COSMIC RAYS (from SGD Explanation of Data Reports)

Cosmic Ray Tabulated Observations -- The table presents the daily (UT) average counting rates per hour (scaled) for seven high counting rate neutron monitors: Thule, Deep River, Kiel, Climax, Beijing, Tokyo, and Haleakala. The characteristics of the stations are given below; the data are corrected applying the barometric coefficients to the listed standard station pressure.

The Climax, CO, USA, and Huancayo, Peru, (replaced by Haleakala, Hawaii) Neutron Monitor data are communicated by J.A. Simpson and G. Lentz of the Enrico Fermi Institute for Nuclear Studies, University of Chicago. The instruments are standard Chicago type neutron monitors, utilizing 12 BF3, counter tubes, divided into two identical and independent sections. For a more detailed description of the neutron intensity monitors see J.A. Simpson, Annals of the IGY, Vol. IV, Part VII, 351-373, 1957. The publication of these data in this monthly series began September 1960 for Climax and in January 1979 for Huancayo. Hourly averages, both corrected and uncorrected and local pressure data are available in both tabular and digital form for these stations from the WDC-A for Solar-Terrestrial Physics, Boulder, CO.

The Deep River, Ontario, Canada, neutron monitor, follows the IQSY design [IQSY Instruction Manual No. 7 which is published in the Annals of the IQSY, Vol 1, Chapter 13]. Publication of the daily rates in SGD began in January 1966 but a chart of hourly values from Deep River, described below, has been published in SGD since January 1959. Until December 31, 1972, the station was operated and maintained by Atomic Energy of Canada Ltd., but on January 1, 1973, the National Research Council of Canada took over the responsibility for maintenance of the station.

The 18-NM-64 neutron monitor located at Alert, Northwest Territories, Canada, was unique because its asymptotic cone of acceptance in space is less than 10 degrees wide and is aligned within 7 degrees of the spin axis of the Earth. Hence, unlike the stations whose cones of acceptance rotate with the Earth approximately in the plane of the ecliptic, Alert always "looks" into a fixed cone directed northward. It experiences negligible periodic diurnal intensity variation. The monitor at Alert was provided by Atomic Energy of Canada, Ltd., and housed in a building provided by National Research Council of Canada. It is the responsibility of the National Research Council; the day-to-day operation is by courtesy of the Canadian Meteorological Service. The data for Deep River and Alert are now provided by Margaret D. Wilson and M. Bercovitch of the National Research Council of Canada. The original data can be obtained from National Research Council of Canada, Ontario, Canada K1A OR6, or from any of the World Data Centers.

The Thule nucleonic intensity detector, of standard IQSY design, was originally located at the Geopole Station Greenland: latitude 76 degrees 36'N, longitude 68 degrees 48'W, altitude 260m, geomagnetic threshold rigidity essentially zero. At the end of 1976, it was moved to a new site on Thule Air Base. The coordinates are essentially unchanged except that the altitude is now close to sea level. Data acquired after station relocation have been renormalized to be compatible with the earlier data.

Thule data are communicated by John W. Bieber, Bartol Research Institute, University of Delaware, Newark, DE 19716 (U.S.A.) Thule data published in Solar Geophysical Data are preliminary. Final data are released to the World Data Centers and to the scientific community following an annual comprehensive review of instrument status and stability.

The Beijing superneutron monitor data are available from Prof. Du Heng, WDC-D Space Sciences, Center for Space and Applied Research, Beijing, China. The monitor was set up in 1983 and operated since early 1984. Its counting rate is 20 times as large as that of an IGY neutron monitor. Its statistical accuracy is 4.5 times as large as that of an IGY monitor. Data are exchanged routinely among the WDCs.

Two other monitors, at Kiel (18-NM-64) and Tokyo (36-NM-64), have asymptotic cones of acceptance much different from those given above. Therefore, they can be used to distinguish between UT-dependent and LT dependent time variations. Higher cutoff rigidities also aid further estimation of rigidity dependence.

The publication in SGD of the Kiel and Tokyo data began with the December 1973 data. The data from both neutron monitors are routinely submitted to the World Data Centers A, B, and C2 for Cosmic Rays as well as to listed researchers. Kiel data have been available since September 1964 and Tokyo (or Tokyo-Itabashi) data since January 1970. Since there were changes in the number of counters, a revision of pressure reduction, and so on, the level of Tokyo data has changed several times. The Kiel data are communicated to Solar-Geophysical Data by K. Takahashi after receiving the Kiel data from K. Rohrs.

Charts -- Variations of cosmic ray intensity are depicted in chart form in SGD for the above stations. The vertical scale lines mark the days of the month in Universal Time. The horizontal scale lines are in intervals of 5% deviation from the arbitrarily chosen 100% reference level for each station. The 100% reference levels are based upon (after barometric correction) 0.6740x106 counts per hour for Deep River, and 0.7132x106 for Alert. For Thule, Kiel, Climax, and Tokyo, the plots represent percentage deviation from the mean intensity of the corresponding 27 days which is taken to be the 100% level.

COSMIC RAY NEUTRON MONITORS

	Geographic						Baro.	Standard
	Lat.	Long.	Cutoff*	Alt.		Scaling	coeff.	press.
Station	North	East	GV	m	Type	Factor	%/mm Hg	mm Hg
Thule	76.50	291.30	0.00	44	NM 64	100	0.99	754
Deep River	46.10	282.50	1.07	145	NM 64	300	0.987	747
Calgary	51.08	245.87	1.09	1128	NM 64	300	1.0155	671.1
Kiel	54.34	10.12	2.32	54	NM 64	100	0.961	755
Climax	39.37	253.82	2.97	3400	IGY	100	0.962	504
Beijing	40.08	116.26	9.56	47	NM 64	256	0.75%/mb	624.8
Tokyo	35.75	139.72	11.50	20	NM 64	256	0.888	760.5
Haleakala	20.71	203.07	13.30	3052	NM 64	1000	0.962	518

*Calculated by DGRF75 (COSMIC RAY TABLE No. 1, ed. WDC-C2 Japan, March 1983).