National Ocean Satellite Application Service

Current Status of the HY-2B Satellite Radar Altimeter

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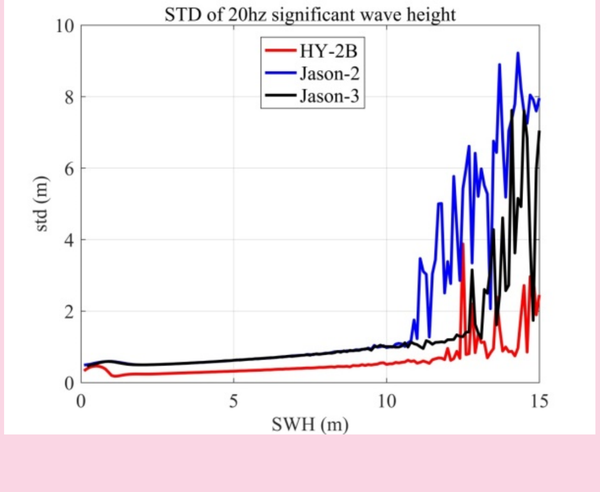
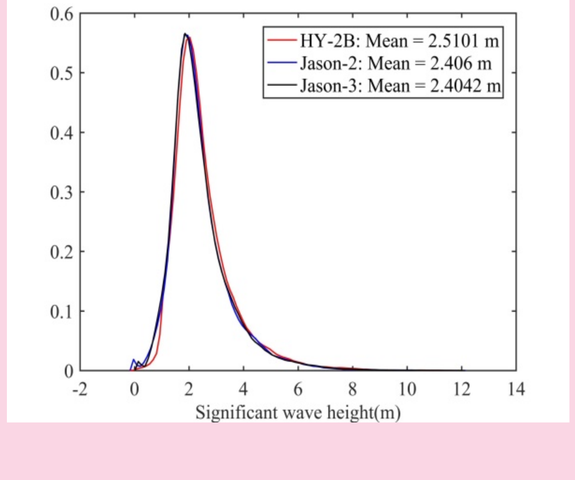
◆**Introduction** The HY-2B satellite is the second dynamic environment satellite in China. It was successfully launched on October 25th 2018 with a sun-synchronous orbit at an altitude of ~970km. Repeat cycles of 14 days are planned for the first two years with oceanographic purpose and 168 days geodetic cycles will follow for the third year of the mission. The satellite is equipped with a Ku/C bands altimeter and the orbit is determined thanks to SLR, GPS.

Comparing with Jason-2 and Jason-3 satellite radar altimeters and on-site buoys, the objects of comparison include significant wave height, sea surface wind speed, and sea level anomaly and so on. It is found that the precision of HY-2B satellite radar altimeter secondary products reaches the same kind of satellite radar altimeter products in the world, and some products are better than Jason-2 and Jason-3 standard products.

INTRODUCTION The HY-2B satellite altimeter provides sea surface height, significant wave height, sea surface wind speed and polar ice sheet elevation. First of all, the description of instruments and the instrument parameters will be put forward briefly in this research. And then, the current status of the HY-2B products will be described in detail, including the measurement accuracy.

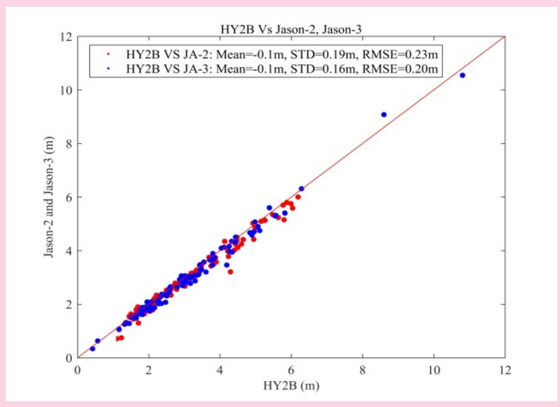
◆ CURRENT STATUS OF THE HY-2B SATELLITE RADAR ALTIMETER In order to explain the measurement stability, a indicator is used in my presentation. As indicator for the precision of a parameter at 1 Hz, we consider the standard deviation (std) of the parameter like significant wave height, sigma0 and range over 20 Hz measurements and evaluate those as a function of significant wave height. We then compute the median of the standard deviations for each significant wave height to obtain the performance curve.



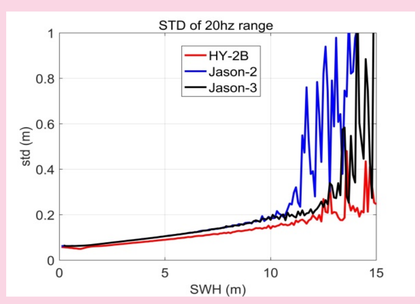


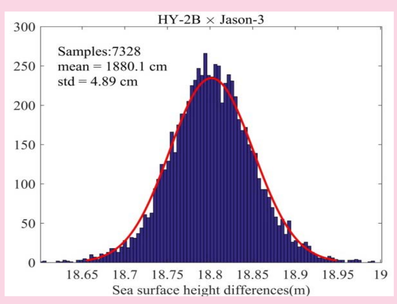
By comparing the indicator calculated from HY-2B, Jason-2, Jason-3, we can find their measurement stability. From these graphs we can get two important results. The precision decreases with Hs when Hs are greater than 2 m. The HY-2B Hs has the lowest (standard deviation) std among the three altimeter data sets when Hs is lower than 12m. Of course, we can't say which one is good and which one is bad among these altimeters. But, at least it means that the measurement of the instrument on the HY-2B is stable. Or more stable than Jason-2 and Jason-3.

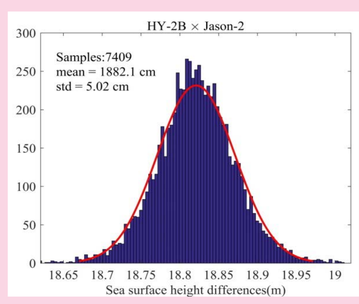
The histogram distribution of significant wave height from Jaos-2/3 and HY-2B are compared we can conclude that the accuracy of significant wave height from HY-2B is comparable to the JASONs.



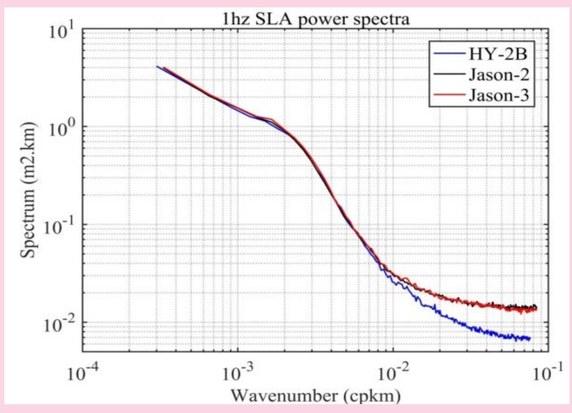
Results relatively to the 2 altimeters are very good. Standard deviation of differences is about 20 cm. The root mean square error (rmse) ranges from 20 cm to 23 cm. The bias is negative.







The results on IGDRs products are very good and close to the one from JA2 JA3.



We note that the noise floor for the 1-Hz data from HY-2B is smaller than JA2 and JA3.

CONCLUSIONS Generally speaking, the products of HY-2B satellite radar altimeter are perfect. And it will contribute to the earth observation system.