CONTRIBUTION OF THE NEW DORIS/DGXX INSTRUMENTS TO THE GEODETIC PRODUCTS

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Abstract

Jason-2 was launched on June 20th, 2008 with the first DORIS DGXX instrument onboard. This new generation of DORIS receivers can track up to 7 beacons simultaneously, compared to one and two beacons for the first (Spot-4) and second (Jason-1, Envisat, Spot-5) generations respectively, increasing dramatically the number of available measurements, especially at lower elevation, and strengthening the passes over each DORIS station. Since April 2010, a second DGXX instrument is operating onboard Cryosat-2. DGXX receivers will equip also HY-2A and Saral/Altika (launchs planned for 2011), Sentinel-3A and Jason-3 (launchs planned for 2013). Hence, within 3 years from now, the capacity of the DORIS constellation will be highly improved. We may think that the density of the measurements per day will allow a significant gain of the weekly positioning results, and that the current centimetre positioning performances will be obtained with only one or two days of data. One may also consider that, on request of the IDS, new beacons could be deployed for specific positioning purposes or scientific applications.

The goal of this paper is to analyze how the contribution of the measurements collected by the DGXX instruments can improve the geodetic performances of the DORIS system. We use the DORIS Jason-2 and (we hope) Cryosat-2 data to estimate the noise reduction of the coordinate time series and earth orientation, and the effect of these new data on the geocenter and the scale. We also compare the positioning results obtained with each generation of receiver. We show how the DGXX tracking capacity allows improving the positioning results of some stations (eg Dionysos) with few data on the 1st and 2nd generation instruments because of their close vicinity to beacons with acquisition priority.