

## SC 2.5 Satellite Altimetry

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Vice-Chair: C.K. Shum

### Terms of Reference

global ocean surface topography. The long-term time series of altimeter measurements has revolutionised the knowledge of many interdisciplinary scientific research fields including the marine gravity field, oceanic dynamics, terrestrial hydrology, ice sheet mass balance, sea level changes, and solid Earth geodynamics. Conventional Ku-band altimetry is now a mature technique after more than 24 years of continuous observations and will be further applied in Jason-3. New missions employing Ka-band radar (SARAL/AltiKa), delay Doppler SAR altimetry (CryoSat-2, Sentinel-3 and Jason-CS) and laser altimetry (ICESat-1/-2 including a photon counting instrument) are providing and will provide higher resolution observations of the cryosphere, sea-ice, ice-covered oceans, open oceans and inland water bodies. The future Surface Water and Ocean Topography (SWOT) altimeter mission, to be launched in 2020, is expected to substantially improve our understanding of ocean circulation and surface water hydrology at finer scales. Another altimetric technology under development is GNSS-R altimetry or reflectometry, which also has applications in the remote sensing of ocean wind retrieval, soil moisture, land cover, snow depth, and ocean surface topography.

With these existing and new technological advances in altimetry, novel observations are and will be driving technological leaps forward for satellite geodesy and oceanography. At the same time, they will bridge an observational gap on a spatio-temporal domain critical for solving interdisciplinary problems of considerable societal benefit. Therefore, the purpose of this IAG sub-commission is to promote innovative research using historic and future altimeter observations to study local, regional, and global geophysical processes, with emphasis on emerging cross-disciplinary applications using satellite altimetry, and in combination with other *in situ* data sets and techniques including hydrography data, SAR/InSAR and GRACE/GOCE. The research results and potential data products will benefit IAG's Global Geodetic Observing System.

### Objectives

Sub-Commission 2.5 will:

- Establish a close link between this sub-commission and the International Altimeter Service (IAS) and data product providers, in order to (1) organise scientific forums to discuss new results, (2) bring new algorithms from expert research into data production, and (3) encourage development of data products that more directly facilitate cross-disciplinary applications using satellite altimetry;
- Promote innovative applications of satellite altimetry, including evaluations and cross-disciplinary applications of future satellite altimetry;
- Continue developing techniques to improve altimeter data quality, aiming towards new data products in coastal zones including coastal ocean, estuaries and inland water bodies;
- Focus on capabilities of the very high along-track spatial resolution from new SAR and SARAL altimeters for precisely modelling the marine gravity field, the mean sea surface, bathymetry and ocean mean dynamic topography, as well as temporal variations of sea level induced by solid Earth processes, climate change and the global terrestrial water cycle;
- Promote cross-disciplinary research on the shapes and temporal variations of land/ice/ocean surfaces, such as studies of long-term ocean variability, regional and global sea level changes, mountain glaciers/ice-sheet ablations/accumulations, permafrost degradation, coastal and ice-shelf ocean tides, vertical displacements at major tectonic-active zone, land subsidence and other geophysical processes; and
- Establish a specific connection with relevant altimetry observing systems in IAG's GGOS.

### Program of Activities

This sub-commission will organize independent workshops or special sessions in major meetings to promote altimetric applications in interdisciplinary earth sciences, and to increase the visibility of IAG in altimetric science. Special study groups may be established to investigate important issues.

## **Steering Committee**

- Chair: Xiaoli Deng (Australia)
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