

Development and analysis of a gridded dataset from GPS occultation data based on LEO satellite swaths

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COSMIC/FORMOSAT-3 satellites have been providing GPS radio occultation (RO) data in unprecedented sampling density. The six low-earth-orbit satellites were launched with a rocket in April 2006, so they were initially on one orbit. Raising the altitudes one by one slowly dispersed the satellites, but after about a year since the launch, three of them were still on the same orbit. Therefore, data density was especially high in the vicinity of the orbit over about a year.

We have developed an algorithm to create a gridded dataset based on the COSMIC/FORMOSAT-3 RO data by exploiting this feature. Namely, we made a gridded dataset based on a swath around the orbit. Since the distribution of the tangent points is irregular in the swath, they were interpolated onto a regular grid. The dataset is useful to analyze mesoscale features in the troposphere and the stratosphere. Case studies show that it is capable to capture three-dimensional features of gravity waves, which have been analyzed on the basis of independent vertical profiles in many studies using GPS RO data.