

SATELLITE DATA FOR GLOBAL MONITORING

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ABSTRACT

Although global monitoring has been carried out by weather satellites since 1960, only the Tiros N-NOAA series, 1978- has acquired data of sufficient spatial resolution and radiometric quality to be useful for long term quantitative studies. During the period 1964-1978 the Nimbus series (1-7) and Landsats 1-3 tested new technologies for earth observations. These programs were basically engineering demonstrations, so that the data are not documented for climate studies. The NASA program ended in 1978 with the launch of 5!!! satellites: Landsat 3, Nimbus 7, Seasat, the Heat Capacity Mapping Mission, and Tiros-N, the prototype for the present NOAA series. It will resume around 1997, after a gap of almost 20 years.

Thus, the operational environmental satellites (1978-) must be considered the most appropriate data source for global long term climatic studies. The present complement consists of a pair of sun-synchronous polar orbiters (U.S.), providing twice daily global coverage, and 5 geostationary satellites (two from the U.S. one each from Japan, India, and the European Community). Although the primary purpose of the geostationary satellites is to provide imagery for weather analysis and warnings, the quantitative data are used to derive winds, estimate precipitation, snowcover and insolation, and in the U.S., for soundings. Quantitative data from the polar orbiters is used for atmospheric soundings, sea surface temperature, vegetation index, ozone profiles, and snowmaps. Because of their importance to weather forecasts the operational satellites will continue and gradually improve in capability. The satellite data record is now long enough to allow statistically significant climate variables to be derived.

If one considers as essential program elements the stability and continuity of data sets, then the NOAA AVHRR and TOVS instruments and the recent Landsat and SPOT radiometers represent our best opportunities for environmental/climate studies, at least within the foreseeable future. Recent efforts both inside and outside NOAA have attempted to remedy the historical lack of information on radiometric calibration of the earth observing satellites. NOAA is currently involved in establishing a scientific framework for systematic development of climate data sets of global extent: the existing sea surface temperature and vegetation index products are examples which should only improve with time. A summary of NOAA's status and plans is presented.

Meanwhile NASA is starting the Earth Observing System program, with initial observations expected in the 1996-98 time frame. This ambitious program dwarfs previous efforts. The question of resuming such programs after a gap of 20 years is addressed by an anecdote illustrating the agency's (historical) attitude toward programmatic continuity. Certainly we wish NASA well in this endeavour.