

SC 2.5 Satellite Altimetry

Chair: Xiaoli Deng (Australia)

Terms of Reference

For long-term geodetic and climate change studies, a series of repeat-track radar altimeter satellite missions (e.g., Geosat/GFO, TOPEX/Jason-1/-2/-3, ERS-1/-2/Envisat, Cryosat-2, Altika, and Sentinel-3) have made and will continue to monitor ocean surface height globally. Missions of the CryoSat-2 InSAR/SAR altimetry and ICESat-1/-2 laser altimetry are significantly improving observations of the cryosphere, sea-ice and ice-covered oceans. CryoSat-2 altimetry in its conventional LRM and SAR modes, will be the best chance to improve the marine gravity field by a factor of two in the near future. The future planned Surface Water and Ocean Topography (SWOT) wide-swath synthetic aperture radar interferometry (InSAR) altimetry mission is about to map high spatial resolution oceanic sub-mesoscale variability and surface water hydrology. Another potential technology under development is the so-called GNSS-R altimetry or reflectometry. With these existing and new technological advances in altimetry, the purpose of this IAG sub-commission is to promote innovative research involving the use of historic and future altimeter observations on the studies of local, regional, and global geophysical processes, with emphasis on emerging cross-disciplinary applications using satellite altimetry, and in combination with other data sets, including *in situ* hydrography data (XBT/MBT/Argo) and GRACE/GOCE. The research results and potential data products will benefit IAG's Global Geodetic Observing System (GGOS) and the International Altimetry Service (IAS).

Objectives

General objectives of the Sub-Commission 2.5 will include:

- To establish a close link between this sub-commission and international altimeter services to bridge the gaps on new research and application data products or services not currently available, in terms of establishing scientific forums to discuss new result results, and as expert users, suggesting to altimeter services to develop more efficient procedures and new data products involving cross-disciplinary applications using satellite altimetry;
- To promote innovative applications of satellite altimetry, including evaluations and cross-disciplinary applications of future satellite altimetry;
- To continue developing techniques to improve altimeter data quality towards new data products in coastal zones including coastal ocean, estuaries, and coastal land;
- To promote cross-disciplinary research to improve the determinations of the shapes and temporal variations of land/ice/ocean surfaces, such as studies of coastal ocean variability, regional sea level change, mountain glaciers/ice-sheet ablations/accumulations, permafrost

degradation, coastal and ice-shelf ocean tides, vertical displacements at major tectonic-active zone and due to other geophysical processes;

- To improve the marine geoid, mean dynamic ocean topography, temporal variations induced by solid Earth processes and global terrestrial water cycle; and
- To establish a specific connection with relevant altimetry observing systems in IAG's GGOS and IAS.

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 will be established to investigate important issues.

Steering Committee

- Chair: Xiaoli Deng (Australia)
- Vice Chair: C.K. Shum (USA)
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