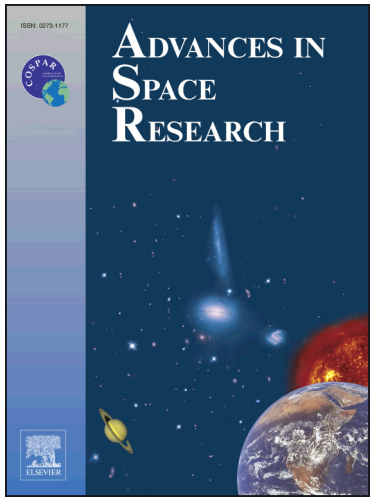

First Calibration Results of Jason-2 and SARAL/AltiKa Satellite Altimeters from the Qianli Yan Permanent Cal/Val Facilities, China

Lei Yang, Xinghua Zhou, S.P. Mertikas, Lin Zhu, Long Yang, Ning Lei

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First Calibration Results of Jason-2 and SARAL/AltiKa Satellite Altimeters from the Qianli Yan Permanent Cal/Val Facilities, China

Lei Yang[a,*], Xinghua Zhou [a], S. P. Mertikas[b], Lin Zhu[c,d], Long Yang [a], Ning Lei [a]

[a] First Institute of Oceanography, State Oceanic Administration, Qingdao 266061, China;

[b] Technical University of Crete, School of Mineral Resources Engineering, Geodesy and Geomatics Engineering Laboratory, GR-73100 Chania, Crete, Greece

[c] Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Science, Hefei, 230031

[d] University of Science and Technology of China, Hefei, 230037

Abstract. This work presents the first calibration results for the Jason-2 and the SARAL/AltiKa altimetric missions using the permanent calibration facilities on the Qianli Yan islet (China). Qianli Yan is located in the Yellow Sea and only ~3 km from the Jason-2 and SARAL/AltiKa crossover point. Analysis of Jason-2 and SARAL/AltiKa waveform data and geophysical data over the Qianli Yan calibration area has proven the altimeters and microwave radiometers are not contaminated by the mainland or the islet. The accuracies of the regional geoid model, provided by the First Institute of Oceanography (FIO), State Oceanic Administration of China, and the DTU10 MSS model were assessed by a GNSS buoy experiment. The results indicated the FIO model is suitable for altimeter calibration in the Qianli Yan area. Based on observations and the geoid model, the absolute biases for the Jason-2 and SARAL/AltiKa altimeters (2013–2014) were determined as 21.0 ± 5.9 and −44.0 ± 7.3 mm, respectively. The two years' results indicated the Jason-2 bias had no trend. However, the SARAL/AltiKa bias presented a downward trend that was more stable in 2014 than 2013. The Qianli Yan results are consistent with those determined by other international dedicated calibration sites and crossover analysis.

Keywords: Absolute calibration, Jason-2, SARAL/AltiKa, Qianli Yan Cal/Val

1 Introduction

Satellite radar altimetry constitutes fundamental technology for monitoring global sea level change and thus, indirectly, climate change. It is able to provide measurements of sea surface height (SSH) to within ±1 cm with respect to the center of mass of the Earth over the global ocean(Fu and Haines, 2013; Sandwell et al., 2014). The altimeters of the TOPEX/Poseidon, Jason-1, Jason-2, Jason-3, and Sentinel-3A satellites have been measuring SSH over repeated orbits without interruption for more than 20 years (Masters et al., 2012). In 2011, China launched the HY-2A satellite altimeter and India launched the SARAL/AltiKa in 2013. These new altimeters have improved the spatial and temporal resolutions of SSH measurements. Furthermore, the HY-2A operates with an alternative orbit and period; thus, it can fill the observational gaps of the other satellites. This could be of great benefit both for monitoring global sea level change and for studies of oceanic dynamics and physics and geodetic science(Dadzie and Li, 2007; Hwang and

* Corresponding author.
E-mail address: leiyang@fio.org.cn (Lei Yang)