

Introduction of the SWOT satellite altimetry mission

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SWOT (Surface Water and Ocean Topography) is a next-generation satellite altimetry mission by NASA and CNES to be launched in 2021, which will measure the spatial-temporal variation of water surface elevations of the land and ocean. Unlike conventional nadir altimeters which measures the elevation of water just below the spacecraft (e.g. Jason 1/2, Cryosat), SWOT is a “swath altimeter” which will observe the 2-dimensional distribution of water surface elevations using radar interferometer. With its 21-day sun-unsynchronized orbit, almost entire areas between N78 and S78 are to be measured without major gap by the observation swath of ~120km width. High-resolution (<100m) observations are planned over land to capture small rivers and lakes, whereas the observation over oceans will be at ~500m resolution mainly targeting mesoscale eddies.

Especially for hydrology, SWOT will be the first-ever comprehensive measurement of water surface elevations, as the spatial scales of rivers and lakes are much smaller than that of oceans. It will observe rivers wider than 100m and lakes and wetlands larger than 5ha with better than 10cm vertical accuracy, and will provide spatial and temporal distributions of surface water extent and storage. In addition to the directly-observable water surface elevations, by delineating water surface slope, SWOT is expected to estimate river discharge from space. The SWOT measurements, in combination with other ancillary datasets and models, will enhance our ability to assess the storage change in lakes and reservoirs, the occurrence of flood and draught, the dynamics of wetland and floodplain, at a global scale.

Toward its launch in 2021, tremendous efforts are ongoing for sensor development, error budget analysis, algorithm development, and ancillary data/model preparation. Overview of the SWOT mission, mainly focusing on hydrology components, will be presented during the JpGU-AGU joint meeting.

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