

Accepted Manuscript

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PII: S0273-1177(16)30439-2
DOI: <http://dx.doi.org/10.1016/j.asr.2016.08.006>
Reference: JASR 12859

To appear in: *Advances in Space Research*

Received Date: 22 December 2015
Revised Date: 2 August 2016
Accepted Date: 7 August 2016

Please cite this article as: Soudarin, L., Capdeville, H., Lemoine, J-M., Activity of the CNES/CLS Analysis Center for the IDS contribution to ITRF2014, *Advances in Space Research* (2016), doi: <http://dx.doi.org/10.1016/j.asr.2016.08.006>

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Activity of the CNES/CLS Analysis Center for the IDS contribution to ITRF2014

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Abstract

Within the frame of the International DORIS Service, the CNES/CLS Analysis Center, previously known as LCA and renamed GRG, contributes to the geodetic and geophysical research activity through DORIS data analysis. The main work carried out in the past two years concerns the processing of the measurements collected by the DORIS-equipped satellites over 22 years, in order to provide a homogeneous series of station coordinates and Earth pole parameters for the IDS contribution to the ITRF2014. First, we brought several upgrades to the processing and the modeling. Some of them are corrective actions to issues raised during or shortly after the production of our contribution to the ITRF2008 (ground station frequency offsets, attitude laws and macromodels). Recent models have been assessed with the aim to update our analysis configuration. Among others, we adopted the time variable gravity (TVG) model EIGEN-6S2 and applied tropospheric gradients. Then we processed almost all the DORIS data collected between January 1993 and December 2014. The series of weekly SINEX solutions derived from this processing is labeled grgwd40. This new series performs better than the series produced for ITRF2008. Especially, the results discussed in this paper show a decrease of 2% of the DORIS orbit residuals as well as a strong reduction of the annual terms of the TRF scale and Tz translation which can be explained by the application of the TVG model.

Keywords: DORIS; ITRF2014; IDS Analysis Center; station positions; EOP; Terrestrial Reference Frame

1 Introduction

The French system DORIS (Doppler Orbitography and Radiopositioning Integrated by Satellite) was developed to meet the need for precise determination of the satellite position, related to altimetry missions measuring ocean topography, and the need for accurate location of ground beacons. Starting to operate in February 1990 with the first instrument on board SPOT-2, the system rapidly reached its objectives (Soudarin and Cazenave, 1993; Nouel et al., 1994). The accuracy achieved by DORIS allowed the International Earth Rotation and Reference Systems Service (IERS) to include this system as a new technique for the realization of the International Terrestrial Reference Frame (ITRF) with an initial contribution to the ITRF 1994 (Boucher et al., 1995). A call for participation for the new realization ITRF2014 was disseminated in 2013. As a contributor to the geodetic and geophysical research activity through DORIS data analysis, the CNES/CLS Analysis Center agreed to participate by providing a homogeneous series of station coordinates and Earth pole parameters for the combined solution performed by the International DORIS Service (IDS; Willis et al., 2010) to be included in ITRF2014. Thus, the main works carried out by the Analysis Center in the past two years concern the processing of the measurements collected by the DORIS-equipped satellites over 22 years in order to produce this series that we called grgwd40. The purpose of this paper is to give an overview of this

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