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Poster
Inversion of radio occultation profiles usually relies on the Abel transform in spherically symmetric atmosphere. The main contribution to the refractive index comes from gaseous constituents such as pressure, temperature and water vapor. However, the impact of other particles in the troposphere neglected in the retrieval can become important during severe weather events, causing the commonly applied assumptions to be invalid. We used Global Forecast System (GFS) model to simulate the effect of cloud water and ice on bending angle profiles. The information of solid and liquid parts was assessed from cloud mixing ratio based on temperature-dependent separation. The signal was propagated along occultation plane between GPS satellite and low-Earth orbiter through tangent point placed in the vicinity of tropical cyclone. Hence, we restored 2-dimensional profile structure, neglecting out-of-plane components. Simulations were performed with Multiple Phase Screen (MPS) method on the example of Typhoon Soudelor that passed through Taiwan on August 8, 2015. The refractive index induced by liquid clouds inside of the cyclone eye exceeded value of 2.5 ppm which corresponds to cloud mixing ratio on the level of 20 g/kg. This causes the bending angle to differ by over 1.5 % with respect to retrievals with zero clouds contributions. Ice clouds can affect radio occultation profiles up to the top height of 19 km. The most significant impact of ice water was observed at the transition altitude of around 10 km, where cloud water becomes solid. The highest fractional difference of the bending angle reached 0.5 %.
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