Type: Poster

Atmospheric Tides in Space Geodetic Applications

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Atmospheric tides are thermally excited oscillations induced mainly by solar radiation absorption by ozone and water vapor, and latent heat release due to deep convection. We study atmospheric tides by their manifestations, which instigate high-frequency harmonics in atmospheric density and its spatial gradients. These mass variations excite variations in the gravity field which can be observed from space (e.g., GRACE-FO) and from the ground (e.g., superconducting gravimeters); the crustal deformation due to surface loading; the atmospheric delays estimated during the analysis of microwave-based space geodetic measurements; and Earth rotation parameters observed e.g., by VLBI. We have modeled these effects employing numerical weather models including ECMWF's ERA5 and DWD's ICON. We have estimated the impact of these effects on space geodetic observations such as GRACE-FO's laser ranging interferometer, and GNSS. The presentation provides a glimpse into the modeling of these effects as well as the validation thereof employing space geodetic observations.

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