



The role of ground-based GNSS water vapor observations in IEOS/GEOSS

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The Integrated Earth Observing System/Global Earth Observing System of Systems (IEOS/GEOSS) is the response of 54 nations and 33 international organizations including the European Commission to the need for timely, accurate, long-term, global information as a basis for answering pressing industrial, political and societal questions and responding to socio-economic imperatives at global-to-local scales. The participants in the last Earth Observation Summit in 2004 recognized the need to support the creation of a comprehensive, coordinated, and sustained Earth observing system to continuously monitor the state of the Earth, increase understanding of dynamic Earth processes, enhance prediction of the Earth system, and further implement environmental treaty obligations. A 10-year implementation plan developed by the ad hoc Group on Earth Observations (GEO) lays the groundwork for developing and/or implementing a distributed system of observing systems, building sequentially on existing capabilities and international cooperation. This paper concentrates on only two of the many possible contributions of Global Navigation Satellite Systems to this effort: quality control of global radiosonde moisture soundings and calibration/validation of satellite water vapor soundings. Radiosondes form the basis of inter-comparison, calibration and validation of most other atmospheric observing systems, and serve as the benchmark or “ground-truth” for satellite-derived estimates of temperature, moisture and other atmospheric constituents or properties. Because of the unique characteristics of radiosondes, and the fact that satellite observations are frequently made in locations that are otherwise inaccessible, many of the parameters measured by radiosondes and

satellites are under-observed and difficult to verify. At a minimum, we believe that collocation of ground-based GNSS receivers at all (~150) Global Climate Observing System Upper-Air Network Sites, and upgrading their infrastructure to ensure reliable power and real-time communications, is one of the most cost effective and high return investments that can be made by the world community in IEOS/GEOSS.

For more information on IEOS/GEOSS, see <http://earthobservations.org/contact.asp>.

For more information on the use of GNSS in NOAA weather forecasting, climate monitoring, research and other applications, see <http://gpsmet.noaa.gov>