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Abstracts

Z. Altamimi

TRF and EOP Comparative analysis between DORIS and other

space geodesy techniques

CATREF software, used for ITRF combination, is now upgraded to include Earth Rotation Parameters. Using CATREF new features some simultaneous combinations of TRF and EOP provided by DORIS and other techniques will be evaluated. We focus on the limitation factors inherent to each technique and to the combination, such as the current status of the observing networks, distribution of the collocation sites and their quality and accuracy of the combined frame parameters. Some questions related to DORIS contribution to IERS products(EOP, geocenter motion) will be opened for discussion.

C. Noll, E. Gaulué

Archive and distribution of DORIS data and products in support of the IDS

The data centers supporting the International DORIS Service (IDS) are the primary means of distributing DORIS data and products to the user community. This presentation will outline background information, current status, and recent developments at the IDS data centers. The overview will also include a review of available data and product types and recent changes to the directory structure and file naming conventions adopted by the IDS data centers.

L. Soudarin, J.F. Crétaux, J.J. Valette

Contribution of the new satellites to the positioning performances

With the 'historic' constellation of the DORIS-carrier satellites (Spot-2, -3, -4, Topex/Poseidon), the positioning performances are at the one-centimeter level for monthly station solution, and at the 1-mas level for the daily Earth pole position. With the three new instruments launched recently onboard Jason-1, Spot-5, and Envisat, we may expect a significant improvement of the results, and a decreasing of the time span of observations allowing to reach the level of precision obtained until today. We present here the results of the analysis of two months of data from the six flying satellites (July-August 2002). We will compare different combination of constellation that we used to compute station coordinate sets and EOP series, and show the precision of monthly and weekly solutions.

J.J. Valette, Z. Altamimi, L. Soudarin

Combination of DORIS TRF

Analysis Campaign for stations coordinates data sets has been led in 2002. We will present the Analysis Centres participation and the results obtained for comparison and combination of the solutions. We will present the future developments among th em the extension of the analysis to EOP with CATREF software. A useful discussion will focus on what has to be done now considering the present products and what wi ll be the best combination strategy to get prepared for a DORIS technique combined solution expected by IERS.

B. Meisel, D. Angermann

Intra-technique combination at DGFI: some aspects related to DORIS

In the function as ITRS Combination Center and IERS Combination Research Center, D GFI is strongly involved in the combination of space geodetic observations, such a s VLBI, SLR, GPS and DORIS.

In this presentation I will briefly describe the combination strategy of DGFI. In this context I will focus on the general methodology for the combination of soluti ons of the same technique. Some relevant aspects related to this intra-technique c ombination include the reconstruction of unconstrained normal equation, the relati ve weighting of individual solutions, the datum definition, the detection of outli ers (reduction of bad stations), etc. With regard to the issues mentioned above I will present first results related to presently available DORIS solutions

R. Warnant, L. Morel, S. Stankov, J.-C. Jodogne, H. Nebdi, N. Jakowski.

The use of DORIS as a tool to study the Earth ionosphere.

Space Geodetic techniques based on dual frequency signals have already proven thei r usefulness for the study of the ionosphere and are nowadays widely used by the i onosphere community. The so-called “geometric free” combination of the measurement s made on these dual frequency signals allows to retrieve the Total Electron Conte nt which is the integral of the electron concentration along the receiver-to-satel lite path from the bottom of the ionosphere (about 50 km) up to the altitude of th e satellite considered. This geodetic technique does not give a direct access to t he electron concentration which is the most interesting data for ionospherists. Ne vertheless, the combination of several techniques at the same location allows to r etrieve more detailed information. The paper illustrates the interest of such coll ocations for ionospheric studies.

First, the collocation of GPS (altitude 20 000 km) and DORIS (altitude from 800 to 1 336 km) allows to give information about the integrated electron content of the protonosphere (ionised atmosphere above 1 000 km) by simply making the difference between GPS and DORIS electron contents. In addition, the collocation of GPS, DORI S and an ionosonde allows to retrieve the electron concentration profile which cou ld be used to validate ionospheric models. The installation of a DORIS beacon at t he Geophysical Centre of Dourbes (Belgium) would allow to take profit of such a co llocation.

P. Willis, Y. Bar-Sever

DORIS time series elaboration with the GOA software : Summary of station related problems (1993-2002)

Since 1998, IGN and JPL have been producing in a common effort times series of DORIS tracking stations coordinates in the SINEX format. Those series are currently easily available at the DORIS data center at CDDIS. Besides stations coordinates monitoring for geodetic and geophysical applications, such times series are also used for geocenter motion investigation and Earth Rotation determination. In a first step, we will present the current strategy using the Gipsy/Oasis II software, also used for GPS data processing and called "free network" approach. We will then present the advantages of such a procedure. Finally, we will focus on the numerous problems found in the realization of the latest DORIS time series (from 1993 to 2002). We will show that several stations present a non-linear movement that can be due to several phenomena: antenna physical falls (Ottawa, Amsterdam, Thule), Earthquakes (Arequipa, Colombo, Dyonisos, Sakhalin, Socorro Is.) or volcano depletion (Socorro Is.). It is important that all DORIS analysis groups adopt the same naming conventions when breaks are found in stations coordinates time series. Otherwise, combining such different series would create systematic errors at the level of a couple of cm. We propose here, for discussion, a list of all problems that we found in our latest analysis. It would be important that other groups share these information and that a common agreement could be found between all DORIS analysis groups in the identification of such breaks and in the naming of these stations when exchanging SINEX solutions, either times series or global position and velocity global solution.

P. Willis, B. Haines, Y. Bar-Sever, L. Young

DORIS/JASON data, what is happening in the South Atlantic Anomaly region?

In December 2001, the JASON satellite has been launched carrying on-board an improved DORIS receiver that can record more precise DORIS data (multi-channel with a lower instrumental noise). Precise orbit determination groups have shown excellent results in comparison or in combination with the 2 other tracking techniques on-board the satellite (GPS and Laser). However, for geodetic applications some abnormal results were found for certain stations coordinates. The goal of this paper is to summarize and characterize the different problems encountered using the JPL Gipsy/Oasis software on the DORIS/JASON data for different type of applications: Precise orbit determination, ground tracking station positioning, stations and satellites clock frequency determination. We will show that all results are related to the crossing of the South Atlantic Anomaly region by the JASON satellite and propose a scientific explanation of these phenomena. In this region of the world, the satellite clock is accelerated, due to the higher density and protons and this can be seen in all types of results. The other DORIS satellites seem to be less sensitive to this phenomena, probably because the their DORIS clock is better shielded or because their clock is less sensitive to radiations. We will show that the physical phenomena seems to increase at a steady pace, almost at a linear trend, showing a saturation of the JASON/DORIS clock. We will propose some ways to cope with this physical phenomena for different type of application and also show that usual data processing commonly used for other DORIS satellite does not work properly.