Meteorological Satellites

Some recent results of the Meteorological Satellite Program, specifically, research with pictures and radiation data from the Tiros satellites, were presented on 27 December during sessions of the 3rd western national meeting of the American Geophysical Union, held at the University of Colorado, Boulder, 26–28 December 1963.

An overall impression gained from the session on satellite meteorology, and also from other sessions, including the general assembly of the Union, was that interdisciplinary boundaries within geophysics are breaking down. This observation, often noted and perhaps trite, doubtless is a well known fact among those of broad background, but its more striking impact upon those of lesser experience may be one of the more desirable aspects of such a meeting. Indeed, it is obvious that the Tiros data in themselves cannot be considered as solely "meteorological"; they also have implications for hydrology, oceanography, aeronomy, and space physics.

C. O. Erickson (U.S. Weather Bureau, Washington, D.C.) reviewed selected research results and emphasized the fundamentally different nature of picture data obtained by satellites as compared to conventional meteorological observations obtained at fixed points. Although the data are increasingly useful, the initial problem of how to use them proficiently has been only partially overcome by the numerous case studies relating the Tiros pictures to conventional meteorological analyses.

Tiros pictures yield considerable information, including amounts of cloud cover, the presence of cyclonic circulations, and estimates of atmospheric stability, wind direction, and wind shear. However, the information is still largely qualitative and subjective and may vary greatly in time and space. It appears that further real progress in the use of satellite picture data in weather analysis and prediction will depend increasingly on our ability to make these data more quantitative and objective so that they may be incorporated into numerical models.

Albert Arking (New York University) described an interesting and significant attempt to quantify Tiros picture data. Nearly 1500 Tiros III pictures were analyzed on a digital computer in a study of the global distribution of cloud cover. General agree-

ment with climatological averages was obtained, but there were certain regional differences, for example, greater cloudiness over North Africa. Because of the limited period (3 months) and the inferior quality of the later Tiros III pictures, further study along this line would be very desirable.

James Arnold (Chicago) presented some work of T. Fujita which utilized both Tiros pictures and certain of the Tiros radiation data to give the pattern of equivalent blackbody temperatures. The patterns fit very well, and allow for estimating the height of cloud tops. Although radiation data are not yet available operationally, because of calibration and data-reduction problems, this demonstration of combined potential is significant for the future, especially for tropical areas where data are sparse. Erickson earlier had pointed out that Tiros measurements of outgoing, long-wave radiation had been used in preliminary studies of the earth-atmosphere heat budget and that more extensive data would permit global studies not heretofore possible.

Research with Tiros VII radiation measurements in the 15-micron CO_2 band was described by W. Nordberg (NASA, Greenbelt, Md.). Assuming a uniform mixing ratio of CO_2 with altitude, these measurements were interpreted in terms of mean equivalent blackbody temperatures and gave the gross temperature structure of the stratosphere. A more sophisticated effort, using spectrometer measurements from several narrow intervals in the 15-micron band, is planned for the future. The spectrometer will first be flown from a balloon, and the measurements from several intervals are expected to aid a more detailed analysis of stratospheric temperatures.

Julius London (University of Colorado) arranged the program for this and other meteorology sessions. The entire meeting was favored by delightful weather for the season.

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Forthcoming Events

February

12–16. American College of **Cardiology**, 13th annual, New Orleans, La. (P. Reichert, Empire State Bldg., New York, N.Y. 10001)

13–14. Texas **Industrial Pharmacy** Seminar, Austin. (L. R. Parker, Pharmacy Extension Service, Univ. of Texas, Austin)