

IAF EARTH OBSERVATION SYMPOSIUM (B1)
International Cooperation in Earth Observation Missions (1)

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WITHOUT SATELLITES – WEATHER FORECASTING?

Abstract

Using environmental satellites to observe the Earth from space is one of the key tools in forecasting weather, analyzing climate, and monitoring hazards worldwide. Satellite observations have a huge impact on numerical weather prediction (NWP) model analyses and forecasts, with sounding data from polar orbiting and GPS-radio occultation satellites reducing model forecast error by almost half. Satellites provide observations in otherwise data sparse areas, such as the oceans of the Northern Hemisphere and most of the Southern Hemisphere. Polar-orbiting environmental satellites from National Oceanic and Atmospheric Administration (NOAA), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and other satellites, with their ability to rapidly sample the atmosphere around the entire globe, are the primary data sources used by these NWP models and are critical to their forecast accuracy at three days and beyond. Without Satellite data, good model forecasts would not be possible at three- to seven-day lead times in both hemispheres, and sometimes even at two- to three-day lead times in the Southern Hemisphere. Denying satellite data to NWP significantly degrades the forecast at all forecast times in both hemispheres, and has a greater impact than denying conventional observations (radiosondes, surface weather stations, ships, buoys, and aircraft) Many types of satellite observation are also used directly in numerical weather prediction (NWP) models. Observations from up to 90 individual satellite instruments are routinely assimilated by many Global NWP Models. Without Satellites, prediction of powerful storms over the oceans was difficult, sometimes leading to disastrous outcomes. This study looks at the impact of satellite observations on the quality of Operational Weather forecasts and along with lead times.