068	0.0355	0.0617	0.0499	0.0165	0.0011	0.0	0.0	0.0	0.0144
82.5	0.0	0.0	0.0011	0.0145	0.0479	0.0755	0.0631	0.0267	0.0045	0.0000	0.0	0.0	0.0196
77.5	0.0	0.0000	0.0046	0.0307	0.0731	0.1028	0.0897	0.0479	0.0127	0.0006	0.0	0.0	0.0304
72.5	0.0	0.0006	0.0127	.0.0551	0.1115	0.1437	0.1299	0.0798	0.0271	0.0032	0.0000	0.0	0.0472
67.5	0.0001	0.0033	0.0270	0.0875	0.1600	0.1977	0.1825	0.1196	0.0491	0.0097	0.0005	-0.0000	0.0701
62.5	0.0011	0.0103	0.0488	0.1279	0.2135	0.2576	0.2395	0.1665	0.0792	0.0222	0.0030	0.0003	0.0980
57.5	0.0053	0.0233	0.0787	0.1756	0.2709	0.3178	0.2987	0.2194	0.1175	0.0418	0.0097	0.0028	0.1307
52.5	0.0146	0.0436	0.1169	0.2291	0.3302	0.3774	0.3583	0.2764	0.1634	0.0695	0.0224	0.0095	0.1683
47.5	0.0306	0.0722	0.1625	0.2864	0.3887	0.4337	0.4157	0.3353	0.2154	0.1054	0.0425	0.0225	0.2100
42.5	0.0545	0.1090	0.2144	0.3452	0.4437	0.4842	0.4683	0.3933	0.2719	0.1492	0.0707	0.0429	0.2547
37.5	0.0867	0.1535	0.2707	0.4027	0.4927	0.5263	0.5134	0.4478	0.3304	0.1995	0.1073	0.0715	0.3010
32.5	0.1271	0.2046	0.3291	0.4563	0.5330	0.5580	0.5488	0.4961	0.3885	0.2549	0.1517	0.1085	0.3471
27.5	0.1749	0.2605	0.3871	0.5033	0.5627	0.5776	0.5727	0.5357	0.4433	0.3131	0.2026	0.1533	0.3912
22.5	0.2285	0.3189	0.4420	0.5414	0.5802	0.5841	0.5837	0.5647	0.4922	0.3715	0.2595	0.2047	0.4314
17.5	0.2859	0.3774	0.4910	0.5695	0.5847	0.5772	0.5815	0.5814	0.5327	0.4275	0.3169	0.2608	0.4658
12.5	0.3448	0.4331	0.5317	0.5832	0.5757	0.5573	0.5660	0.5850	0.5628	0.4784	0.3754	0.3195	0.4929
7.5	0.4024	0.4834	0.5620	0.5848	0.5540	0.5254	0.5381	0.5754	0.5809	0.5216	0.4313	0.3781	0.5115
2.5	0.4561	0.5257	0.5803	0.5732	0.5205	0.4833	0.4993	0.5530	0.5859	0.5548	0.4818	0.4338	0.5205
-2.5	0.5030	0.5578	0.5857	0.5490	0.4771	0.4330	0.4517	0.5191	0.5778	0.5765	0.5243	0.4839	0.5196
-7.5	0.5409	0.5782	0.5778	0.5135	0.4260	0.3772	0.3976	0.4753	0.5568	0.5854	0.5567	0.5260	0.5098
-12.5	0.5678	0.5856	0.5571	0.4685	0.3697	0.3186	0.3397	0.4240	0.5242	0.5810	0.5772	0.5577	0.4887
-17.5	0.5822	0.5798	0.5248	0.4162	0.3111	0.2600	0.2809	0.3676	0.4815	0.5637	0.5849	0.5774	0.4601
-22.5	0.5833	0.5610	0.4823	0.3595	0.2528	0.2039	0.2236	0.3090	0.4310	0.5342	0.5792	0.5841	0.4245
-27.5	0.5711	0.5302	0.4320	0.3008	0.1973	0.1526	0.1704	0.2509	0.3752	0.4942	0.5604	0.5774	0.3836
-32.5	0.5462	0.4899	0.3764	0.2430	0.1469	0.1079	0.1232	0.1957	0.3168	0.4457	0.5296	0.5577	0.3391
-37.5	0.5100	0.4394	0.3181	0.1884	0.1032	0.0710	0.0835	0.1456	0.2585	0.3911	0.4884	0.5258	0.2929
-42.5	0.4642	0.3842	0.2599	0.1393	0.0675	0.0425	0.0520	0.1023	0.2029	0.3332	0.4388	0.4835	0.2468
-47.5	0.4112	0.3258	0.2042	0.0971	0.0400	0.0222	0.0288	0.0669	0.1521	0.2746	0.3833	0.4330	0.2027
-52.5	0.3536	0.2671	0.1534	0.0628	0.0207	0.0094	0.0134	0.0397	0.1090	0.2179	0.3247	0.3766	0.1618
-57.5	0.2940	0.2106	0.1091	0.0369	0.0087	0.0027	0.0047	0.0207	0.0715	0.1656	0.2656	0.3171	0.1252
-62.5	0.2351	0.1586	0.0724	0.0188	0.0025	0.0003	0.0009	0.0088	0.0433	0.1193	0.2086	0.2569	0.0935
-67.5	0.1787	0.1129	0.0440	0.0078	0.0003	0.0000	0.0000	0.0027	0.0232	0.0805	0.1557	0.1971	0.0668
-72.5	0.1267	0.0746	0.0237	0.0023	0.0000	0.0	0.0	0.0004	0.0104	0.0499	0.1081	0.1431	0.0449
-77.5	0.0868	0.0442	0.0107	0.0004	0.0	0.0	0.0	0.0000	0.0035	0.0273	0.0701	0.1023	0.0287
-82.5	0.0604	0.0237	0.0036	0.0000	0.0	0.0	0.0	0.0	0.0007	0.0124	0.0453	0.0749	0.0185
-87.5	0.0473	0.0140	0.0008	0.0	0.0	0.0	0.0	0.0	0.0000	0.0054	0.0331	0.0612	0.0135

Table 22

AVERAGE MONTHLY ZONAL VALUES OF μ_o^4

MATRIX MUY4 1975

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0000	0.0015	0.0121	0.0247	0.0187	0.0046	0.0001	0.0	0.0	0.0	0.0052
82.5	0.0	0.0	0.0002	0.0041	0.0191	0.0340	0.0271	0.0090	0.0009	0.0000	0.0	0.0	0.0079
77.5	0.0	0.0000	0.0010	0.0109	0.0342	0.0533	0.0447	0.0196	0.0034	0.0001	0.0	0.0	0.0140
72.5	0.0	0.0001	0.0034	0.0233	0.0595	0.0838	0.0732	0.0380	0.0092	0.0006	-0.0000	0.0	0.0244
67.5	-0.0000	0.0006	0.0092	0.0428	0.0954	0.1270	0.1138	0.0647	0.0199	0.0024	0.0000	-0.0000	0.0399
62.5	0.0001	0.0025	0.0198	0.0706	0.1394	0.1792	0.1625	0.1001	0.0374	0.0070	0.0005	0.0000	0.0603
57.5	0.0010	0.0074	0.0372	0.1073	0.1910	0.2364	0.2176	0.1442	0.0630	0.0161	0.0023	0.0004	0.0858
52.5	0.0039	0.0169	0.0626	0.1525	0.2481	0.2966	0.2767	0.1958	0.0974	0.0314	0.0069	0.0022	0.1165
47.5	0.0104	0.0328	0.0967	0.2050	0.3079	0.3566	0.3369	0.2528	0.1404	0.0545	0.0162	0.0063	0.1521
42.5	0.0224	0.0566	0.1395	0.2626	0.3670	0.4125	0.3945	0.3125	0.1912	0.0862	0.0318	0.0162	0.1918
37.5	0.0415	0.0892	0.1900	0.3222	0.4216	0.4607	0.4456	0.3711	0.2476	0.1267	0.0553	0.0320	0.2344
32.5	0.0691	0.1306	0.2463	0.3803	0.4680	0.4977	0.4867	0.4251	0.3069	0.1753	0.0876	0.0558	0.2782
27.5	0.1057	0.1800	0.3054	0.4331	0.5028	0.5208	0.5148	0.4707	0.3657	0.2302	0.1288	0.0885	0.3212
22.5	0.1509	0.2357	0.3642	0.4770	0.5235	0.5284	0.5278	0.5047	0.4202	0.2890	0.1780	0.1301	0.3614
17.5	0.2034	0.2949	0.4187	0.5090	0.5286	0.5198	0.5249	0.5245	0.4667	0.3482	0.2335	0.1798	0.3964
12.5	0.2611	0.3541	0.4654	0.5265	0.5177	0.4959	0.5061	0.5288	0.5020	0.4044	0.2926	0.2357	0.4244
7.5	0.3209	0.4099	0.5010	0.5283	0.4917	0.4582	0.4730	0.5172	0.5235	0.4536	0.3521	0.2951	0.4437
2.5	0.3792	0.4583	0.5228	0.5144	0.4524	0.4097	0.4280	0.4905	0.5296	0.4925	0.4080	0.3546	0.4532
-2.5	0.4323	0.4961	0.5292	0.4856	0.4028	0.3538	0.3743	0.4507	0.5198	0.5183	0.4568	0.4105	0.4521
-7.5	0.4763	0.5205	0.5199	0.4442	0.3463	0.2943	0.3157	0.4008	0.4949	0.5290	0.4949	0.4589	0.4407
-12.5	0.5083	0.5295	0.4953	0.3932	0.2867	0.2349	0.2559	0.3442	0.4566	0.5239	0.5195	0.4963	0.4197
-17.5	0.5257	0.5226	0.4575	0.3360	0.2278	0.1790	0.1985	0.2848	0.4079	0.5032	0.5288	0.5201	0.3902
-22.5	0.5273	0.5003	0.4090	0.2765	0.1727	0.1294	0.1465	0.2260	0.3521	0.4687	0.5222	0.5284	0.3541
-27.5	0.5129	0.4642	0.3534	0.2182	0.1242	0.0879	0.1020	0.1713	0.2928	0.4227	0.5000	0.5206	0.3134
-32.5	0.4836	0.4169	0.2943	0.1643	0.0839	0.0554	0.0662	0.1232	0.2339	0.3685	0.4640	0.4973	0.2702
-37.5	0.4416	0.3619	0.2355	0.1173	0.0525	0.0317	0.0394	0.0832	0.1786	0.3099	0.4167	0.4601	0.2267
-42.5	0.3899	0.3028	0.1801	0.0736	0.0299	0.0160	0.0210	0.0521	0.1296	0.2506	0.3616	0.4118	0.1848
-47.5	0.3321	0.2433	0.1309	0.0487	0.0149	0.0067	0.0096	0.0297	0.0885	0.1939	0.3023	0.3559	0.1459
-52.5	0.2719	0.1870	0.0897	0.0274	0.0063	0.0021	0.0035	0.0149	0.0562	0.1428	0.2426	0.2958	0.1114
-57.5	0.2130	0.1365	0.0572	0.0136	0.0020	0.0004	0.0009	0.0063	0.0327	0.0993	0.1859	0.2357	0.0818
-62.5	0.1586	0.09	0.0334	0.0057	0.0004	0.0000	0.0001	0.0021	0.0169	0.0644	0.1351	0.1786	0.0573
-67.5	0.1106	0.059	0.0174	0.0018	0.0000	-0.0000	-0.0000	0.0005	0.0075	0.0384	0.0920	0.1265	0.0378
-72.5	0.0708	0.0347	0.0077	0.0004	0.0000	0.0	0.0	0.0000	0.0026	0.0205	0.0571	0.0833	0.0231
-77.5	0.0428	0.0175	0.0028	0.0000	0.0	0.0	0.0	0.0000	0.0007	0.0093	0.0324	0.0529	0.0132
-82.5	0.0256	0.0077	0.0007	0.0000	0.0	0.0	0.0	0.0	0.0001	0.0034	0.0178	0.0337	0.0074
-87.5	0.0175	0.0037	0.0001	0.0	0.0	0.0	0.0	0.0	0.0000	0.0011	0.0111	0.0244	0.0049

TABLE 23
AVERAGE MONTHLY ZONAL VALUES OF μ_o^1
MATRIX MUY1 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0252	0.1761	0.3255	0.3935	0.3625	0.2390	0.0716	0.0	0.0	0.0	0.1332
82.5	0.0	0.0	0.0782	0.2211	0.3445	0.4071	0.3793	0.2694	0.1378	0.0120	0.0	0.0	0.1545
77.5	0.0	0.0143	0.1461	0.2876	0.3828	0.4344	0.4102	0.3271	0.2057	0.0536	0.0	0.0	0.1890
72.5	0.0	0.0634	0.2126	0.3532	0.4402	0.4761	0.4588	0.3934	0.2711	0.1201	0.0080	0.0	0.2336
67.5	0.0237	0.1319	0.2778	0.4139	0.5025	0.5332	0.5205	0.4536	0.3343	0.1875	0.0572	0.0009	0.2867
62.5	0.0920	0.1992	0.3407	0.4708	0.5557	0.5885	0.5741	0.5086	0.3950	0.2534	0.1259	0.0626	0.3475
57.5	0.1602	0.2649	0.4010	0.5239	0.6030	0.6336	0.6201	0.5592	0.4525	0.3172	0.1935	0.1313	0.4053
52.5	0.2270	0.3284	0.4582	0.5729	0.6449	0.6724	0.6603	0.6053	0.5066	0.3786	0.2594	0.1989	0.4596
47.5	0.2920	0.3893	0.5119	0.6175	0.6816	0.7053	0.6949	0.6466	0.5569	0.4371	0.3232	0.2647	0.5103
42.5	0.3546	0.4473	0.5617	0.6573	0.7128	0.7325	0.7240	0.6828	0.6029	0.4922	0.3844	0.3284	0.5569
37.5	0.4144	0.5018	0.6072	0.6921	0.7385	0.7538	0.7473	0.7138	0.6443	0.5435	0.4427	0.3895	0.5992
32.5	0.4710	0.5524	0.6481	0.7215	0.7584	0.7691	0.7647	0.7393	0.6808	0.5907	0.4975	0.4475	0.6369
27.5	0.5239	0.5988	0.6841	0.7455	0.7724	0.7785	0.7762	0.7591	0.7121	0.6334	0.5485	0.5020	0.6696
22.5	0.5728	0.6407	0.7149	0.7637	0.7805	0.7817	0.7817	0.7731	0.7380	0.6712	0.5953	0.5527	0.6972
17.5	0.6173	0.6776	0.7402	0.7762	0.7825	0.7790	0.7811	0.7812	0.7583	0.7040	0.6374	0.5990	0.7195
12.5	0.6570	0.7093	0.7599	0.7827	0.7786	0.7702	0.7746	0.7833	0.7728	0.7313	0.6747	0.6408	0.7362
7.5	0.6916	0.7357	0.7738	0.7832	0.7686	0.7555	0.7620	0.7794	0.7814	0.7531	0.7068	0.6776	0.7473
2.5	0.7210	0.7564	0.7818	0.7778	0.7528	0.7350	0.7437	0.7695	0.7840	0.7691	0.7335	0.7092	0.7527
-2.5	0.7448	0.7713	0.7838	0.7664	0.7312	0.7088	0.7196	0.7538	0.7807	0.7793	0.7546	0.7353	0.7523
-7.5	0.7629	0.7804	0.7799	0.7492	0.7040	0.6771	0.6899	0.7323	0.7715	0.7835	0.7699	0.7557	0.7462
-12.5	0.7751	0.7834	0.7701	0.7262	0.6714	0.6403	0.6550	0.7052	0.7563	0.7818	0.7793	0.7704	0.7344
-17.5	0.7813	0.7805	0.7544	0.6978	0.6336	0.5984	0.6150	0.6727	0.7355	0.7741	0.7827	0.7791	0.7169
-22.5	0.7815	0.7716	0.7329	0.6640	0.5910	0.5520	0.5703	0.6351	0.7090	0.7605	0.7800	0.7818	0.6939
-27.5	0.7758	0.7569	0.7059	0.6251	0.5429	0.5013	0.5212	0.5927	0.6771	0.7411	0.7714	0.7784	0.6656
-32.5	0.7640	0.7362	0.6735	0.5815	0.4925	0.4467	0.4681	0.5456	0.6401	0.7160	0.7569	0.7690	0.6322
-37.5	0.7462	0.7101	0.6359	0.5334	0.4373	0.3887	0.4113	0.4944	0.5981	0.6855	0.7365	0.7535	0.5939
-42.5	0.7227	0.6784	0.5935	0.4812	0.3787	0.3276	0.3513	0.4394	0.5517	0.6497	0.7103	0.7322	0.5511
-47.5	0.6934	0.6415	0.5466	0.4254	0.3172	0.2638	0.2886	0.3810	0.5010	0.6089	0.6786	0.7050	0.5039
-52.5	0.6585	0.5996	0.4956	0.3662	0.2532	0.1980	0.2235	0.3197	0.4465	0.5635	0.6415	0.6720	0.4528
-57.5	0.6181	0.5530	0.4407	0.3043	0.1871	0.1304	0.1566	0.2558	0.3886	0.5137	0.5992	0.6331	0.3980
-62.5	0.5719	0.5019	0.3825	0.2400	0.1194	0.0616	0.0882	0.1899	0.3277	0.4599	0.5516	0.5880	0.3398
-67.5	0.5194	0.4466	0.3213	0.1737	0.0505	0.0005	0.0201	0.1224	0.2644	0.4024	0.4983	0.5329	0.2789
-72.5	0.4566	0.3865	0.2577	0.1060	0.0052	0.0	0.0	0.0541	0.1989	0.3414	0.4362	0.4755	0.2261
-77.5	0.4069	0.3199	0.1920	0.0414	0.0	0.0	0.0	0.0102	0.1319	0.2761	0.3773	0.4335	0.1822
-82.5	0.3742	0.2600	0.1243	0.0061	0.0	0.0	0.0	0.0	0.0644	0.2086	0.3374	0.4061	0.1483
-87.5	0.3581	0.2274	0.0586	0.0	0.0	0.0	0.0	0.0	0.0171	0.1593	0.3176	0.3924	0.1275

AVERAGE MONTHLY ZONAL VALUES OF μ_o^2

TABLE 24

MATRIX MUTZ 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0016	0.0344	0.1079	0.1557	0.1328	0.0602	0.0076	0.0	0.0	0.0	0.0418
82.5	0.0	0.0	0.0090	0.0555	0.1266	0.1726	0.1505	0.0807	0.0227	0.0005	0.0	0.0	0.0517
77.5	0.0	0.0007	0.0254	0.0925	0.1635	0.2059	0.1855	0.1202	0.0479	0.0050	0.0	0.0	0.0707
72.5	0.0	0.0059	0.0512	0.1375	0.2169	0.2545	0.2367	0.1711	0.0815	0.0176	0.0003	0.0	0.0980
67.5	0.0011	0.0203	0.0855	0.1876	0.2782	0.3170	0.2999	0.2256	0.1228	0.0399	0.0045	-0.0000	0.1322
62.5	0.0096	0.0442	0.1274	0.2419	0.3381	0.3807	0.3615	0.2825	0.1704	0.0711	0.0180	0.0042	0.1711
57.5	0.0281	0.0770	0.1755	0.2988	0.3967	0.4391	0.4200	0.3407	0.2230	0.1103	0.0411	0.0186	0.2144
52.5	0.0559	0.1175	0.2284	0.3567	0.4529	0.4931	0.4751	0.3984	0.2789	0.1562	0.0732	0.0425	0.2611
47.5	0.0922	0.1646	0.2845	0.4138	0.5051	0.5415	0.5253	0.4540	0.3365	0.2076	0.1133	0.0754	0.3098
42.5	0.1356	0.2168	0.3421	0.4684	0.5518	0.5832	0.5694	0.5058	0.3939	0.2627	0.1599	0.1161	0.3591
37.5	0.1854	0.2725	0.3994	0.5189	0.5916	0.6169	0.6060	0.5523	0.4496	0.3200	0.2119	0.1634	0.4076
32.5	0.2395	0.3301	0.4547	0.5637	0.6235	0.6417	0.6341	0.5921	0.5016	0.3776	0.2675	0.2158	0.4537
27.5	0.2963	0.3877	0.5063	0.6015	0.6463	0.6569	0.6529	0.6239	0.5486	0.4339	0.3250	0.2718	0.4961
22.5	0.3542	0.4437	0.5526	0.6311	0.6595	0.6620	0.6618	0.6468	0.5890	0.4872	0.3828	0.3295	0.5335
17.5	0.4114	0.4962	0.5923	0.6516	0.6627	0.6570	0.6605	0.6601	0.6217	0.5357	0.4389	0.3873	0.5647
12.5	0.4662	0.5438	0.6241	0.6624	0.6558	0.6419	0.6491	0.6635	0.6455	0.5781	0.4918	0.4433	0.5888
7.5	0.5168	0.5849	0.6471	0.6631	0.6389	0.6173	0.6280	0.6567	0.6599	0.6130	0.5399	0.4959	0.6051
2.5	0.5617	0.6184	0.6605	0.6539	0.6127	0.5839	0.5978	0.6401	0.6644	0.6394	0.5815	0.5434	0.6130
-2.5	0.5997	0.6431	0.6640	0.6348	0.5779	0.5428	0.5595	0.6141	0.6598	0.6564	0.6156	0.5845	0.6124
-7.5	0.6294	0.6584	0.6575	0.6066	0.5355	0.4952	0.5142	0.5796	0.6433	0.6637	0.6410	0.6177	0.6033
-12.5	0.6500	0.6638	0.6410	0.5700	0.4870	0.4426	0.4633	0.5375	0.6183	0.6608	0.6569	0.6422	0.5858
-17.5	0.6608	0.6590	0.6153	0.5262	0.4337	0.3865	0.4084	0.4891	0.5847	0.6480	0.6629	0.6571	0.5607
-22.5	0.6615	0.6443	0.5809	0.4766	0.3773	0.3287	0.3511	0.4360	0.5435	0.6256	0.6588	0.6620	0.5285
-27.5	0.6521	0.6202	0.5391	0.4225	0.3195	0.2710	0.2932	0.3797	0.4959	0.5943	0.6447	0.6568	0.4904
-32.5	0.6329	0.5872	0.4909	0.3658	0.2620	0.2151	0.2364	0.3220	0.4433	0.5551	0.6209	0.6415	0.4474
-37.5	0.6044	0.5465	0.4380	0.3080	0.2067	0.1627	0.1825	0.2646	0.3874	0.5091	0.5893	0.6165	0.4009
-42.5	0.5674	0.4992	0.3819	0.2510	0.1552	0.1155	0.1332	0.2093	0.3299	0.4577	0.5478	0.5827	0.3522
-47.5	0.5230	0.4468	0.3243	0.1965	0.1090	0.0749	0.0900	0.1577	0.2724	0.4024	0.5006	0.5410	0.3029
-52.5	0.4725	0.3909	0.2670	0.1461	0.0697	0.0422	0.0541	0.1114	0.2168	0.3451	0.4480	0.4924	0.2544
-57.5	0.4173	0.3330	0.2117	0.1014	0.0384	0.0183	0.0268	0.0719	0.1647	0.2873	0.3917	0.4384	0.2081
-62.5	0.3587	0.2750	0.1601	0.0637	0.0162	0.0041	0.0088	0.0403	0.1178	0.2309	0.3331	0.3800	0.1655
-67.5	0.2974	0.2185	0.1137	0.0343	0.0036	-0.0000	0.0008	0.0177	0.0774	0.1775	0.2734	0.3164	0.1274
-72.5	0.2343	0.1649	0.0740	0.0140	0.0001	0.0	0.0	0.0047	0.0448	0.1286	0.2127	0.2539	0.0942
-77.5	0.1699	0.1149	0.0422	0.0033	0.0	0.0	0.0	0.0004	0.0209	0.0854	0.1591	0.2051	0.0678
-82.5	0.1476	0.0755	0.0191	0.0002	0.0	0.0	0.0	0.0	0.0066	0.0498	0.1219	0.1718	0.0494
-87.5	0.1298	0.0548	0.0058	0.0	0.0	0.0	0.0	0.0	0.0009	0.0291	0.1030	0.1549	0.0399

TABLE 25

AVERAGE MONTHLY ZONAL VALUES OF μ_o^3

MATRII MUT3 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0001	0.0073	0.0364	0.0619	0.0491	0.0158	0.0010	0.0	0.0	0.0	0.0143
82.5	0.0	0.0	0.0012	0.0151	0.0488	0.0757	0.0624	0.0259	0.0042	0.0000	0.0	0.0	0.0195
77.5	0.0	0.0000	0.0050	0.0317	0.0741	0.1031	0.0889	0.0469	0.0121	0.0005	0.0	0.0	0.0303
72.5	0.0	0.0007	0.0133	0.0565	0.1127	0.1439	0.1290	0.0784	0.0261	0.0029	0.0000	0.0	0.0471
67.5	0.0001	0.0035	0.0280	0.0893	0.1615	0.1980	0.1814	0.1178	0.0476	0.0092	0.0004	-0.0000	0.0699
62.5	0.0011	0.0105	0.0503	0.1302	0.2153	0.2579	0.2383	0.1643	0.0773	0.0213	0.0028	0.0003	0.0977
57.5	0.0052	0.0237	0.0807	0.1782	0.2728	0.3182	0.2974	0.2170	0.1152	0.0405	0.0093	0.0027	0.1304
52.5	0.0144	0.0442	0.1193	0.2320	0.3321	0.3777	0.3570	0.2738	0.1606	0.0677	0.0217	0.0095	0.1678
47.5	0.0304	0.0729	0.1654	0.2895	0.3905	0.4340	0.4145	0.3326	0.2124	0.1032	0.0415	0.0223	0.2095
42.5	0.0542	0.1098	0.2176	0.3482	0.4454	0.4844	0.4672	0.3908	0.2686	0.1466	0.0695	0.0427	0.2541
37.5	0.0864	0.1545	0.2741	0.4056	0.4941	0.5265	0.5125	0.4455	0.3271	0.1966	0.1058	0.0713	0.3003
32.5	0.1268	0.2057	0.3326	0.4589	0.5342	0.5581	0.5481	0.4941	0.3852	0.2518	0.1498	0.1082	0.3464
27.5	0.1744	0.2616	0.3905	0.5055	0.5635	0.5777	0.5723	0.5342	0.4403	0.3099	0.2006	0.1530	0.3905
22.5	0.2280	0.3200	0.4450	0.5431	0.5806	0.5841	0.5836	0.5636	0.4996	0.3684	0.2563	0.2043	0.4307
17.5	0.2854	0.3784	0.4936	0.5695	0.5845	0.5771	0.5817	0.5809	0.5307	0.4246	0.3147	0.2604	0.4653
12.5	0.3443	0.4340	0.5337	0.5836	0.5752	0.5572	0.5665	0.5852	0.5614	0.4758	0.3733	0.3191	0.4925
7.5	0.4020	0.4842	0.5634	0.5845	0.5530	0.5252	0.5389	0.5762	0.5802	0.5194	0.4293	0.3777	0.5111
2.5	0.4554	0.5263	0.5810	0.5722	0.5191	0.4830	0.5004	0.5544	0.5860	0.5533	0.4800	0.4334	0.5202
-2.5	0.5027	0.5551	0.5856	0.5474	0.4754	0.4327	0.4529	0.5209	0.5786	0.5756	0.5228	0.4836	0.5195
-7.5	0.5407	0.5783	0.5769	0.5113	0.4241	0.3769	0.3989	0.4775	0.5583	0.5852	0.5556	0.5257	0.5088
-12.5	0.5676	0.5855	0.5556	0.4658	0.3677	0.3183	0.3411	0.4215	0.5263	0.5816	0.5767	0.5575	0.4868
-17.5	0.5821	0.5794	0.5225	0.4139	0.3090	0.2597	0.2822	0.3704	0.4841	0.5649	0.5848	0.5773	0.4604
-22.5	0.5833	0.5604	0.4796	0.3564	0.2508	0.2036	0.2249	0.3118	0.4340	0.5361	0.5796	0.5841	0.4250
-27.5	0.5712	0.5294	0.4289	0.2977	0.1954	0.1523	0.1716	0.2536	0.3784	0.4966	0.5613	0.5775	0.3841
-32.5	0.5465	0.4890	0.3730	0.2400	0.1452	0.1077	0.1243	0.1982	0.3201	0.4495	0.5309	0.5578	0.3396
-37.5	0.5104	0.4394	0.3147	0.1856	0.1019	0.0708	0.0844	0.1478	0.2618	0.3942	0.4900	0.5261	0.2935
-42.5	0.4648	0.3831	0.2565	0.1368	0.0664	0.0423	0.0527	0.1042	0.2059	0.3363	0.4407	0.4838	0.2475
-47.5	0.4117	0.3247	0.2011	0.0950	0.0392	0.0221	0.0293	0.0684	0.1549	0.2777	0.3854	0.4333	0.2033
-52.5	0.3540	0.2660	0.1506	0.0612	0.0202	0.0093	0.0137	0.0409	0.1103	0.2209	0.3269	0.3770	0.1624
-57.5	0.2945	0.2096	0.1067	0.0357	0.0094	0.0027	0.0048	0.0214	0.0734	0.1682	0.2676	0.3174	0.1257
-62.5	0.2355	0.1578	0.0706	0.0181	0.0024	0.0003	0.0010	0.0092	0.0447	0.1216	0.2105	0.2572	0.0940
-67.5	0.1790	0.1122	0.0426	0.0074	0.0003	0.0000	0.0000	0.0029	0.0241	0.0824	0.1574	0.1974	0.0671
-72.5	0.1270	0.0741	0.0228	0.0021	0.0000	0.0	0.0	0.0005	0.0109	0.0512	0.1094	0.1434	0.0451
-77.5	0.0871	0.0438	0.0101	0.0003	0.0	0.0	0.0	0.0000	0.0037	0.0282	0.0712	0.1026	0.0289
-82.5	0.0607	0.0235	0.0033	0.0000	0.0	0.0	0.0	0.0	0.0008	0.0129	0.0463	0.0752	0.0186
-87.5	0.0475	0.0138	0.0007	0.0	0.0	0.0	0.0	0.0	0.0001	0.0058	0.0340	0.0615	0.0137

TABLE 26

AVERAGE MONTHLY ZONAL VALUES OF μ_o^4

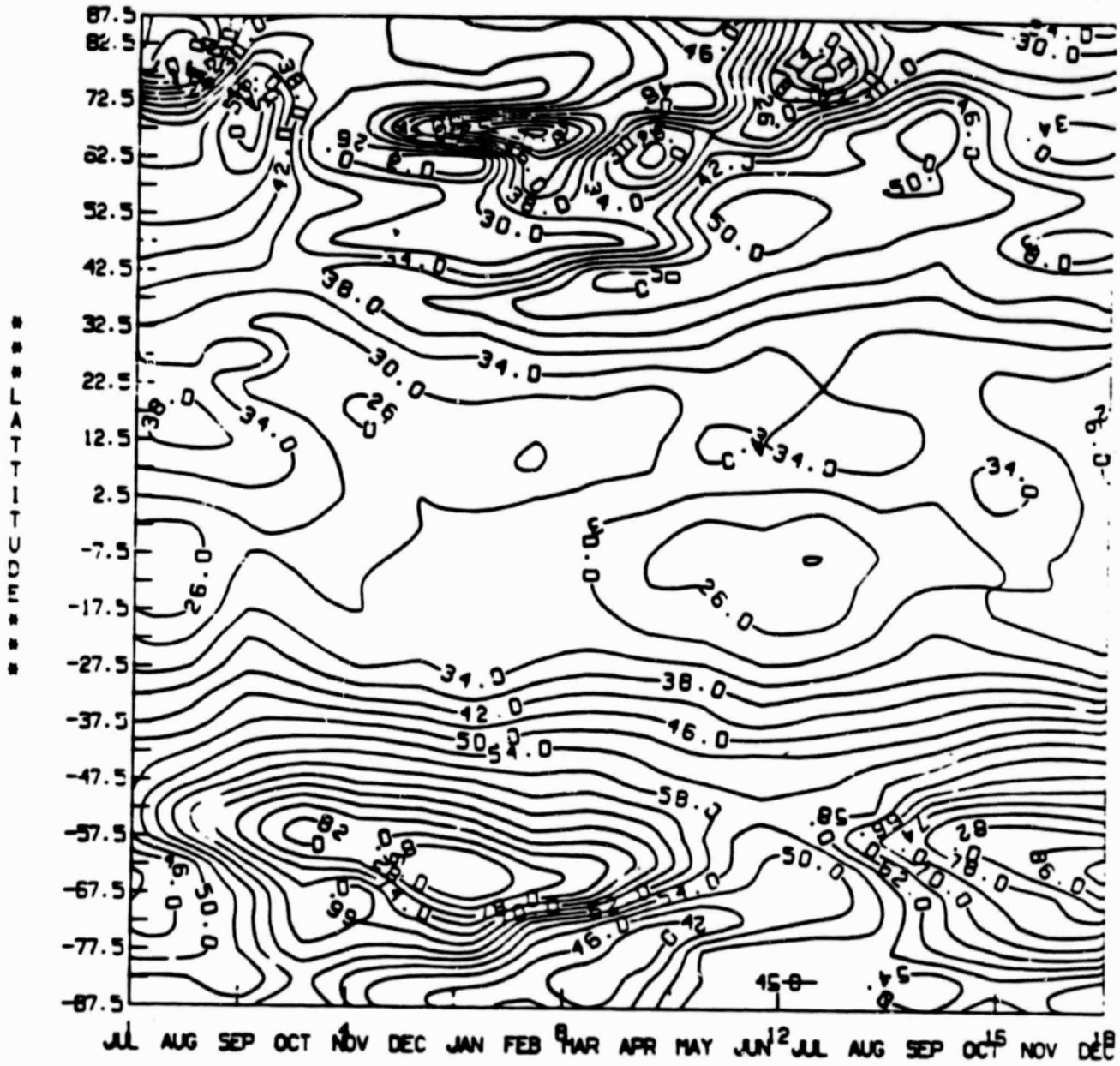
MATRIX MUT4 1976

LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
87.5	0.0	0.0	0.0000	0.0016	0.0125	0.0248	0.0183	0.0043	0.0001	0.0	0.0	0.0	0.0051
82.5	0.0	0.0	0.0002	0.0043	0.0195	0.0341	0.0266	0.0087	0.0008	0.0000	0.0	0.0	0.0079
77.5	0.0	0.0000	0.0010	0.0113	0.0348	0.0534	0.0441	0.0190	0.0032	0.0001	0.0	0.0	0.0140
72.5	0.0	0.0001	0.0037	0.0241	0.0604	0.0840	0.0725	0.0371	0.0087	0.0005	0.0000	0.0	0.0243
67.5	0.0000	0.0006	0.0096	0.0440	0.0966	0.1272	0.1129	0.0634	0.0192	0.0023	0.0000	-0.0000	0.0398
62.5	0.0001	0.0026	0.0206	0.0722	0.1409	0.1795	0.1614	0.0984	0.0363	0.0067	0.0005	0.0000	0.0601
57.5	0.0010	0.0076	0.0384	0.1094	0.1927	0.2367	0.2163	0.1420	0.0613	0.0155	0.0022	0.0004	0.0855
52.5	0.0039	0.0172	0.0643	0.1551	0.2500	0.2970	0.2754	0.1933	0.0952	0.0304	0.0067	0.0022	0.1162
47.5	0.0103	0.0333	0.0990	0.2079	0.3099	0.3569	0.3356	0.2502	0.1378	0.0530	0.0157	0.0068	0.1517
42.5	0.0223	0.0573	0.1423	0.2657	0.3689	0.4128	0.3932	0.3097	0.1881	0.0842	0.0311	0.0161	0.1913
37.5	0.0413	0.0900	0.1932	0.3253	0.4233	0.4609	0.4445	0.3685	0.2443	0.1242	0.0542	0.0318	0.2338
32.5	0.0688	0.1316	0.2497	0.3832	0.4693	0.4978	0.4858	0.4228	0.3035	0.1724	0.0862	0.0556	0.2776
27.5	0.1053	0.1811	0.3089	0.4356	0.5037	0.5209	0.5143	0.4689	0.3624	0.2271	0.1270	0.0882	0.3206
22.5	0.1504	0.2368	0.3675	0.4790	0.5239	0.5284	0.5277	0.5034	0.4172	0.2857	0.1760	0.1298	0.3607
17.5	0.2030	0.2959	0.4217	0.5102	0.5285	0.5197	0.5251	0.5240	0.4644	0.3450	0.2313	0.1794	0.3958
12.5	0.2606	0.3552	0.4678	0.5270	0.5171	0.4957	0.5068	0.5290	0.5004	0.4014	0.2904	0.2353	0.4239
7.5	0.3204	0.4108	0.5027	0.5280	0.4905	0.4579	0.4740	0.5180	0.5227	0.4512	0.3499	0.2947	0.4433
2.5	0.3787	0.4591	0.5236	0.5132	0.4508	0.4094	0.4292	0.4920	0.5297	0.4907	0.4060	0.3542	0.4529
-2.5	0.4318	0.4966	0.5291	0.4837	0.4009	0.3534	0.3757	0.4528	0.5208	0.5173	0.4551	0.4101	0.4520
-7.5	0.4760	0.5206	0.5188	0.4418	0.3442	0.2939	0.3172	0.4033	0.4967	0.5288	0.4936	0.4585	0.4408
-12.5	0.5081	0.5294	0.4935	0.3903	0.2846	0.2345	0.2574	0.3470	0.4591	0.5245	0.5188	0.4961	0.4199
-17.5	0.5256	0.5222	0.4549	0.3329	0.2257	0.1787	0.1999	0.2876	0.4109	0.5047	0.5288	0.5200	0.3906
-22.5	0.5273	0.4996	0.4060	0.2733	0.1709	0.1292	0.1477	0.2287	0.3554	0.4709	0.5227	0.5284	0.3546
-27.5	0.5131	0.4633	0.3500	0.2152	0.1226	0.0877	0.1030	0.1738	0.2962	0.4254	0.5011	0.5207	0.3140
-32.5	0.4839	0.4159	0.2909	0.1616	0.0826	0.0552	0.0670	0.1253	0.2372	0.3716	0.4655	0.4975	0.2708
-37.5	0.4420	0.3608	0.2321	0.1150	0.0516	0.0316	0.0400	0.0849	0.1817	0.3131	0.4186	0.4604	0.2273
-42.5	0.3903	0.3016	0.1771	0.0767	0.0292	0.0159	0.0214	0.0534	0.1322	0.2537	0.3636	0.4121	0.1854
-47.5	0.3325	0.2423	0.1283	0.0474	0.0145	0.0067	0.0098	0.0306	0.0906	0.1969	0.3044	0.3562	0.1465
-52.5	0.2724	0.1860	0.0875	0.0265	0.0060	0.0021	0.0036	0.0155	0.0579	0.1454	0.2447	0.2962	0.1119
-57.5	0.2135	0.1357	0.0555	0.0130	0.0019	0.0004	0.0009	0.0066	0.0338	0.1014	0.1879	0.2360	0.0822
-62.5	0.1590	0.0932	0.0322	0.0054	0.0004	0.0000	0.0001	0.0022	0.0176	0.0660	0.1368	0.1789	0.0576
-67.5	0.1109	0.0594	0.0166	0.0017	0.0000	-0.0000	-0.0000	0.0005	0.0079	0.0395	0.0933	0.1267	0.0381
-72.5	0.0710	0.0344	0.0074	0.0003	0.0000	0.0	0.0	0.0001	0.0028	0.0212	0.0580	0.0835	0.0233
-77.5	0.0430	0.0174	0.0026	0.0000	0.0	0.0	0.0	0.0000	0.0007	0.0097	0.0331	0.0531	0.0133
-82.5	0.0257	0.0077	0.0006	0.0000	0.0	0.0	0.0	0.0	0.0001	0.0036	0.0182	0.0338	0.0075
-87.5	0.0176	0.0036	0.0001	0.0	0.0	0.0	0.0	0.0	0.0000	0.0012	0.0114	0.0245	0.0049

Average Zonal Monthly Values of Cloud Fractions

1975 - 1976

Figure 7



DATA PROCESSING SECTION

&

APPENDIX

INPUT FILE ORGANIZATION

DATA DESCRIPTION	SOURCE	YEAR
Sun's daily apparent declination	American Ephemeris and Nautical Almanac	1975
Sun's daily apparent declination	American Epheremis and Nautical Almanac	1976
Monthly zonal averaged surface albedo	NASA TM 79576 (CMN)	1978
Monthly zonal averaged cloud fractions	Nimbus-6	1975
Monthly zonal averaged cloud fractions	Nimbus-6	1976

SUN'S APPARANT DECLINATION ANGLE (1975)
(1-365 days)

CDN175

-23.0697479	-11.5740824	7.2609444	21.3217926
-22.9899292	-11.2189436	7.6336937	21.4849548
-22.9024658	-10.8609152	8.0042772	21.6419373
-22.8073425	-10.5000830	8.3726377	21.7926483
-22.7047119	-10.1366100	8.7386379	21.9370575
-22.5945129	-9.7705822	9.1022215	22.0751343
-22.4768677	-9.4020824	9.4632492	22.2067719
-22.3517914	-9.0312214	9.8216658	22.3319702
-22.2194061	-8.6581383	10.1773319	22.4506226
-22.0797424	-8.2828884	10.5301933	22.5627594
-21.9328766	-7.9055824	10.8801098	22.6682892
-21.7788544	-7.5263329	11.2270269	22.7672119
-21.6178131	-7.1452770	11.5708609	22.8594513
-21.4497833	-6.7624722	11.9114714	22.9450073
-21.2748718	-6.3780546	12.2488041	23.0238495
-21.0931549	-5.9921103	12.5827494	23.0959320
-20.9047394	-5.6048040	12.9132767	23.1612396
-20.7096558	-5.2162218	13.2402487	23.2197571
-20.5080719	-4.8264713	13.5636101	23.2714539
-20.3000031	-4.4356651	13.8832769	23.3162842
-20.0856323	-4.0438881	14.1991377	23.3542938
-19.8649902	-3.6513042	14.5111103	23.3854065
-19.6381836	-3.2579994	14.8191385	23.4096527
-19.4053192	-2.8640547	15.1231098	23.4270172
-19.1665344	-2.4696102	15.4229155	23.4375000
-18.9219055	-2.0747776	15.7184715	23.4410858
-18.6715088	-1.6796379	16.0097198	23.4378052
-18.4154510	-1.2843046	16.2965393	23.4276733
-18.1538696	-0.8777778	16.5788727	23.4106293
-17.8868256	-0.4731666	16.8565979	23.3867340
-17.6144257	-0.0684166	17.1296387	23.3559875
-17.3367920	0.2968055	17.3979645	23.3183746
-17.0540009	0.6914999	17.6614075	23.2739258
-16.7662201	1.0857773	17.9198914	23.2226563
-16.4734802	1.4795542	18.1734009	23.1645966
-16.1759491	1.8726931	18.4218140	23.0997925
-15.8737764	2.2651386	18.6650391	23.0282135
-15.5670271	2.6568050	18.9030151	22.9499207
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READY
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APPARENT SUN'S DECLINATION 1976

(1-366 days)

DAT76

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-22.8292694	-12.0108604	5.6587496
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-22.6199799	-11.3052492	6.4183598
-22.5041351	-10.9478874	6.7954435
-22.3808899	-10.5876932	7.1705542
-22.2503204	-10.2247210	7.5436106
-22.1124878	-9.8591099	7.9145269
-21.9674225	-9.4909992	8.2832212
-21.8152313	-9.1204710	8.6495552
-21.6560211	-8.7476654	9.0134993
-21.4897919	-8.3726931	9.3749151
-21.3166809	-7.9956932	9.7337484
-21.1367340	-7.6167212	10.0898876
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-20.7567139	-6.8534708	10.7938328
-20.5567932	-6.4693880	11.1414442
-20.3503723	-6.0838051	11.4860268
-20.1375427	-5.6968594	11.8274717
-19.9183960	-5.3086653	12.1656656
-19.6930389	-4.9193048	12.5005827
-19.4615784	-4.5288877	12.8320551
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Table 27

AVERAGED ZONAL MONTHLY CLOUD FRACTIONS 1975

FCLD 75

	JAN	FEB	MARCH	APRL	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
87.5	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.28	0.30	0.33	0.36
82.5	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.18	0.35	0.34	0.33	0.36
77.5	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.16	0.45	0.31	0.33	0.33
72.5	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.33	0.55	0.35	0.28	0.28
67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.44	0.56	0.30	0.30	0.51
62.5	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.45	0.53	0.30	0.24	0.19
57.5	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.49	0.47	0.36	0.33	0.31
52.5	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.47	0.44	0.35	0.33	0.29
47.5	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.43	0.41	0.32	0.28	0.27
42.5	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.39	0.38	0.37	0.41	0.38
37.5	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.35	0.33	0.33	0.38	0.42
32.5	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.33	0.30	0.29	0.34	0.39
27.5	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.33	0.38	0.26	0.29	0.34
22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.36	0.29	0.27	0.27	0.31
17.5	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.39	0.33	0.29	0.25	0.28
12.5	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.39	0.37	0.32	0.27	0.27
7.5	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.35	0.36	0.33	0.28	0.28
2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.31	0.33	0.32	0.29	0.30
-2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.30	0.30	0.28	0.30
-7.5	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.25	0.30	0.29	0.29	0.31
-12.5	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.32	0.30	0.30	0.33
-17.5	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.34	0.31	0.30	0.32
-22.5	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.38	0.34	0.31	0.32
-27.5	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.34	0.41	0.38	0.34	0.35
-32.5	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.40	0.46	0.44	0.41	0.40
-37.5	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.44	0.50	0.51	0.50	0.48
-42.5	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.50	0.56	0.58	0.58	0.56
-47.5	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.56	0.63	0.68	0.65	0.64
-52.5	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.65	0.73	0.79	0.75	0.74
-57.5	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.63	0.75	0.84	0.81	0.83
-62.5	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.48	0.65	0.75	0.77	0.90
-67.5	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.48	0.56	0.69	0.63	0.81
-72.5	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.47	0.56	0.68	0.66	0.69
-77.5	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.48	0.55	0.65	0.61	0.61
-82.5	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.54	0.51	0.59	0.52	0.49
-87.5	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.57	0.57	0.64	0.52	0.47

list fcld76

Table 27-A

1976

FCLD76	JAN	FEB	MARCH	APRJ	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
87.5	0.39	0.39	0.39	0.47	0.54	0.32	0.16	0.32	0.30	0.33	0.36	0.39	0.37
82.5	0.36	0.36	0.35	0.42	0.47	0.28	0.12	0.25	0.30	0.28	0.30	0.30	0.30
77.5	0.34	0.31	0.35	0.41	0.43	0.21	0.04	0.28	0.36	0.32	0.30	0.31	0.30
72.5	0.30	0.32	0.41	0.47	0.47	0.25	0.28	0.39	0.49	0.39	0.36	0.39	0.39
67.5	0.57	0.63	0.49	0.26	0.34	0.27	0.43	0.48	0.53	0.39	0.32	0.32	0.36
62.5	0.21	0.50	0.34	0.20	0.40	0.42	0.44	0.47	0.50	0.41	0.35	0.36	0.38
57.5	0.29	0.46	0.33	0.31	0.46	0.50	0.49	0.50	0.50	0.47	0.43	0.41	0.43
52.5	0.30	0.35	0.35	0.38	0.50	0.52	0.50	0.48	0.47	0.45	0.41	0.40	0.44
47.5	0.27	0.29	0.29	0.33	0.46	0.51	0.47	0.46	0.43	0.42	0.34	0.37	0.40
42.5	0.32	0.36	0.49	0.50	0.49	0.46	0.44	0.43	0.41	0.46	0.44	0.44	0.45
37.5	0.43	0.48	0.48	0.47	0.45	0.41	0.39	0.38	0.37	0.41	0.40	0.43	0.43
32.5	0.39	0.43	0.43	0.43	0.40	0.36	0.36	0.34	0.34	0.35	0.36	0.37	0.38
27.5	0.34	0.37	0.37	0.36	0.36	0.33	0.35	0.32	0.33	0.31	0.32	0.30	0.34
22.5	0.32	0.32	0.32	0.30	0.32	0.32	0.34	0.32	0.33	0.29	0.29	0.28	0.31
17.5	0.29	0.27	0.28	0.27	0.33	0.33	0.35	0.35	0.33	0.30	0.28	0.25	0.30
12.5	0.28	0.26	0.28	0.29	0.35	0.34	0.36	0.37	0.33	0.32	0.30	0.25	0.31
7.5	0.27	0.26	0.29	0.30	0.33	0.32	0.33	0.34	0.32	0.35	0.32	0.25	0.32
2.5	0.29	0.30	0.31	0.31	0.29	0.29	0.28	0.31	0.30	0.35	0.32	0.28	0.32
-2.5	0.31	0.31	0.30	0.28	0.25	0.26	0.24	0.28	0.28	0.32	0.31	0.28	0.30
-7.5	0.32	0.32	0.30	0.26	0.24	0.23	0.22	0.26	0.27	0.30	0.30	0.29	0.29
-12.5	0.33	0.33	0.30	0.26	0.26	0.24	0.23	0.28	0.30	0.30	0.30	0.29	0.29
-17.5	0.32	0.32	0.31	0.28	0.27	0.25	0.24	0.29	0.32	0.30	0.29	0.28	0.29
-22.5	0.31	0.32	0.33	0.31	0.30	0.27	0.28	0.31	0.35	0.33	0.31	0.29	0.30
-27.5	0.32	0.35	0.37	0.36	0.35	0.31	0.32	0.35	0.37	0.38	0.37	0.33	0.34
-32.5	0.37	0.41	0.43	0.42	0.41	0.37	0.39	0.40	0.43	0.45	0.45	0.42	0.40
-37.5	0.45	0.48	0.49	0.48	0.44	0.42	0.44	0.46	0.48	0.52	0.54	0.53	0.47
-42.5	0.53	0.55	0.55	0.53	0.50	0.50	0.50	0.52	0.55	0.60	0.62	0.61	0.53
-47.5	0.62	0.59	0.60	0.56	0.54	0.52	0.53	0.57	0.62	0.67	0.68	0.69	0.58
-52.5	0.70	0.65	0.66	0.63	0.59	0.55	0.58	0.58	0.74	0.78	0.78	0.76	0.66
-57.5	0.80	0.72	0.73	0.69	0.58	0.52	0.56	0.69	0.79	0.85	0.85	0.85	0.71
-62.5	0.90	0.82	0.80	0.72	0.57	0.50	0.48	0.58	0.72	0.79	0.86	0.92	0.72
-67.5	0.88	0.81	0.76	0.59	0.44	0.49	0.47	0.53	0.64	0.74	0.77	0.86	0.67
-72.5	0.75	0.58	0.52	0.43	0.42	0.48	0.51	0.53	0.64	0.71	0.76	0.76	0.60
-77.5	0.63	0.49	0.45	0.39	0.45	0.27	0.57	0.57	0.61	0.65	0.68	0.67	0.58
-82.5	0.48	0.44	0.39	0.45	0.48	0.54	0.54	0.54	0.51	0.57	0.56	0.53	0.51
-87.5	0.45	0.48	0.42	0.48	0.54	0.57	0.57	0.57	0.54	0.62	0.55	0.50	0.53

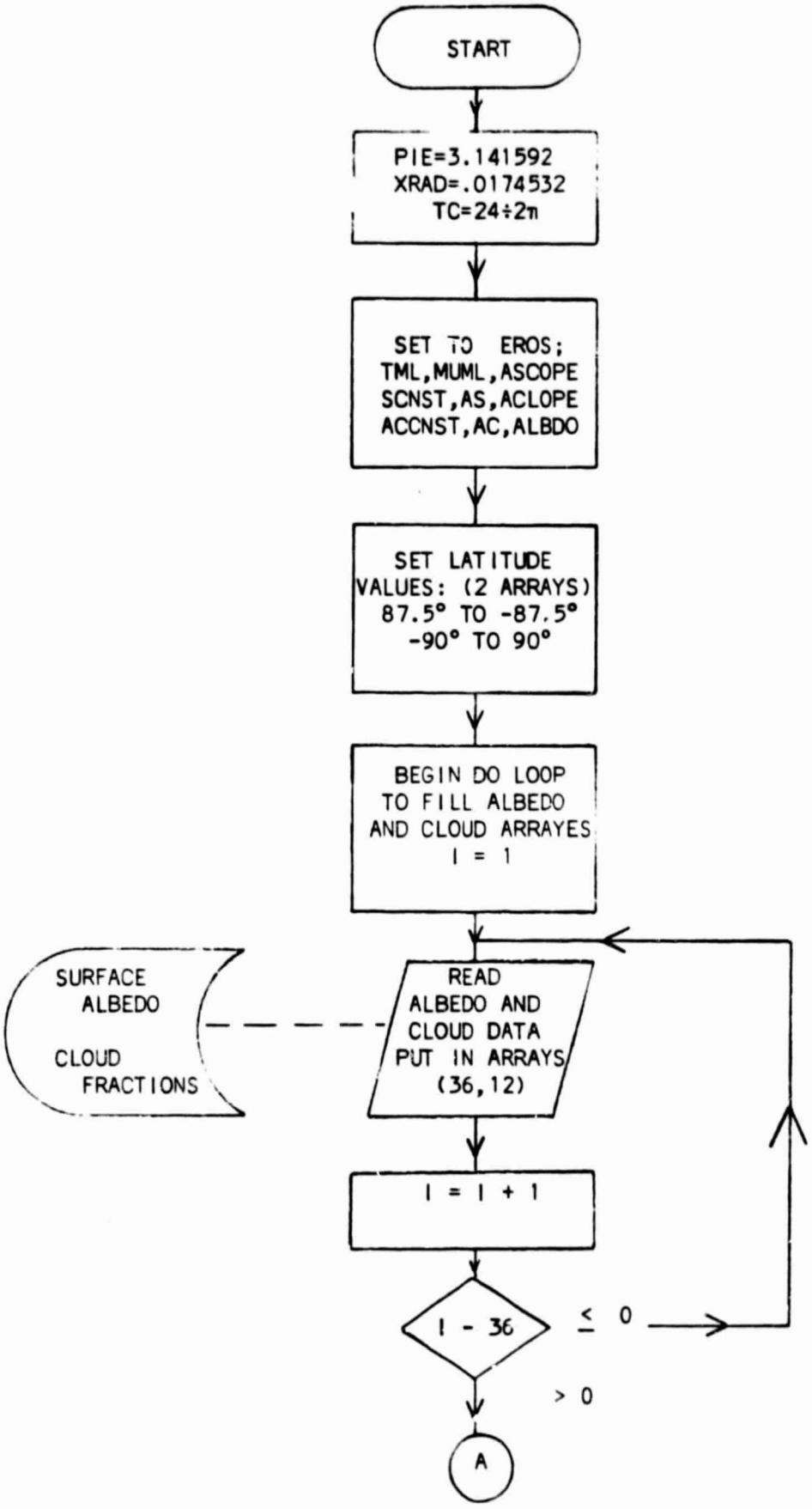
Table 28

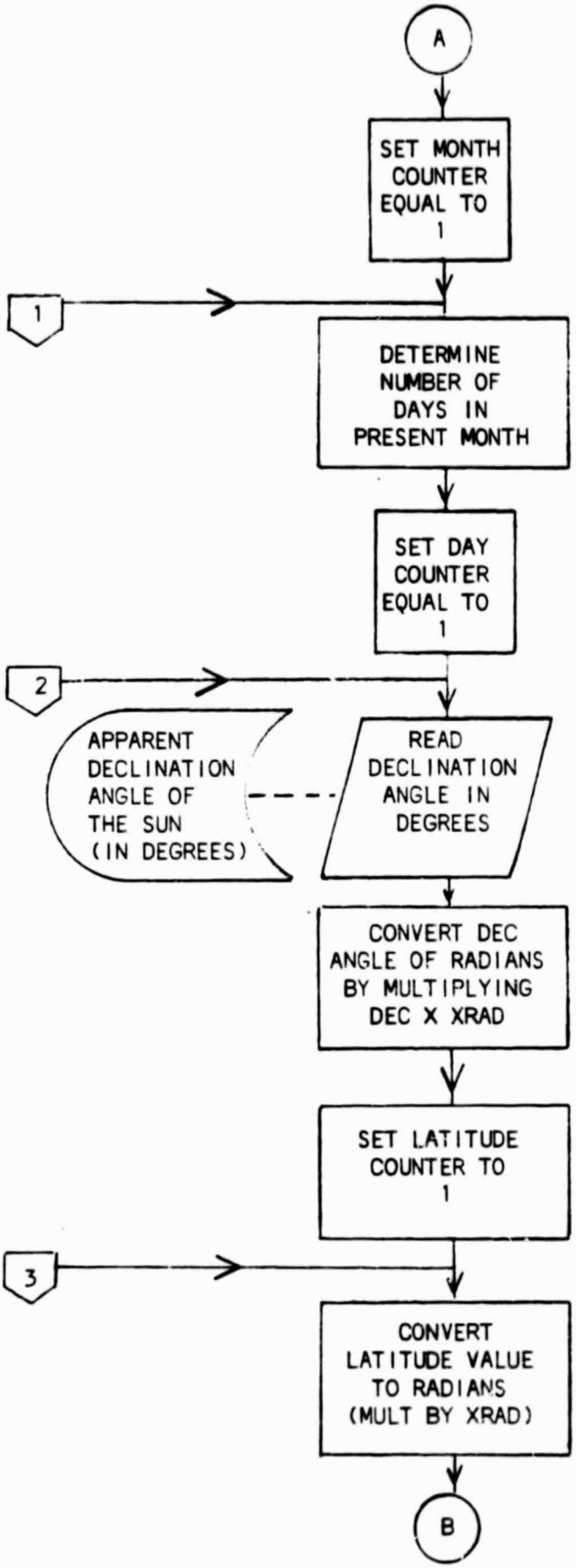
SURFACE ALBEDO

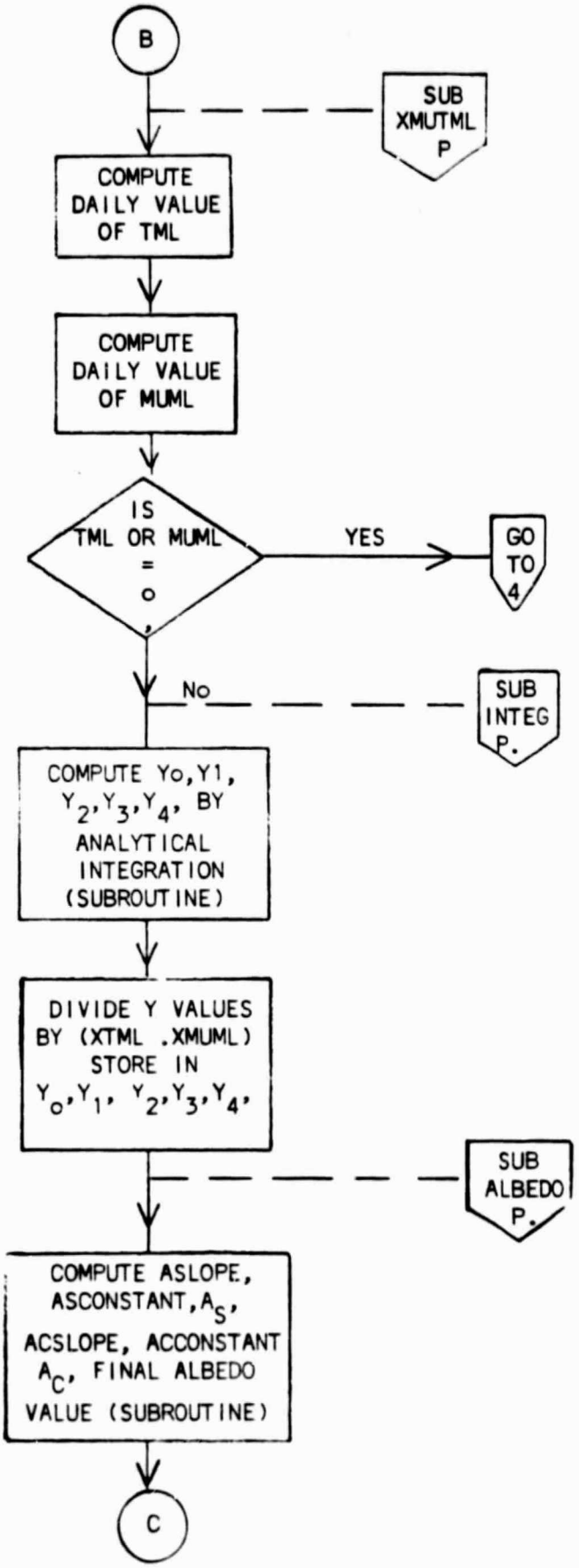
SALB

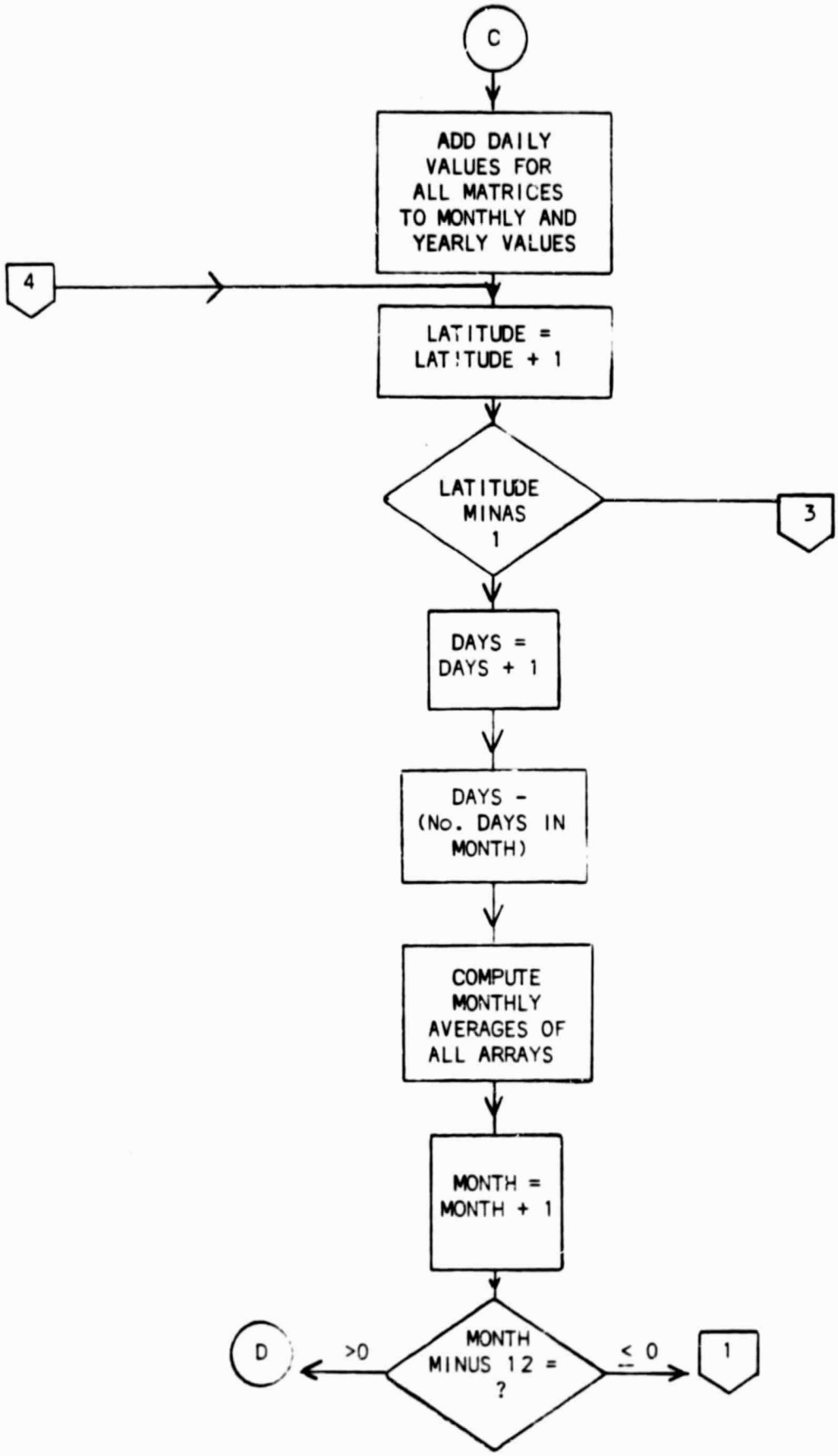
LAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
87.5	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
82.5	0.75	0.75	0.75	0.75	0.75	0.74	0.73	0.71	0.70	0.74	0.75	0.75	0.74
77.5	0.74	0.75	0.74	0.73	0.73	0.71	0.67	0.61	0.58	0.61	0.68	0.70	0.69
72.5	0.67	0.68	0.66	0.64	0.62	0.57	0.46	0.41	0.38	0.57	0.62	0.66	0.58
67.5	0.69	0.69	0.69	0.67	0.57	0.46	0.27	0.24	0.24	0.56	0.65	0.69	0.54
62.5	0.66	0.66	0.64	0.60	0.43	0.31	0.21	0.20	0.20	0.49	0.59	0.63	0.47
57.5	0.55	0.53	0.52	0.44	0.30	0.20	0.15	0.14	0.14	0.33	0.45	0.52	0.36
52.5	0.49	0.48	0.41	0.33	0.21	0.16	0.14	0.14	0.14	0.27	0.39	0.47	0.30
47.5	0.45	0.43	0.38	0.30	0.19	0.13	0.13	0.13	0.14	0.23	0.36	0.43	0.28
42.5	0.32	0.31	0.17	0.13	0.12	0.12	0.12	0.12	0.12	0.13	0.17	0.25	0.17
37.5	0.14	0.13	0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.14	0.15	0.12
32.5	0.13	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.13	0.12
27.5	0.13	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.13	0.11
22.5	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.10
17.5	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
12.5	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.09
7.5	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.09
2.5	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
-2.5	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
-7.5	0.09	0.09	0.09	0.09	0.09	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09
-12.5	0.08	0.08	0.08	0.08	0.08	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.09
-17.5	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09
-22.5	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09
-27.5	0.09	0.09	0.09	0.09	0.10	0.11	0.11	0.10	0.09	0.09	0.09	0.09	0.09
-32.5	0.08	0.08	0.08	0.09	0.10	0.10	0.10	0.10	0.09	0.08	0.08	0.08	0.09
-37.5	0.07	0.07	0.08	0.09	0.11	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.09
-42.5	0.06	0.06	0.07	0.08	0.11	0.12	0.11	0.09	0.08	0.07	0.06	0.06	0.08
-47.5	0.07	0.07	0.08	0.11	0.14	0.16	0.16	0.12	0.09	0.07	0.07	0.06	0.10
-52.5	0.07	0.07	0.08	0.11	0.14	0.16	0.16	0.12	0.09	0.07	0.07	0.06	0.10
-57.5	0.08	0.09	0.10	0.14	0.20	0.23	0.25	0.27	0.26	0.23	0.17	0.10	0.18
-62.5	0.11	0.10	0.12	0.21	0.35	0.47	0.55	0.57	0.56	0.55	0.43	0.23	0.35
-67.5	0.41	0.28	0.34	0.51	0.63	0.63	0.71	0.72	0.72	0.71	0.69	0.56	0.58
-72.5	0.69	0.64	0.68	0.74	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.74	0.73
-77.5	0.73	0.72	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
-82.5	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
-87.5	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

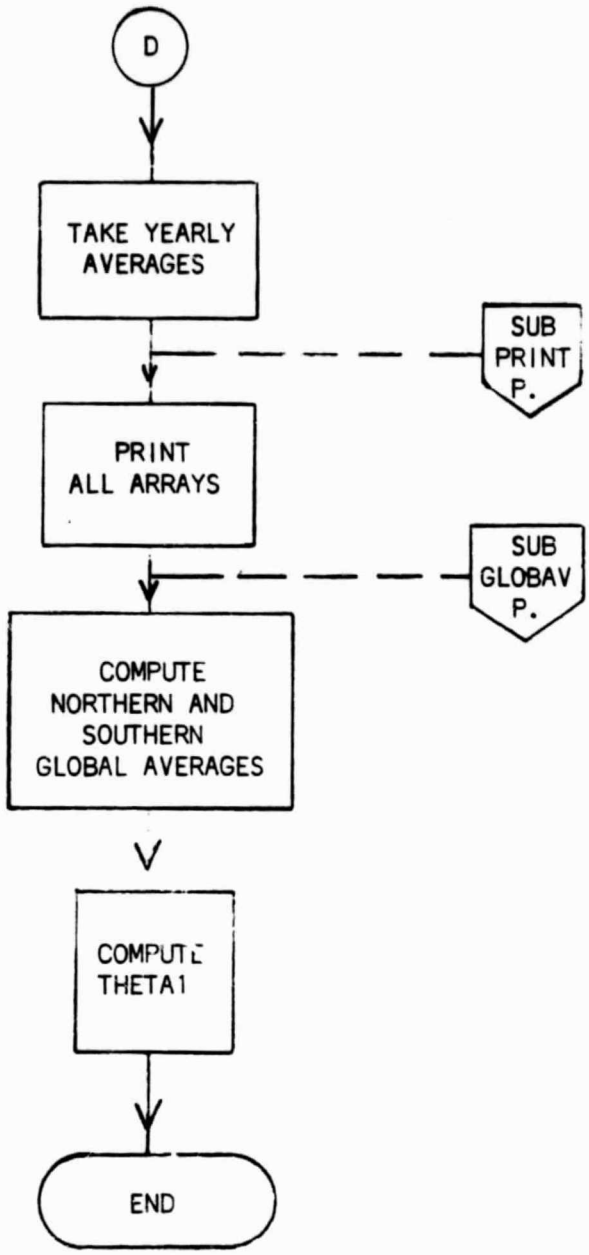
Flowchart Albedo Model Main Program



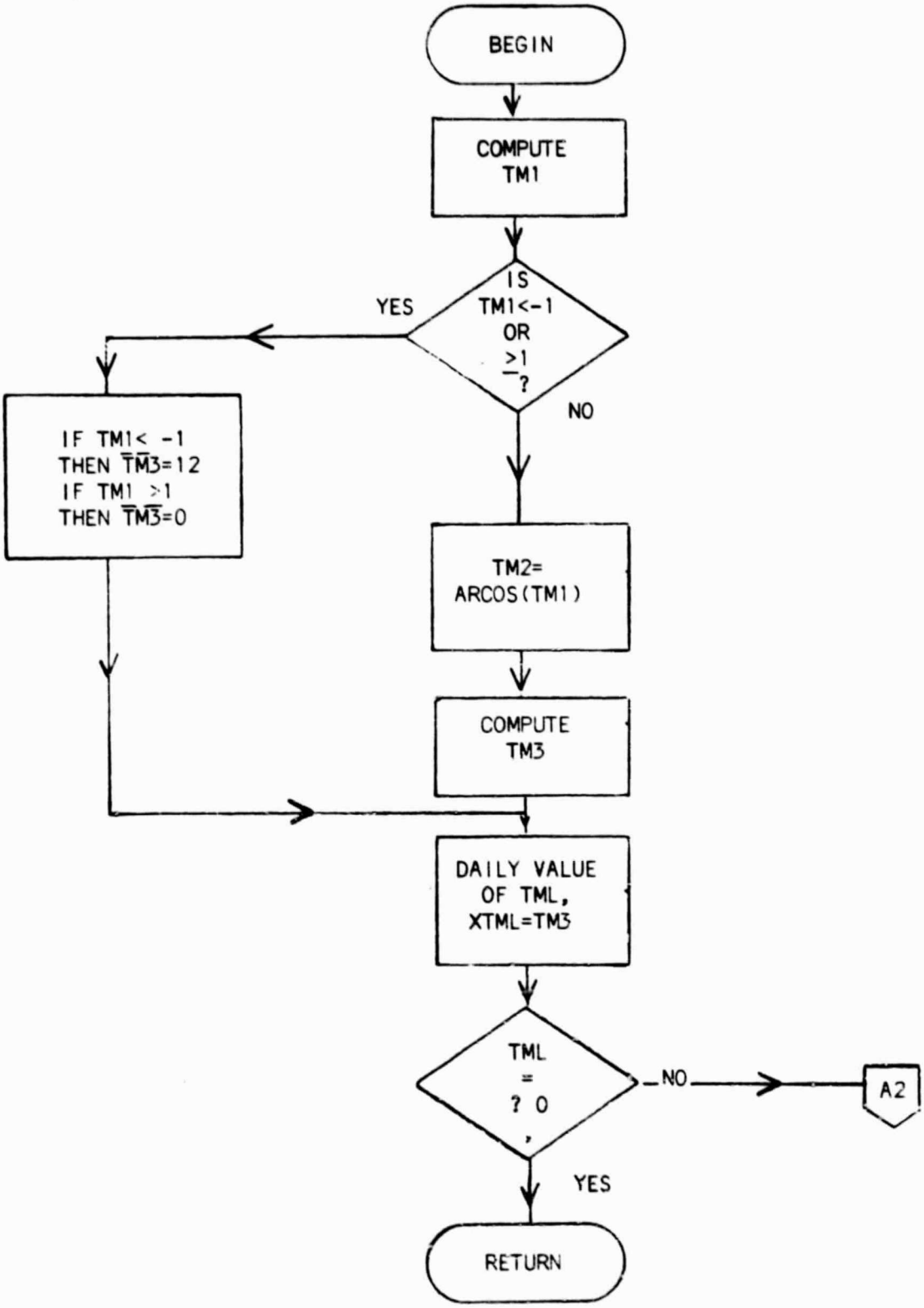

A
SET MONTH COUNTER EQUAL TO 1
1
DETERMINE NUMBER OF DAYS IN PRESENT MONTH
SET DAY COUNTER EQUAL TO 1
2
APPARENT DECLINATION ANGLE OF THE SUN (IN DEGREES)
READ DECLINATION ANGLE IN DEGREES
CONVERT DEC ANGLE OF RADIANS BY MULTIPLYING DEC X XRAD
SET LATITUDE COUNTER TO 1
3
CONVERT LATITUDE VALUE TO RADIANS (MULT BY XRAD)
B

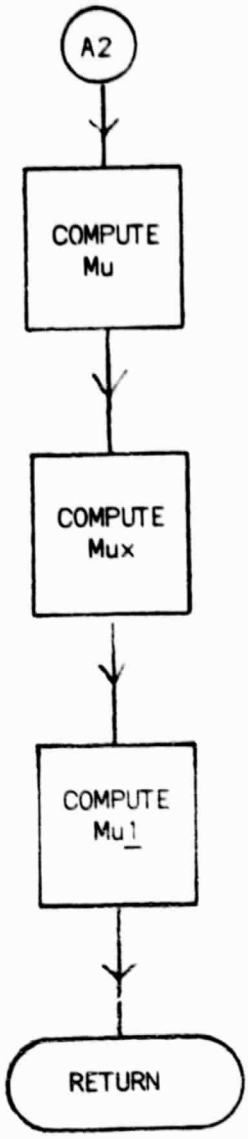

B
SUB XMUTML P
COMPUTE DAILY VALUE OF TML
COMPUTE DAILY VALUE OF MUML
IS TML OR MUML = o
YES
GO TO 4
No
SUB INTEG P.
COMPUTE Yo, Y1, Y2, Y3, Y4, BY ANALYTICAL INTEGRATION (SUBROUTINE)
DIVIDE Y VALUES BY (XTML .XMUML) STORE IN Yo, Y1, Y2, Y3, Y4,
SUB ALBEDO P.
COMPUTE ASLOPE, ASCONSTANT, AS, ACSLOPE, ACCONSTANT AC, FINAL ALBEDO VALUE (SUBROUTINE)
C


C
ADD DAILY VALUES FOR ALL MATRICES TO MONTHLY AND YEARLY VALUES
4
LATITUDE = LATITUDE + 1
LATITUDE MINAS 1
3
DAYS = DAYS + 1
DAYS - (No. DAYS IN MONTH)
COMPUTE MONTHLY AVERAGES OF ALL ARRAYS
MONTH = MONTH + 1
MONTH MINUS 12 = ?
>0
D
≤ 0
1

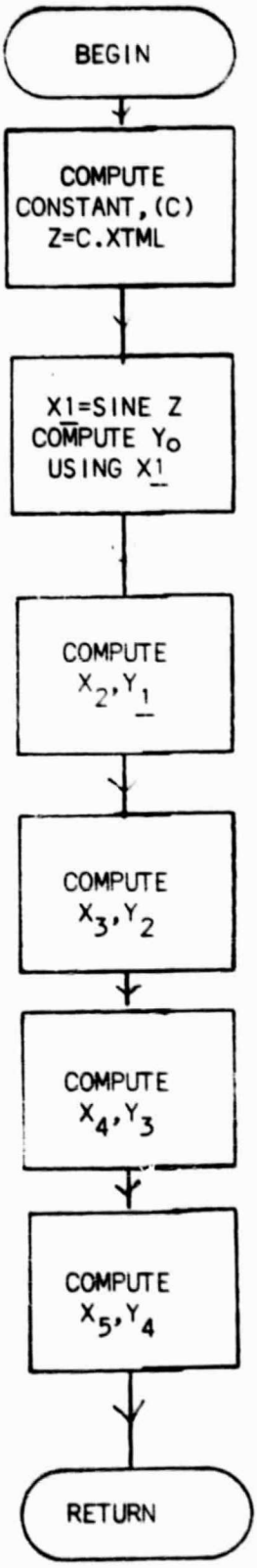

D
TAKE YEARLY AVERAGES
SUB PRINT P.
PRINT ALL ARRAYS
SUB GLOBAV P.
COMPUTE NORTHERN AND SOUTHERN GLOBAL AVERAGES
COMPUTE THETA1
END

SUBROUTINE TMLXMU



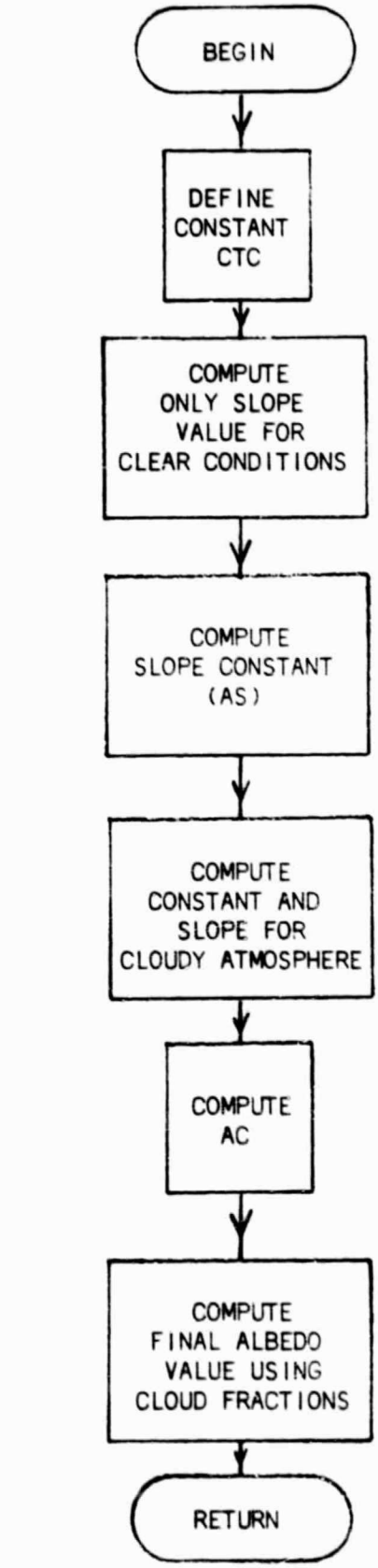

A2
COMPUTE
Mu
COMPUTE
Mux
COMPUTE
Mu1
RETURN

SUBROUTINE INTEG
COMPUTES Y VALUES USING
ANALYTICAL INTEGRATION

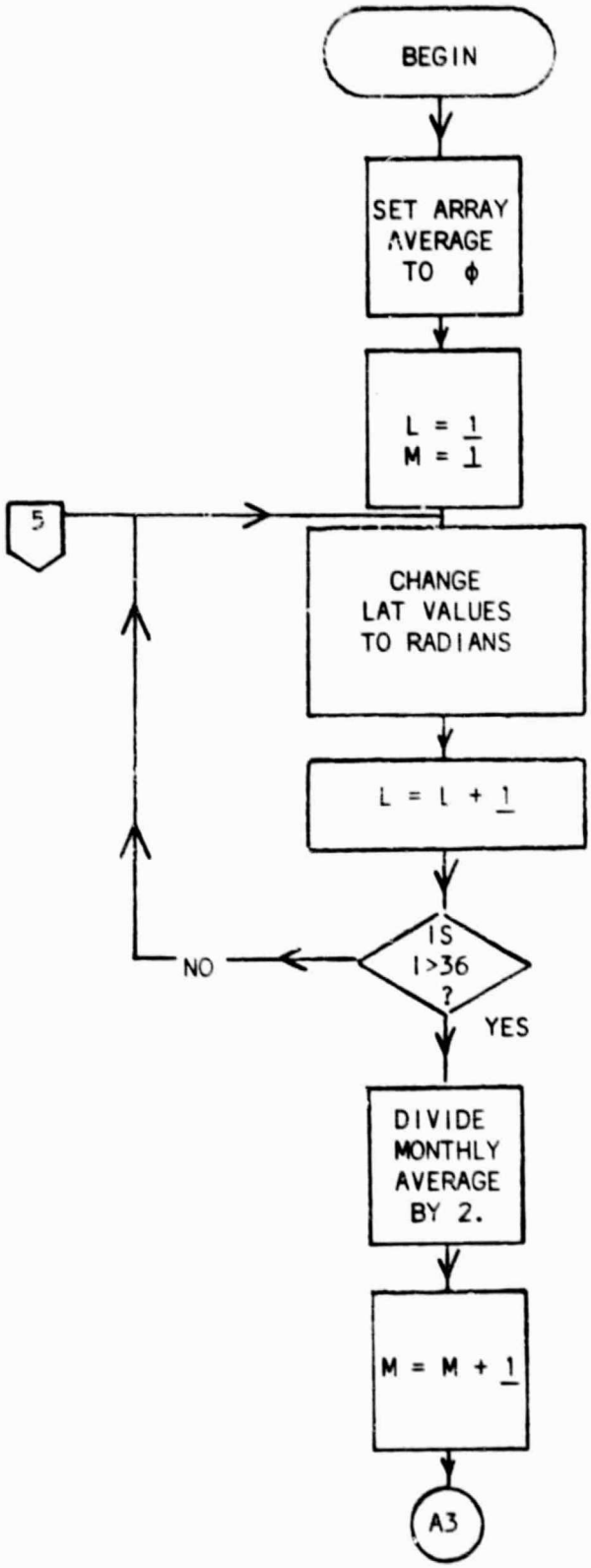


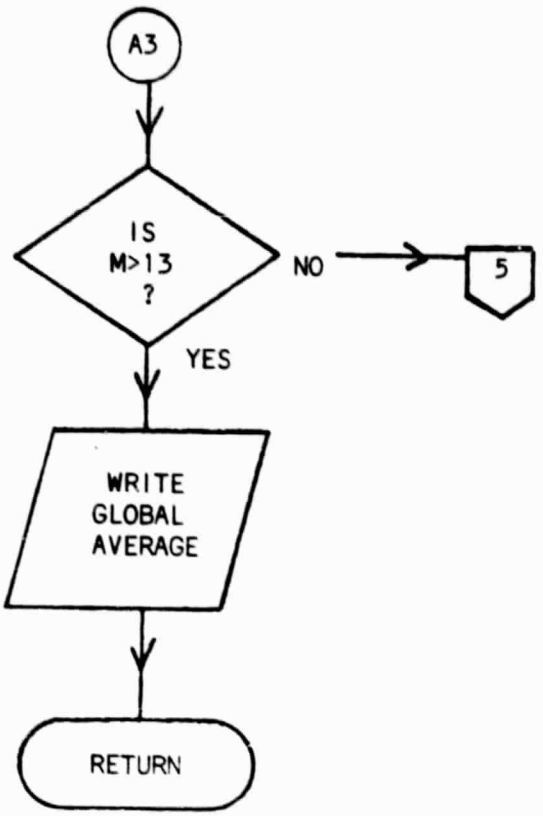
SUBROUTINE ALBEDO

COMPUTES ALBEDO VALUES
FOR CLEAR AND CLOUDY ATMOSPHERES



SUBROUTINE GLOBAV




A3
IS
M>13
?
NO
5
YES
WRITE
GLOBAL
AVERAGE
RETURN

```
/Y9KLGA76 JOB (FR0041665D,T,AAAAAA,001H01),132,MSGCLASS=A                    00000010
/.  EXEC FORTRANH                                                           00000020
/SOURCE.SYSIN DD *                                                          00000030
                                                                            00000040
C*************************************************************************00000050
                                                                            00000060
C  MAIN PROGRAM ALBEDO.                  The flow chart of this program is given.  00000070
C                                        This program reads the files and gives the 00000080
C  DATE:  JUNE 25,1980                   output in the form of tables as given in this 00000090
C                                        technical memorandum.              00000100
C  NASA RESEARCH PROJECT.                                                   00000110
C                                                                           00000120
C                                                                           00000140
C  UDC PROJECT DIRECTOR:  HARBANS DHURIA                                    00000150
C                                                                           00000160
C                                                                           00000180
C  PROGRAM SPECIFICATIONS:  READ DECLINATION ANGLES IN DEGREES OVER         00000190
C              EACH DAY OF THE MONTH FOR 36 LATITUDES,                      00000200
C              CHANGE DEGREES TO RADIANS                                    00000210
C              CALCULATE ALGORITHM FOR EACH LATITUDE ON EACH DAY,           00000220
C              TAKE THE AVERAGE FOR THE MONTH                               00000230
C              WRITE THE ARRAY.                                             00000240
C                                                                           00000250
C                                                                           00000260
C                                                                           00000270
      DIMENSION YLAT(36),ZLAT(37),MONTHS(12),TML(36,13),ASLOPE(36,13)       00000280
      DIMENSION AS(36,13),ERB(36,12),FC(36,12),ALBDO(36,13),                00000290
     *ACLOPE(36,13),ASCNST(36,13),ACCNST(36,13),AC(36,13)                   00000300
      DIMENSION ANG(13),ASG(13),AG(13),THETA1(36,12)                        00000310
      REAL MUML(36,13),MUY1(36,13),MUY2(36,13),MUY3(36,13),MUY4(36,13)      00000320
      DOUBLE PRECISION ANAME(14)                                            00000330
      DATA MONTHS/31,29,31,30,31,30,31,31,30,31,30,31/                      00000340
      DATA ANAME/'TML','MUML','ASLOPE','ASCNST','AS','ACLOPE',              00000350
     *'ACCNST','AC','ALBDO','MUY4','MUY1','MUY2','MUY3','THETA1'/           00000360
C                                                                           00000370
C  ROUTINE TO ACCOUNT FOR THE YEAR                                          00000380
C                                                                           00000390
      IYR=1976                                                              00000400
      DAYS=366                                                              00000410
      XLAT=92.5                                                             00000420
      WLAT=95.0                                                             00000430
      XRAD=0.0174532925199433                                               00000440
      PIE=XRAD*180                                                          00000450
      TC=24/(2*PIE)                                                         00000460
C                                                                           00000470
C  INITIALIZE ARRAYS TO ZERO                                                00000480
C                                                                           00000490
      DO 5 IN=1,36                                                          00000500
      DO 5 INN=1,13                                                         00000510
      TML(IN,INN)=0                                                         00000520
      MUML(IN,INN)=0                                                        00000530
      ASLOPE(IN,INN)=0                                                      00000540
      ASCNST(IN,INN)=0                                                      00000550
      AS(IN,INN)=0                                                          00000560
      ALBDO(IN,INN)=0                                                       00000570
      ACLOPE(IN,INN)=0                                                      00000580
      ACCNST(IN,INN)=0                                                      00000590
      AC(IN,INN)=0                                                          00000600
      MUY1(IN,INN)=0                                                        00000610
      MUY2(IN,INN)=0                                                        00000620
      MUY3(IN,INN)=0                                                        00000630
      MUY4(IN,INN)=0                                                        00000640
```

```
 5 CONTINUE                                                              00000650
53 FORMAT(80A1)                                                          00000660
                                                                         00000670
 SET LATITUDE VALUES                                                     00000680
                                                                         00000690
   DO 8 I=1,36                                                           00000700
   XLAT=XLAT-5                                                           00000710
   WLAT=WLAT-5                                                           00000720
   YLAT(I)=XLAT                                                          00000730
   ZLAT(I)=WLAT                                                          00000740
                                                                         00000750
 READ ALBEDO INPUT DATA FOR CLEAR AND CLOUDY ATMOSPHERE                  00000760
                                                                         00000770
   READ(10,50)(ERB(I,MY),MY=1,12)                                        00000780
   READ(14,50)(FC(I,MY),MY=1,12)                                         00000790
50 FORMAT(6X,12F5.3)                                                     00000800
 8 CONTINUE                                                              00000810
    ZLAT(37)=-90.0                                                       00000820
                                                                         00000830
 BEGIN OUTER LOOP FOR THE 12 MONTHS                                      00000840
                                                                         00000850
   DO 400 MC=1,12                                                        00000860
   IJ=MONTHS(MC)                                                         00000870
   DO 150 J=1,IJ                                                         00000880
                                                                         00000890
 READ DAILY DECLINATION ANGLE.                                           00000900
                                                                         00000910
   READ(13,10)XDEC                                                       00000920
10 FORMAT(F12.7)                                                         00000930
                                                                         00000940
 CHANGE DEGREES TO RADIANS                                               00000950
                                                                         00000960
   DEC=XDEC*XRAD                                                         00000970
                                                                         00000980
 CALCULATE ALGORITHM FOR 36 LATITUDES                                    00000990
                                                                         00001000
   DO 150 IL=1,36                                                        00001010
                                                                         00001020
 BEGIN SUBROUTINE TO COMPUTE TML AND MUML.                               00001030
                                                                         00001040
   XLAT=YLAT(IL)*XRAD                                                    00001050
   CALL TMLXMU(XLAT,DEC,TC,XTML,XMUML,PIE)                               00001060
   TML(IL,MC)=TML(IL,MC)+XTML                                            00001070
   MUML(IL,MC)=MUML(IL,MC)+XMUML                                         00001080
   TML(IL,13)=TML(IL,13)+XTML                                            00001090
   MUML(IL,13)=MUML(IL,13)+XMUML                                         00001100
                                                                         00001110
 SET VALUES TO CALL INTEGRATION SUBROUTINE                               00001120
   IF(XTML.EQ.0.OR.XMUML.EQ.0)GO TO 150                                  00001130
   CALL INTEG(DEC,XLAT,XTML,Y0,Y1,Y2,Y3,Y4,PIE)                          00001140
                                                                         00001150
 COMPUTE Y VALUES                                                        00001160
                                                                         00001170
   Z=XTML*XMUML                                                          00001180
20 CONTINUE                                                              00001190
   Y0=Y0/Z                                                               00001200
   Y1=Y1/Z                                                               00001210
   Y2=Y2/Z                                                               00001220
   Y3=Y3/Z                                                               00001230
   Y4=Y4/Z                                                               00001240
                                                                         00001250
 CALL SUBROUTINE TO COMPUTE ASLOPE,ASCNST,AS,ACLOPE,ACCNST,AC,ALBDO      00001260
                                                                         00001270
```

```
      SALB=ERB(IL,MC)                                                   00001280
      XFC=FC(IL,MC)                                                     00001290
                                                                        00001300
                                                                        00001310
                                                                        00001320
      CALL ALBEDO(SALB,XFC,XTML,XMUML,Y0,Y1,Y2,Y3,Y4,                   00001330
     *XASLOP,XASCST,XAS,XACLOP,XACNST,XAC,XALB)                         00001340
                                                                        00001350
    ADD DAILY VALUES TO MONTH AND YEAR ACCUMULATORS.                    00001360
                                                                        00001370
      MUY1(IL,MC)=MUY1(IL,MC)+Y1                                        00001380
      MUY1(IL,13)=MUY1(IL,13)+Y1                                        00001390
      MUY2(IL,MC)=MUY2(IL,MC)+Y2                                        00001400
      MUY2(IL,13)=MUY2(IL,13)+Y2                                        00001410
      MUY3(IL,MC)=MUY3(IL,MC)+Y3                                        00001420
      MUY3(IL,13)=MUY3(IL,13)+Y3                                        00001430
      MUY4(IL,MC)=MUY4(IL,MC)+Y4                                        00001440
      MUY4(IL,13)=MUY4(IL,13)+Y4                                        00001450
      AS(IL,MC)=AS(IL,MC)+XAS                                           00001460
      AS(IL,13)=AS(IL,13)+XAS                                           00001470
      ASLOPE(IL,MC)=ASLOPE(IL,MC)+XASLOP                                00001480
      ASLOPE(IL,13)=ASLOPE(IL,13)+XASLOP                                00001490
      ASCNST(IL,MC)=ASCNST(1L,MC)+XASCST                                00001500
      ASCNST(IL,13)=ASCNST(IL,13)+XASCST                                00001510
      ACLOPE(IL,MC)=ACLOPE(IL,MC)+XACLOP                                00001520
      ACLOPE(IL,13)=ACLOPE(IL,13)+XACLOP                                00001530
      ALBDO(IL,MC)=ALBDO(1L,MC)+XALB                                    00001540
      ALBDO(IL,13)=ALBDO(IL,13)+XALB                                    00001550
      ACCNST(IL,MC)=ACCNST(IL,MC)+XACNST                                00001560
      ACCNST(IL,13)=ACCNST(IL,13)+XACNST                                00001570
      AC(IL,MC)=AC(IL,MC)+XAC                                           00001580
      AC(IL,13)=AC(IL,13)+XAC                                           00001590
  140 CONTINUE                                                          00001600
  150 CONTINUE                                                          00001610
                                                                        00001620
    FIND MONTHLY AVERAGES OVER EACH OF 36 LATITUDES                     00001630
    IJ =NUMBER OF DAYS IN THE MONTH.                                    00001640
    FOR THE MONTH OVER EACH OF 36 LATITUDES                             00001650
                                                                        00001660
                                                                        00001670
      IJ=MONTHS(MC)                                                     00001680
      DO 300 L=1,36                                                     00001690
      MUY1(L,MC)=MUY1(L,MC)/IJ                                          00001700
      MUY2(L,MC)=MUY2(L,MC)/IJ                                          00001710
      MUY3(L,MC)=MUY3(L,MC)/IJ                                          00001720
      MUY4(L,MC)=MUY4(L,MC)/IJ                                          00001730
      TML(L,MC)=TML(L,MC)/IJ                                            00001740
      MUML(L,MC)=MUML(L,MC)/IJ                                          00001750
      ACLOPE(L,MC)=ACLOPE(L,MC)/IJ                                      00001760
      ALBDO(L,MC)=ALBDO(L,MC)/IJ                                        00001770
      AS(L,MC)=AS(L,MC)/IJ                                              00001780
      ASLOPE(L,MC)=ASLOPE(L,MC)/IJ                                      00001790
      ASCNST(L,MC)=ASCNST(L,MC)/IJ                                      00001800
      ACCNST(L,MC)=ACCNST(L,MC)/IJ                                      00001810
      AC(L,MC)=AC(L,MC)/IJ                                              00001820
  300 CONTINUE                                                          00001830
  400 CONTINUE                                                          00001840
                                                                        00001850
    TAKE YEARLY AVERAGE                                                 00001860
                                                                        00001870
       DO 180 L=1,36                                                    00001880
      MUY1(L,13)=MUY1(L,13)/DAYS                                        00001890
      MUY3(L,13)=MUY3(L,13)/DAYS                                        00001900
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```
      MUY2(L,13)=MUY2(L,13)/DAYS                                        00001910
      MUY4(L,13)=MUY4(L,13)/DAYS                                        00001920
       TML(L,13)=TML(L,13)/DAYS                                         00001930
       MUML(L,13)=MUML(L,13)/DAYS                                       00001940
      AC(L,13)=AC(L,13)/DAYS                                            00001950
      ACCNST(L,13)=ACCNST(L,13)/DAYS                                    00001960
      ACLOPE(L,13)=ACLOPE(L,13)/DAYS                                    00001970
      ALBDO(L,13)=ALBDO(L,13)/DAYS                                      00001980
      AS(L,13)=AS(L,13)/DAYS                                            00001990
      ASLOPE(L,13)=ASLOPE(L,13)/DAYS                                    00002000
      ASCNST(L,13)=ASCNST(L,13)/DAYS                                    00002010
  180 CONTINUE                                                          00002020
                                                                        00002030
C   PRINT THE ARRAYS                                                    00002040
C   GLOBAV COMPUTES ONE MONTHLY AVERAGE FOR THE WHOLE GLOBE.            00002050
                                                                        00002060
      CALL PRINT(MUY1,14,ANAME(11),IYR,YLAT)                            00002070
      CALL PRINT(MUY2,14,ANAME(12),IYR,YLAT)                            00002080
      CALL PRINT(MUY3,14,ANAME(13),IYR,YLAT)                            00002090
      CALL PRINT(MUY4,14,ANAME(10),IYR,YLAT)                            00002100
      CALL PRINT(TML,13,ANAME(1),IYR,YLAT)                              00002110
      CALL PRINT(MUML,13,ANAME(2),IYR,YLAT)                             00002120
      CALL PRINT(ASLOPE,6,ANAME(3),IYR,YLAT)                            00002130
      CALL PRINT(ASCNST,6,ANAME(4),IYR,YLAT)                            00002140
      CALL PRINT(AS,6,ANAME(5),IYR,YLAT)                                00002150
      CALL GLOBAV(AS,ZLAT,AG,6,XRAD)                                    00002160
      CALL PRINT(ACLOPE,6,ANAME(6),IYR,YLAT)                            00002170
      CALL PRINT(ACCNST,6,ANAME(7),IYR,YLAT)                            00002180
      CALL PRINT(AC,6,ANAME(8),IYR,YLAT)                                00002190
      CALL GLOBAV(AC,ZLAT,AG,6,XRAD)                                    00002200
      CALL PRINT(ALBDO,6,ANAME(9),IYR,YLAT)                             00002210
      CALL GLOBAV(ALBDO,ZLAT,AG,6,XRAD)                                 00002220
                                                                        00002230
C   COMPUTE GLOBAL AVERAGES FOR NORTHERN AND SOUTHERN HEMISPHERES       00002240
                                                                        00002250
      DO 430 I=1,13                                                     00002260
      ANG(I)=0                                                          00002270
      ASG(I)=0                                                          00002280
      AG(I)=0                                                           00002290
  430 CONTINUE                                                          00002300
      DO 500 M=1,13                                                     00002310
      DO 500 L=1,18                                                     00002320
      Z1=ZLAT(L)*XRAD                                                   00002330
      Z2=ZLAT(L+1)*XRAD                                                 00002340
      ANG(M)=ANG(M)+(ALBDO(L,M)*(SIN(Z1)-SIN(Z2)))                      00002350
  500 CONTINUE                                                          00002360
      WRITE(6,525)                                                      00002370
      WRITE(6,525)                                                      00002380
      WRITE(6,725)                                                      00002390
      WRITE(6,725)                                                      00002400
      WRITE(6,550)(ANG(J),J=1,13)                                       00002410
      WRITE(6,550)(ANG(J),J=1,13)                                       00002420
  550 FORMAT(/7X,13F8.5)                                                00002430
                                                                        00002440
      DO 700 M=1,13                                                     00002450
      DO 700 L=19,36                                                    00002460
      Z1=ZLAT(L)*XRAD                                                   00002470
      Z2=ZLAT(L+1)*XRAD                                                 00002480
      ASG(M)=ASG(M)+(ALBDO(L,M)*(SIN(Z1)-SIN(Z2)))                      00002490
  700 CONTINUE                                                          00002500
  725 FORMAT(8X,5X,'JAN',5X,'FEB',5X,'MAR',5X,'APR',5X,'MAY',           00002510
     *5X,'JUN',5X,'JUL',5X,'AUG',5X,'SEP',5X,'OCT',5X,'NOV',5X,'DEC',5X,00002520
     *'AVG',/)                                                          00002530
```

```
      WRITE(6,730)                                                    00002540
      WRITE(6,730)                                                    00002550
      WRITE(6,725)                                                    00002560
      WRITE(6,725)                                                    00002570
      WRITE(6,550)(ASG(K),K=1,13)                                     00002580
      WRITE(6,550)(ASG(K),K=1,13)                                     00002590
  525 FORMAT(////////////////////////40X,'NORTHERN GLOBAL AVERAGES')   00002600
  730 FORMAT(//40X,'SOUTHERN GLOBAL AVERAGES')                        00002610
C                                                                     00002620
C  COMPUTE THETA1                                                     00002630
C                                                                     00002640
      DO 936 L=1,36                                                   00002650
      DO 936 M=1,12                                                   00002660
      THETA1(L,M)=(ARCOS(MUY1(L,M)))*180/PIE                          00002670
  936 CONTINUE                                                        00002680
      CALL PRINT(THETA1,14,ANAME(14),IYR,YLAT)                        00002690
      STOP                                                            00002700
      END                                                             00002710
C                                                                     00002720
      SUBROUTINE TMLXMU(XLAT,DEC,TC,XTML,XMUML,PIE)                   00002730
C                                                                     00002740
      REAL MU,MUX,MU1                                                 00002750
C                                                                     00002760
      XMUML=0                                                         00002770
      TM1=-TAN(DEC)*TAN(XLAT)                                         00002780
      IF(TM1.LE.-1.OR.TM1.GE.1)GO TO 100                              00002790
      TM2=ARCOS(TM1)                                                  00002800
      TM3=TC*TM2                                                      00002810
      GO TO 110                                                       00002820
  100 TM3=12                                                          00002830
      IF(TM1.GE.1)TM3=0                                               00002840
  110 CONTINUE                                                        00002850
      XTML=TM3                                                        00002860
      IF(XTML.EQ.0) GO TO 120                                         00002870
      MU=2*SIN(DEC)*SIN(XLAT)                                         00002880
      MUX=2*PIE*XTML/24                                               00002890
      MU1=24*COS(DEC)*COS(XLAT)*SIN(MUX)/(PIE*XTML)                   00002900
      XMUML=(MU+MU1)/2                                                00002910
  120 CONTINUE                                                        00002920
      RETURN                                                          00002930
      END                                                             00002940
C                                                                     00002950
C  BEGIN SUBROUTINE TO INTEGRATE                                      00002960
C                                                                     00002970
      SUBROUTINE INTEG(DEC,XLAT,TMX,Y0,Y1,Y2,Y3,Y4,PIE)               00002980
C                                                                     00002990
C                                                                     00003000
C                                                                     00003010
      A=SIN(DEC)*SIN(XLAT)                                            00003020
      B=COS(XLAT)*COS(DEC)                                            00003030
C                                                                     00003040
      C=(2*PIE)/24                                                    00003050
      Z=C*TMX                                                         00003060
C                                                                     00003070
      X1=SIN(Z)                                                       00003080
      Y0=A*Z/C+B/C*X1                                                 00003090
C                                                                     00003100
      X2=SIN(Z)*COS(Z)/2+0.5*Z                                        00003110
      Y1=A*A*Z/C+2*A*B/C*X1+B*B*X2/C                                  00003120
C                                                                     00003130
      X3=SIN(Z)*COS(Z)*COS(Z)/3+2*X1/3                                00003140
      Y2=1/C*(A**3*Z+3*A*A*B*X1+3*A*B*B*X2+B**3*X3)                   00003150
C                                                                     00003160
```

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      X4=SIN(Z)*(COS(Z))**3/4+3*X2/4                                    00003170
      Y3=1/C*(A**4*Z+4*A**3*B*X1+6*A*A*B*B*X2+4*A*B**3*X3+B**4*X4)      00003180
                                                                        00003190
      X5=SIN(Z)*(COS(Z))**4/5+4*X3/5                                    00003200
      Y4A=A**5*Z+5*A**4*B*X1+10*A**3*B**2*X2+10*A*A*B**3*X3             00003210
      Y4B=5*A*B**4*X4+B**5*X5                                           00003220
      Y4=Y4A+Y4B                                                        00003230
      Y4=1/C*Y4                                                         00003240
                                                                        00003250
      X6=SIN(Z)*(COS(Z))**5/6+5*X4/6                                    00003260
      Y5=1/C*(A**6*Z+6*A**5*B*X1+15*A**4*B*B*X2+20*A**3*B**3*X3+        00003270
     *15*A*A*B**4*X4+6*A*B**5*X5+B**6*X6)                               00003280
                                                                        00003290
      X7=SIN(Z)*(COS(Z))**6/7+6*X5/7                                    00003300
      Y6=1/C*(A**7*Z+7*A**6*B*X1+21*A**5*B*B*X2+35*A**4*B**3*X3+        00003310
     *35*A**3*B**4*X4+21*A*A*B**5*X5+7*A*B**6*X6+B**7*X7)               00003320
      END                                                               00003330
                                                                        00003340
    BEGIN SUBROUTINE PRINT                                              00003350
                                                                        00003360
      SUBROUTINE PRINT(ARRAY,IUNIT,ANAME,IYR,YLAT)                      00003370
      DOUBLE PRECISION ANAME                                            00003380
      DIMENSION ARRAY(36,13),YLAT(36)                                   00003390
      WRITE(6,423)                                                      00003400
  423 FORMAT(////////////)                                              00003410
      WRITE(6,425)ANAME,IYR                                             00003420
  425 FORMAT(47X,'MATRIX ',A6,2X,I4,/)                                  00003430
      WRITE(6,450)                                                      00003440
  450 FORMAT(3X,'LAT',5X,'JAN',5X,'FFB',5X,'MAR',5X,'APR',5X,'MAY',     00003450
     *5X,'JUN',5X,'JUL',5X,'AUG',5X,'SEP',5X,'OCT',5X,'NOV',5X,'DEC',5X,00003460
     *'AVG',/)                                                          00003470
      DO 475 KL=1,36                                                    00003480
      WRITE(6,500)YLAT(KL),(ARRAY(KL,KM),KM=1,13)                       00003490
  500 FORMAT(1X,F5.1,1X,13F8.4)                                         00003500
  475 CONTINUE                                                          00003510
      RETURN                                                            00003520
      END                                                               00003530
                                                                        00003540
    BEGIN SUBROUTINE WHICH COMPUTES ALBEDO VALUES                       00003550
    FOR CLEAR AND CLOUDY ATMOSPHERES.                                   00003560
                                                                        00003570
      SUBROUTINE ALBEDO(SALB,XFC,XTML,XMUML,Y0,Y1,Y2,Y3,Y4,             00003580
     *XASLOP,XASCST,XAS,XACLOP,XACNST,XAC,XALB)                          00003590
                                                                        00003600
      CTC=.2704/.64                                                     00003610
      XASLOP=.31876+1.2638*Y1-1.3681*Y2+.50833*Y3                       00003620
    COMPUTE AS CONSTANT.                                                00003630
                                                                        00003640
      XASCST=.35057-1.0933*Y1+1.6599*Y2-1.1897*Y3+.32105*Y4             00003650
                                                                        00003660
    COMPUTE AS                                                          00003670
                                                                        00003680
      XAS=SALB*XASLOP+XASCST                                            00003690
                                                                        00003700
    COMPUTE ALBEDO FOR CLOUDY ATMOSPHERE.                               00003710
                                                                        00003720
      XACLOP=.16326+.3633*Y1+.025011*Y2                                 00003730
                                                                        00003740
    COMPUTE AC CONSTANT                                                 00003750
      XACNST=.73-.25*Y1                                                 00003760
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C   COMPUTE FINAL ALBEDO VALUE.                                          00003800
C                                                                        00003810
      XALB=(1-XFC)*XAS+XFC*XAC                                           00003820
      IF(XFC.EQ.0)XALB=0                                                 00003830
      RETURN                                                             00003840
      END                                                                00003850
C                                                                        00003860
C   THIS SUBROUTINE COMPUTES THE GLOBAL AVERAGE FOR EACH MONTH           00003870
C   AND THE GLOBAL AVERAGE FOR THE YEAR.                                 00003880
C                                                                        00003890
      SUBROUTINE GLOBAV(MAT,ZLAT,AVRG,IUNIT,XRAD)                        00003900
      REAL MAT(36,13)                                                    00003910
      DIMENSION ZLAT(37),AVRG(13)                                        00003920
      DO 700 I=1,13                                                      00003930
      AVRG(I)=0                                                          00003940
  700 CONTINUE                                                           00003950
      DO 900 M=1,13                                                      00003960
      DO 800 L=1,36                                                      00003970
      Z1=ZLAT(L)*XRAD                                                    00003980
      Z2=ZLAT(L+1)*XRAD                                                  00003990
      AVRG(M)=AVRG(M)+(MAT(L,M)*(SIN(Z1)-SIN(Z2)))                       00004000
  800 CONTINUE                                                           00004010
      AVRG(M)=AVRG(M)/2.0                                                00004020
  900 CONTINUE                                                           00004030
      WRITE(IUNIT,922)(AVRG(K),K=1,13)                                   00004040
  922 FORMAT(/2X,'AVG',2X,13F8.5)                                        00004050
      RETURN                                                             00004060
      END                                                                00004070
C                                                                        00004080
C  ***************************************************************************00004090
C                                                                        00004100
//    EXEC LINKGO,REGION.GO=200K                                         00004110
//GO.FT10F001 DD DSN=Y9KLG.SALB,DISP=SHR                                 00004120
//GO.FT13F001 DD DSN=Y9KLG.CDAT76,DISP=SHR                               00004130
//GO.FT14F001 DD DSN=Y9KLG.FCLD76,DISP=SHR                               00004140
//GO.FT06F001 DD SYSOUT=A                                                00004150
//*                                                                      00004160
//                                                                       00004170
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//Y9KLGAB1 JOB (FR0041665D,T,AAAAAA,001001),132,MSGCLASS=A                00000010
//*  EXEC FORTRANH                                                        00000020
//SOURCE.SYSIN DD *                                                       00000030
C                                                                         00000040
      REAL NGA(18)                                                        00000050
      DIMENSION ARRAY(36,18),SGA(18),FALB(18),Z(18,36)                    00000060
      DIMENSION AS(18),AC(18),VX(18),MONTHS(18)                           00000070
      REAL DM(2)/.10,-.10/,DASH(2)/.2,.1/,ANGLE1(1)/-90./                 00000080
      COMMON/OPTION/IMIN,IMAX,JMIN,JMAX,FINTER,NUMV,CONTUR(50)            00000090
       LOGICAL*1 CHAR(72)                                                 00000092
       EQUIVALENCE (CHAR(1),MONTHS(1))                                    00000093
       DATA MONTHS/'JUL ','AUG ','SEP ','OCT ','NOV ','DEC ',            00000095
     * 'JAN ','FEB ','MAR ','APR ','MAY ','JUN ','JUL ','AUG ',          00000096
     * 'SEP','OCT','NOV','DEC'/                                          00000097
       DATA NGA/0.32597,0.32735,0.33567,0.33594,0.33645,0.33532,          00000100
     *0.34758,0.37194,0.37035,0.35410,0.34897,0.33322,                    00000110
     *0.3265 ,0.32900,0.33474,0.35551,0.35020,0.33647/                    00000120
       DATA SGA/0.33034,0.35384,0.38375,0.37642,0.36061,0.35955,          00000140
     *0.35317,0.35264,0.36229,0.35701,0.34212,0.32080,0.33281,            00000150
     *0.36054,0.37838,0.37820,0.37088,0.36044/                            00000160
       DATA FALB/.32815,0.34060,0.35971,0.35618,0.34853,0.34744,          00000180
     *0.35037,0.36229,0.36632,0.35556,0.34555,0.32701,0.32970,            00000190
     *0.34477,0.35656,0.36685,0.36054,0.34845/                            00000200
       DATA AS/0.18365,0.18725,0.18997,0.20244,0.20303,0.19628,           00000220
     *0.19857,0.20407,0.20611,0.20443,0.19560,0.18530,0.18386,            00000230
     *0.18732,0.18998,0.20226,0.20290,0.19631/                            00000240
       DATA AC/0.58214,0.59163,0.59792,0.59837,0.59034,0.57941,           00000260
     *0.58476,0.59578,0.60148,0.59831,0.58889,0.57721,0.58246,0.59175,    00000270
     *0.59790,0.59808,0.59013,0.57944/                                    00000280
C                                                                         00000290
C***************************************                                  00000300
C***     READ INPUT DATA FILESS     ****                                 00000310
C***************************************                                  00000320
       DO 600 I=1,6                                                       00000330
       DO 400 L=1,36                                                      00000340
       READ(11,100) (ARRAY(L,M1),M1=1,6)                                  00000350
       READ(12,200) (ARRAY(L,M2),M2=7,18)                                 00000360
       WRITE(6,125) (ARRAY(L,K1),K1=1,18)                                 00000380
  400  CONTINUE                                                           00000390
  125  FORMAT(1X,22F6.3)                                                  00000400
  100   FORMAT(56X,6F8.5)                                                 00000410
  200   FORMAT(7X,12F8.5)                                                 00000420
  300   FORMAT(7X,4F8.5)                                                  00000430
       DO 302 IS=1,18                                                     00000440
        VX(IS)=IS                                                         00000450
       DO 302 L=1,36                                                      00000460
          Z(IS,L)=ARRAY(36-L+1,IS)                                        00000470
      IF(I.NE.1) Z(IS,L)=Z(IS,L)*100.0                                    00000475
  302  CONTINUE                                                           00000480
C***************************************                                  00000490
C***     CALL THE WOLF SUBPROGRAM    ***                                 00000500
C***************************************                                  00000510
C                                                                         00000520
       CALL PLOTST(10.1,4)                                                00000530
C                                                                         00000570
      IF(I.NE.1)GO TO 500                                                 00000580
       CALL SETGRD(2.0,2.0,10.0,10.0,-4)                                  00000682
        CALL SETGRD(4.,4.,100.,80.,-1)                                    00000684
         CALL OGRID(1.0,18.0,9,'I2)',2,0.0,0.8,12,'F3.2)',2,0)            00000686
       CALL SCALE(1.0,18.0,0.0,0.8,0)                                     00000688
      CALL PLOT(VX,NGA,18,'-)')                                           00000690
       CALL PLOT(VX,SGA,18,'.)')                                          00000700
```

This program plots the numerical values of tables and arrays as given in figures 1-7.

```
        CALL PLOT(VX,FALB,18,'*)')                                      00000710
        CALL PLOT(VX,AC,18,'*)')                                        00000720
      CALL PLOT(VX,AS,18,'*)')                                          00000730
         IMAX=18                                                        00000737
        DO 402 J=1,IMAX                                                 00000738
         X=J                                                            00000740
         CALL COORD(X,0.0,XLOC,YLOC,IERR)                               00000742
         CALL HORLIN(MONTHS(J),4,XLOC,1.7,0.0,0.0)                      00000744
402     CONTINUE                                                        00000746
       CALL FRMADV                                                      00000748
 500    CONTINUE                                                        00000750
C                                                                       00000760
      IMIN=1                                                            00000770
      IMAX=18                                                           00000780
      JMIN=1                                                            00000790
      JMAX=36                                                           00000800
C                                                                       00000810
C***    INITIALIZE THE WOLF PLOTTING PACKAGE.                           00000860
C                                                                       00000870
      CALL SETGRD(2.,2.,10.,10.,-4)                                     00000880
      CALL SETGRD(4.,4.,100.,80.,-1)                                    00000890
      CALL OGRID(FLOAT(IMIN),FLOAT(IMAX),9,'I2)',2,                     00000900
     *           -87.5,87.5,35,'F5.1)',2,0)                             00000910
       CALL SCALE(1.0,18.0,1.0,36.0,0)                                  00000915
        CALL UNDEF(0.0)                                                 00000920
C                                                                       00000930
C                                                                       00000950
      NUMV=0                                                            00000960
      FINTER=5.0                                                        00000970
        IF(I.EQ.1) FINTER=0.5                                           00000971
          CALL CONIST(0.0)                                              00000973
       CALL CONLST(100.0)                                               00000974
          IF(I.EQ.4.OR.I.EQ.5) CALL CONIST(2.0)                         00000975
          IF(I.EQ.4.OR.I.EQ.5) FINTER=4.0                               00000976
       IF(I.EQ.1) CALL CONLST(12.0)                                     00000977
C                                                                       00000980
C***    SPECIFY PLOTTING OPTIONS.                                       00000990
C                                                                       00001000
        CALL LABELI(2)                                                  00001010
        CALL CONSUP(-3)                                                 00001015
C                                                                       00001020
C***   OUTPUT THE CONTOUR PLOT                                          00001040
C                                                                       00001060
      CALL ERROR(Z,18,36,1,IERROR)                                      00001070
         CALL ROTCAL(.TRUE.)                                            00001080
      CALL ZDUMP(Z,18,36)                                               00001090
       CALL CONFRM('F4.1)')                                             00001095
       IF(I.EQ.1) CALL CONFRM('F4.1)')                                  00001096
      CALL TRACER(Z,18,36)                                              00001100
        DO 590 J=1,IMAX                                                 00001110
          X=J                                                           00001112
        CALL COORD(X,0.0,XLOC,YLOC,IERR)                                00001114
        CALL HORLIN(MONTHS(J),4,XLOC,1.7,0.0,0.0)                       00001116
590     CONTINUE                                                        00001118
        CALL VERLIN('***LATTITUDE***',15,1.0,6.0,0,1)                   00001135
       CALL FRMADV                                                      00001220
 600   CONTINUE                                                        00001230
        CALL ENDPLT                                                     00001250
       STOP                                                             00001260
      END                                                               00001270
//  EXEC LINKGO,REGION.GO=278K                                          00001280
//LINK.SYSLIB DD DSN=SYS2.WOLFPLOT,DISP=SHR                             00001290
//*GO.FT20F001 DD DSN=SYS2.WRLDATAX,DISP=SHR                            00001300
```

```
/GO.FT11F001 DD DSN=Y9KLG.MAS75,DISP=SHR                          00001310
/GO.FT12F001 DD DSN=Y9KLG.MAS76,DISP=SHR                          00001320
/GO.FT13F001 DD DSN=Y9KLG.MAS77,DISP=SHR                          00001330
/GO.PLOTTAPE DD DCB=(,DEN=1),LABEL=(,BLP,,OUT),                   00001340
/     UNIT=(7TRACK,,DEFER),VOL=SER=123488                         00001350
/GO.FT06F001 DD SYSOUT=A                                          00001360
/*  THIS CARD IS NECESSARY ONLY IF DWORLD IS CALLED               00001370
/*  X=1 OR 2 DEPENDING UPON DATA SET DESIRED                      00001380
*                                                                 00001390
/                                                                 00001400
```

Analytical Method of Computing μ_{dl}^n

Now

$$\mu_{dl}^n = \frac{1}{T_{dl}} \int_o^{T_{dl}} \mu_o^n \frac{(t)\ \mu_o(t)}{\overline{\mu}_{dl}(t)} \ dt$$

$$\mu_{dl}^n = \frac{1}{T_{dl}\overline{\mu}_{dl}} \int_o^{T_{dl}} (\text{Sin } \delta \text{ Sin } \phi + \cos \delta \cos \phi \cos \frac{2\pi t}{T})^{n+1} \ dt \qquad \text{I}$$

Consider

$$\int (\text{Sin } \delta \text{ Sin } \phi + \cos \delta \cos \phi \frac{2\pi t}{T})^n \ dt \qquad \text{II}$$

Consider a, b, c constants such unit

$a = \text{Sin } \delta \text{ Sin } \phi$

$b = \text{Cos } \delta \cos \phi$

$c = \frac{2\pi}{T}$

Let $z = ct$

then (II) can be written as

$$\frac{1}{c} \int (a + b \cos z)^n \ dz \qquad \text{III}$$

$z = ct$

$dz = cdt$

$dt = \frac{dz}{c}$

$z_{dl} = CT_{dl}$

To find

$$\int (a + b \cos \chi)^n d\chi \qquad \text{for } n = 1,2,3,4$$

For n = 1

$$\int (a + b \cos \chi) d\chi = a\chi + \int b \cos\chi \, d\chi$$

$$= a\chi + b \sin \chi$$

Reduction formula for evaluating

$$\int \cos^n \chi \, d\chi = \frac{\sin \chi \cos^{n-1} \chi}{n} + \frac{n-1}{n} \int \cos^{n-2}\chi \, d\chi$$

$$\int (a + b \cos\chi)^2 d\chi = \int (a^2 + 2ab \cos\chi + b^2 \cos^2\chi) d\chi$$

$$= a^2\chi + 2ab \, \chi 1 + b^2 \left(\frac{\sin \chi \cos\chi}{2} + \frac{1}{2} \int \cos^{\circ}\chi \, d\chi\right)$$

$$= a^2\chi + 2ab \, \chi 1 + b^2\left(\frac{\sin \chi \cos \chi}{2} + \frac{1}{2} \chi\right)$$

$$= a^2\chi + 2ab \, \chi 1 + b^2 \chi_2$$

Note in general

$$\chi_1 = \int \cos\chi \, d\chi \qquad \chi_2 = \int \cos^2\chi \, d\chi$$

$$\chi_3 = \int \cos^3\chi \, d\chi \qquad \chi_n = \int \cos^n\chi \, d\chi$$

considering I and II we have

$$\mu^{o}_{dl} = \frac{1}{T_{dl}\,\bar{\mu}_{dl}\,c} \int_{o}^{c.T_{dl}} (a + b\cos z)dz$$

$$= \frac{1}{T_{dl}\,\bar{\mu}_{dl}\,c}\left[az + b\int_{o}^{c.T_{dl}} \cos z\, dz\right]$$

$$\mu^{1}_{dl} = \frac{1}{T_{dl}\,\bar{\mu}_{dl}\,c} \int_{o}^{c.T_{dl}} (a + b\cos z)^2\, dz$$

$$= \frac{1}{T_{dl}\,\bar{\mu}_{dl}\,c}\left[\int_{o}^{c.T_{dl}} a\,d\,z + 2ab\int_{o}^{c.T_{dl}} \cos z\,d\,z + \frac{b^2}{3}\int_{o}^{c.T_{dl}} \cos^2 z\, dz\right]$$

$$= \frac{1}{T_{dl}\,\bar{\mu}_{dl}\,c}\left[a\,z + 2ab\,\chi_1 + b^2\,\chi_2\right]_{o}^{c.T_{dl}}$$

$$\chi_1 = \int_{o}^{c.T_{dl}} \cos z\,d\,z$$

$$= \left|\text{Sin } z\right|_{o}^{c.T_{dl}}$$

$$\chi_2 = \int_{o}^{c.T_{dl}} \cos^2 z\,d\,z$$

$$= \left|\frac{\text{Sin } z\cos z}{2} + \frac{1}{2}\,z\right|_{o}^{c.T_{dl}}$$

$$\mu_{d1}^2 = \frac{1}{T_{d1}\,\bar{\mu}_{d1}\,c} \int_0^{c.T_{d1}} (a + b\cos z)^3\, dz$$

$$= \frac{1}{T_{d1}\,\bar{\mu}_{d1}\,c} \left[a^3 z \Big|_0^{c.T_{d1}} + 3a^2 b \int_0^{c.T_{d1}} \cos z\, dz + 3ab^2 \int_0^{c.T_{d1}} \cos^2 z\, dz + b^3 \int_0^{c.T_{d1}} \cos^3 z\, dz \right]$$

$$= \frac{1}{T_{d1}\,\bar{\mu}_{d1}\,c} \left[a^3 z + 3a^2 b\, \chi_1 + 3ab^2\, \chi_2 + b^3\, \chi_3 \right]_0^{c.T_{d1}}$$

$$\chi_3 = \frac{\sin z \cos^2 z}{3} + \frac{2}{3}\,\chi_1$$

$$\chi_1 = \int_0^{c.T_{d1}} \cos z\, dz = \mathrm{Sin}\,(c\chi T_{d1})$$

$$\chi_2 = \int_0^{c.T_{d1}} \cos^2 z\, dz = \frac{\mathrm{Sin}\ z \cos z}{2} + \frac{1}{2} \int_0^{c.T_{d1}} \cos^0 z\, dz$$

$$= \frac{\mathrm{Sin}(c.T_{d1})\cos(c.T_{d1})}{2} + \frac{1}{2}\, c.T_{d1}$$

$$\chi_4 = \int_0^{c.T_{d1}} \cos^4 z\, dz = \left| \frac{\mathrm{Sin}\ z \cos^3 z}{2} + \frac{3}{4}\,\chi_2 \right|_0^{c.T_{d1}}$$

Computation of $\mu^n_{o(t)} = \frac{1}{T}\int_o^T \mu^n_o(t)\ \frac{\mu_o(t)}{\mu_o(t)}\ dt$

for n = 0, 1,2,3,4,5,6.

a = Sin (Dec) Sin (LAT)

b = cos Dec cos(LAT)

$c = \frac{2\pi}{T}$

z = ct

χ_1 = Sin z

$\text{Muo0} = \frac{az}{c} + \frac{b}{c}\ \chi_1$

$\chi_2 = \frac{\text{Sin z cos z}}{2} + \frac{1}{2}\ z$

$\mu^1_o = \text{Muo1} = \frac{a^2 z}{c} + \frac{2ab}{c}\ \chi_1 + \frac{b^2}{c}\ \chi_2$

$\chi_3 = \frac{\text{Sin z cos}^2 z}{3} + \frac{2}{3}\ \chi_1$

$\mu^2_o = \text{Muo2} = \frac{1}{c}\ [a^3 z + 3a^2 b\chi_1 + 3ab^2\chi_2 + b^3\chi_3]$

$\chi_4 = \frac{\text{Sin z cos Z}}{3} + \frac{3}{4}\ \chi_2$

$\mu^3_o = \text{Muo3} = \frac{1}{c}\ (a^4 z + 4a^3 b\chi_1 + 6a^2 b^2\chi_2 + 4ab^3\ \chi_3 + b^4\chi_4)$

$\chi_5 = \frac{\text{Sin z cos}^4 Z}{5} + \frac{4}{5}\ \chi_3$

$\mu^4_o = \text{Muo4} = \frac{1}{c}[a^5 z + 5a^4 b\chi_1 + 10a^3 b^3\chi_2 + 10a^2 b^3\chi_3 + 5ab^4\chi_4 + b^5\chi_5]$

DESCRIPTION OF VARIABLES
USED IN ALBEDO MAIN PROGRAM
E MODEL

VARIABLE	DESCRIPTION
XTML	Zonal averaged daily time in hours elapsed from noon to sunrise or sunset.
TML(L,M)	Averaged zonal monthly time in hours elapsed from noon to sunrise or sunset.
XMUML	Daily zonal values of cosine of solar zenith angles.
MUML(L,M)	Averaged zonal monthly values of cosine of solar zenith angles.
FC(L,M)	Averaged zonal monthly cloud fractions at the top of the atmosphere. (input data; source: Nimbus 6.)
SALB(L,M)	Averaged zonal monthly surface albedo.
XASLOP	Daily zonal values of slope function of albedo at the top of the cloud free atmosphere.
ASLOPE(L,M)	Averaged zonal monthly values of slope function of albedo at the top of the cloud free atmosphere.
XASCST	Averaged daily zonal values of intercept at the top of a cloud free atmosphere.
ASCNST(L,M)	Averaged zonal monthly values of intercept at the top of a cloud free atmosphere.
XAS	Averaged daily zonal albedo at the top of a cloud free atmosphere.
AS(L,M)	Averaged zonal monthly albedo at the top of a cloud free atmosphere.
XACLOP	Averaged daily zonal values of slope function of albedo at the top of a cloudy atmosphere.
ACLOPE(L,M)	Averaged zonal monthly values of slope function of albedo at the top of a cloudy atmosphere.
XACNST	Daily zonal values of intercept at the top of a cloudy atmosphere.

VARIABLE	DESCRIPTION
ACCNST(L,M)	Averaged zonal monthly values of intercept at the top of a cloudy atmosphere.
XAC	Daily zonal albedo at the top of a cloudy atmosphere.
AC(L,M)	Averagaed zonal monthly albedo at the top of a cloudy atmosphere.
ALBEDO(L,M)	Averaged zonal monthly albedo at the top of the atmosphere, taking into account both clear and cloudy conditions.

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