Achieving and Validating the 1-centimeter Orbit: Jason-1 Precision Orbit Determination Using GPS, SLR, DORIS and Altimeter data

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ABSTRACT

Jason-1, launched on December 7, 2000, is continuing the time series of altimeter level topography observations as the forerunner to the forthcoming TOPEX/Poseidon (TOP)/T/P satellite altimeter. The precise orbit determination (POD) is a critical component of the mission. The goal of the mission is to achieve 1 cm radial orbit accuracy. Any difficulties related to the POD will be identified. The POD is understood to be the achievement of the specified orbit accuracy and the validation of the performance of the orbit solution. This quality is of critical importance since the POD is the foundation for all of the science. This paper presents and evaluates the POD performance and results of the Jason-1 POD. The results show it is possible to achieve 1 cm radial orbit RMS (root mean square) accuracy for Jason-1 POD. The validation of this performance is provided by an extensive analysis of the POD performance and the results are presented here.

POD Performance

Table 1: POD Performance Summary Statistics

- GPS RD: 0.75 mm RMS
- GPS+SLR RD: 1.00 mm RMS
- SLR+DORIS+Xover RD: 0.80 mm RMS

The results show it is possible to achieve 1 cm radial RMS accuracy for Jason-1 POD. The validation of this performance is provided by an extensive analysis of the POD performance and the results are presented here.

POD Overview and Details

Table 2: POD Summary Statistics

- GPS RD: 0.75 mm RMS
- GPS+SLR RD: 1.00 mm RMS

The results show it is possible to achieve 1 cm radial RMS accuracy for Jason-1 POD. The validation of this performance is provided by an extensive analysis of the POD performance and the results are presented here.

POD Performance

Table 3: POD Performance Summary Statistics

- GPS RD: 0.75 mm RMS
- GPS+SLR RD: 1.00 mm RMS

The results show it is possible to achieve 1 cm radial RMS accuracy for Jason-1 POD. The validation of this performance is provided by an extensive analysis of the POD performance and the results are presented here.

References


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