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In 2006, for the launch of Metop-A, the first of three satellites of the EUMETSAT Polar System, EUMETSAT started to develop an infrastructure for the Precise Orbit Determination (POD) in support of Radio Occultation experiments. This infrastructure has developed over time and can now provide precise orbits for a large number of satellites carrying RO instruments, both on-board scientific/governmental missions (i.e., Champ, Grace, Cosmic, Cosmic-2, and Sentinel-6A / Jason CS) and more recently, on-board the commercial satellite fleets of Spire and GeoOptics. In addition other corrections on both the LEO and the GNSS side (i.e. antenna phase centre offset and variation, attitude) are applied during further RO processing consistently across all missions. The internal consistency of the orbits obtained at EUMETSAT is verified by comparing solutions obtained with two different state-of-the-art software, NAPEOS and Bernese. In addition, EUMETSAT participates to the Copernicus Regular Service Review, where POD solutions are compared among different centres. For this activity, EUMETSAT provides orbits for the altimetric satellites Sentinel-3A, Sentinel-3B, and Sentinel-6A.
In this contribution the development, current status, and future prospects of the POD infrastructure at EUMETSAT will be described. To illustrate the role of the quality of POD products in the retrieval of atmospheric bending angles, we compare how different levels of accuracy of POD solutions and other corrections usually applied in RO processing (i.e. Kappa ionospheric correction) are mapped to variations in the bending angle profiles. While up to the stratosphere the profiles are not particularly sensitive to centimetre-level variations in the orbit solutions, these induce high-altitude biases, a region that is important for climate studies, thus pointing to the increasing importance of highly accurate POD in current and forthcoming missions.
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