PRELIMINARY RESULTS OF FY-3E GNOS II MISSION: GNSS RO AND GNSS-R

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The GNOS II payload onboard the FengYun-3E (FY-3E) meteorological satellite launched on July 5, 2021 is the upgraded GNSS remote sensor of GNOS onboard FY-3C and FY-3D. It has both the GNSS radio occultation (GNSS RO) and GNSS reflectometry (GNSS-R) functions that can monitor atmosphere, ionosphere and the Earth surface simultaneously. In particular, the observations of the FY-3E GNOS II sensor mainly involves the Earth's atmospheric refractivity, temperature, humidity, pressure, ionospheric electron density profiles, and the ocean surface wind speed, which is an additional data product.

Firstly, this presentation will introduce the FY-3E GNOS II GNSS RO atmospheric and ionospheric results, comparing with the corresponding data from the models (e.g., ECMWF, NCEP, IRI, etc.), the other missions such as the MetOp, COSMIC, especially the FY-3C and FY-3D GNOS missions. The GNOS RO data quality consistency of different FengYun-3 meteorological satellites i.e., FY-3C/-3D/-3E, as well as different GNSS systems i.e., GPS and BDS will be analyzed.

Secondly, the retrieval algorithm and validation results of the ocean surface wind product will be presented. The GNSS-R L1 product of GNOS II is the 122x20 non-uniform delay-Doppler map. The delay resolution is 1/8 chip near the specular point and 1/4 chip away from the specular point. The Doppler resolution is 500 Hz. The L2 ocean surface winds are retrieved by geophysical model functions related to the delay-Doppler map average (DDMA) and Leading-Edge Slope (LES) observables computed from the L1 DDM. The retrieved L2 winds are validated by comparing to the ECMWF model and HY-2B, HY-2C scatterometer winds. The results are also analyzed by different GNSS systems (GPS and BDS). Furthermore, the preliminary results for the retrieval of sea ice coverage and soil moisture will be presented. The sea ice coverage retrieval results are validated by the OSI SAF product and the soil moisture retrieval results are validated by the SMAP data.

Finally, the additional value of the combination of the GNSS RO and GNSS-R techniques in one payload will be investigated and analyzed.