



## **Update of the South-Atlantic Anomaly corrective model for JASON-1 DORIS data using the maps of energetic particles from the CARMEN dosimeter onboard JASON-2**

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The sensitivity of the ultra stable oscillator (USO) of DORIS/Jason-1 to the high energy protons trapped in the Van Allen belts is now well known. This sensitivity causes a fluctuation of the frequency when the satellite crosses the area of the South-Atlantic Anomaly (SAA). The principal consequence is the impossibility of using the measurements of the DORIS beacons located in the SAA area for cm-precision positioning since the real frequency of the on-board oscillator is varying rapidly in that area. Moreover, these DORIS measurements do not contribute (or little) to the determination of the orbit of Jason-1 because they are eliminated during the pre-processing on residuals criteria.

To correct for this sensitivity to the effects of solar radiation, a model of the frequency evolution of the USO was designed and validated by Lemoine and Capdeville in 2006. This model allows a significant improvement in the orbit adjustment. It takes into account the geographical characteristics of the SAA region (1x1 degree SAA grid) as well as the parameters of the USO's response to this external stimulation: an amplitude, a relaxation time-constant and a memory effect of the SAA disturbance.

In the framework of the IDS contribution to the new realization of ITRF, the Jason-1 DORIS data from the end of TOPEX' life (November 2004) to the launch of Jason-2 (July 2008) have been used, corrected by this model. The corrected DORIS data have been provided to the data center for the use of the IDS Analysis Centers.

The Jason-2 satellite carries a dosimeter instrument (CARMEN). The purpose here is to take the advantage of this instrument to improve our SAA corrective model by using the maps of energetic particles provided by CARMEN. First, a correlation study between the SAA DORIS grid and the CARMEN maps has been done to determine the dosimeter map which has the best agreement. Then, this map is used to calculate the others parameters of the model. The new model will be used to correct the DORIS data and we will examine its impact on the orbit and on the stations positioning.