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FORMOSAT-3 COSMIC Mission and Intense Observation Period (IOP) Campaign

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In collaboration with UCAR in the USA, NSPO will launch six LEO satellites in late March 2006 to obtain near-real time the global distribution of dry air pressure, temperature and water vapor in the neutral atmosphere as well as electron density in the ionosphere. Each satellite carries three science payloads: a GPS receiver which measures the amplitude and phase of GPS signals, a Tri-Band Beacon (TBB) transmitter which emits three coherent frequencies at 150 MHz, 400 MHz and 1066.7 MHz, and a Tiny Ionospheric Photometer (TIP) which measures photon emission at 135.6 nm wavelength. The signals received by the GPS receivers will be employed for GPS limb occultation sensing of atmospheric data (vertical profiles of air pressure, temperature and water vapor) for meteorological and climate research, as well as for weather forecasting. The FORMOSAT-3 satellites should provide at least 2500 vertical profiles of near-real time atmospheric vertical profiles with almost uniform global distribution per day, which is about three times the ∼900 ground based observations that are located mostly in continental regions. Combining the GPS RO data with the data from TIP and ground TBB receivers, the 3D global distribution of electron density and scintillation in the ionosphere can be obtained for space weather monitoring and modeling. After all six FORMOSAT-3 satellites are launched into the initial parking orbits of about 500 km in altitude, it will take 13 months for all satellites to settle in their designed orbital planes with a longitudinal separation of 24 degree and altitude of about 700-800 km. During the first eight months after launch the FORMOSAT-3 satellites will stay relatively close to each other in longitude and the GPS radio occultation data points would be very dense. It is a rare and excellent opportunity for performing cross validation of the radio occultation data with other observations (ground based radiosonde, weather satellite, and balloons, radars, etc.). To make use of this dense observation period, NSPO will conduct an Intense Observation Period (IOP) campaign to perform cross data validation studies as well as the prediction studies of typhoon track, heavy rainfall area, and rainfall accumulation in the East Asia region. Researchers are invited to participate in the IOP campaign.