[JJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-TT Technology &Techniques

[A-TT32]Brand-new geoscientific observations by GNSS-Reflectometry

convener:Kaoru Ichikawa(Research Institute for Applied Mechanics, Kyushu University), Kosuke Heki(Department of Earth and Planetary Sciences, Faculty of Science, Hokkaido University)
Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
GNSS-Reflectometry (GNSS-R) dares to use indirect GNSS signals reflected by an object, which cause multi-path errors in the positioning system, and extracts status information of the reflecting surface itself. It requires low-power and light-weight GNSS receivers alone, so that any platform can be adopted, including microsatellites or UAVs. This session will present various observations using GNSS-R, such as sea surface wind speeds, waves, sea surface height, soil moisture and ice detection.
In addition, possible scientific impacts are discussed with unprecedentedly frequent global observations by multiple satellites, such as NASA's eight-microsatellite CYGNSS GNSS-R mission.

[ATT32-P05]Monitoring of the Rainfall using Marine X-band radar

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Keywords:marine X-band radar, rainfall, observation

Weather radars are operating at a higher site than the surrounding area in order to prevent the terrain from blocking the beam. This causes a quantitative error to the rainfall estimation near the surface, even though radar observations are useful over the sea where in situ observation is difficult. The marine radar has a shorter detecting radius than the weather radar, but can detect targets with higher spatial resolution. We modified a marine radar to estimate quantitative precipitation in order to fill the gap of the weather radar. The analogue-to-digital converter has been developed to extract the precipitation signal from the marine X-band radar. The terrain clutter and vessel included in the precipitation signal were removed by a clutter map. The attenuation of the precipitation signal due to the increase of beam volume were improved by applying the beam attenuation and volume correction factor depending on the distance. We have developed an algorithm to estimate the quantitative rainfall from the marine X-band radar signal based on the linear relationship between the rainfall measured by rain gauge on the ground and the marine X-band radar precipitation signal. This result was validated by comparison with the rainfall by rain gauge on the ground. The precipitation distribution over 5 mm hr^{-1} of the marine X-band radar was consistent with that of the weather radar and the movement of the precipitation echo can be monitored in real time on higher spatial and temporal resolution than the weather radar. This study suggests a new observation technique to complement the temporal and spatial gaps of weather radar and to forecast for the risk of severe weather over coastal region.