2018 IDS Workshop

Monday, September 24 2018 - Wednesday, September 26 2018

This is a meeting for all those who analyze DORIS data, use products derived from DORIS data, or who are involved with the DORIS network. The meeting will highlight current developments and the status of scientific results that use DORIS data, and will provide a platform for discussion and coordination of future activities. The session will include oral presentations and posters.

SESSION I: DORIS network and constellation: status and evolution

SESSION II: IDS Processing and Plans for the Next ITRF

SESSION III: Precise Orbit Determination

SESSION IV: Research activities and new applications

Abstracts Book

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Oral

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15:00 - 15:20: DORIS Network 2018 Status Report: Jérôme Saunier

15:20 - 15:40: The International DORIS Service: status report: Laurent Soudarin et al.

15:40 - 16:00: Noise analysis in the DORIS station position time series with a view to assessing the monument stability: Jérôme Saunier et al.

SESSION II: IDS Processing and Plans for the Next ITRF
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14:20 - 14:40: Pre-GRACE era recovery of time-varying DORIS-based mass concentration parameters for TOPEX/Poseidon precise orbit determination.: John Moyard et al.

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15:00 - 15:20: IDS DORIS RINEX Processing at the European Space Operations Centre: Michiel Otten et al.

15:20 - 15:40: Status of SLR and DORIS data processing of Jason satellites at DGFI-TUM: Sergei Rudenko et al.

SESSION IV: Research activities and new applications
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16:30 - 16:50: Consistency of the DORIS and GPS assessments for real-time global ionospheric maps: Wang Ningbo et al.

16:50 - 17:10: Architecture for a Combined DORIS-GNSS Receiver: Christian Jayles

17:10 - 17:30: A model for DORIS USO in the SAA: Eva Jalabert

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SESSION I: DORIS network and constellation: status and evolution
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IDS1_002: NASA CDDIS: Important Changes to User Access: Carey Noll et al.

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IDS1_004: An Atlantic Network of Geodynamic and Space Stations (project RAEGE): Susana Garcia-Espada et al.

Abstract details

DORIS System status and future missions

Pascale Ferrage (CNES, France)

Session: SESSION I: DORIS network and constellation: status and evolution
Presentation type: Oral

Abstract:
DORIS System status and future missions

C. Manfredi , P. Ferrage, C. Jayles

The DORIS System (Doppler Orbitography and Radio positioning Integrated by satellite) is 28 years old in 2018 and is always maintained at the top level of performance thanks to permanent improvements in the system and its components.

13 DORIS receivers have flown on several Earth observation and altimetric missions since 1990, and many future missions are under preparation. The DORIS constellation will benefit from DORIS system and will warrant the quality of geodetic applications, reference frame and POD contributions to well beyond 2030.

This presentation will focus on the recent improvements of the DORIS system, and on the future missions.

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DORIS Network 2018 Status Report

Jérôme Saunier (IGN, France)

Session: SESSION I: DORIS network and constellation: status and evolution
Presentation type: Oral

Abstract:
The ground stations network is the heart of the DORIS system. We review its overall performance after more than 25 years serving the Earth observation satellites. We make a status report on the current level of service of the nearly sixty ground stations very well distributed throughout the globe and the ability of the network to meet the oceanography and geodesy needs.

We provide comparative data to assess the progress made in terms of infrastructure, equipment, reliability and co-location with other techniques that contributes to the continuous network improvement.

We detail the main network events and evolution over the last two years (since the last workshop).

Finally, we give information on the outlook for the coming years regarding the network evolution and the challenges despite a more difficult context.

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The International DORIS Service: status report

Laurent Soudarin (CLS, France); Pascale Ferrage (CNES, France)

Session: SESSION I: DORIS network and constellation: status and evolution
Presentation type: Oral

Abstract:
The International DORIS Service (IDS) turned 15 years old in 2018. Since its creation in 2003 under the umbrella of the International Association of Geodesy (IAG), the service has continued its mission of providing a support, through DORIS data and products, to geodetic, geophysical, and other research and operational activities. IDS is based on a reinforced structure with two Data Centers, six Analysis Centers, three Associated Analysis Centers and a Combination Center. These components contribute to the operational production and dissemination of DORIS-derived products, and their continuous evolution through dedicated Working Groups. To access the DORIS-related information, data and products, IDS provides a web site and webservice that are regularly upgraded.

This presentation gives the latest news from IDS, as well as the future plans.

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Noise analysis in the DORIS station position time series with a view to assessing the monument stability

Jérôme Saunier (IGN, France); Guilhem Moreaux (CLS, France)

Session: SESSION I: DORIS network and constellation: status and evolution
Presentation type: Oral

Abstract:
Monitoring the monument stability of the DORIS ground stations network is of key importance to achieve the millimeter accuracy objective in position for the terrestrial reference frame determination. The purpose of this study is to obtain meaningful information from stations positions time series, examining the residual coordinate time series, i.e. after subtracting the mean linear velocity from the original time series aligned to the ITRF2014.

The current standard monuments of the DORIS network can be divided into two main categories: directly anchored to the ground / mounted on building roof terrace. We selected significant examples of monuments to provide a comparative assessment of the impact of the monumentation on the station position repeatability. In this selection, we also take into account all changes affecting the station (e.g. beacon, antenna) in order to minimize noises and systematic errors in the examined time series. To avoid any impact of the DORIS constellation change on the quality of the coordinate time series, and since all the IDS analysis centers did not add the DORIS missions at the same time, for each station, we identified from the NASA/GSFC and CNES/CLS multi-satellite solutions time periods with no change.

We try to show a correlation between the time series analysis and the empirical assessment of the monument stability.

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Improvement of the CNES/CLS IDS Analysis Center solution for the contribution to the next ITRF

Hugues Capdeville (CLS, France); Jean-Michel Lemoine (CNES, FRANCE)

Session: SESSION II: IDS Processing and Plans for the Next ITRF
Presentation type: Oral

Abstract:
The satellite Sentinel-3B has just been added in the DORIS processing chain of the CNES/CLS Analysis Center. We will analyze the contribution of this satellite in the mutlisatellite solution. For Jason-2 and 3, we now use the body and solar array quaternions. We will look at the impact on the EOP product which was contaminated by the Jason draconitic signal. The DORIS scale factor and geocenter is the combination of each single DORIS satellite solutions. We also analyze the scale factor and geocenter of several single satellite solutions in order to improve the combined solution. Indeed, previous studies showed that single satellite solutions can have some large scale or geocenter values, such as the HY-2A scale. We have identified a high value for Tz translation for several satellites (Envisat, HY-2A and Sentinel-3A). We will resolve the different problems observed on scale and geocenter.

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Station Positions and Earth Rotation Parameters from JASON-1, JASON-2, and ENVISAT

Rolf Koenig (GFZ German Research Centre for Geosciences, Germany); Anton Reinhold (GFZ German Research Centre for Geosciences, Germany); Susanne Glaser (GFZ German Research Centre for Geosciences, Germany); Karl Hans Neumayer (GFZ German Research Centre for Geosciences, Germany)

Session: SESSION II: IDS Processing and Plans for the Next ITRF
Presentation type: Oral

Abstract:
Aside of GGOS-SIM, a German project aiming at simulating all space-geodetic techniques for the next generation of global Terrestrial Reference Frames (TRFs) in view of the objectives of the Global Geodetic Observing System (GGOS), we evaluate real Doppler Orbitography and Radiopositioning Integrated by Satellite (DORIS) observations from the satellites JASON-1, JASON-2, and ENVISAT for the period 2008 to 2014. These missions are part of the ensemble of missions that was used for the contribution of the International DORIS Service (IDS) of the International Association of Geodesy (IAG) to the recent International TRF, the ITRF2014. As initially Precise Orbit Determination (POD) is performed with view on the use of the orbits in altimetry, in this study the objective is to generate weekly normal equations containing ground station positions and Earth Rotation Parameters (ERPs). Therefore it is necessary to change the arc length, the standards, and the parameter space. Eventually the weekly normal equations are accumulated and a DORIS-only TRF is determined. The estimates are evaluated with respect to solvability and accuracy. Finally the contribution of each mission, and the effect of estimating UT1 or not, can be quantified.

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Improvements to the GSC Processing and their Impact on Geodetic Products

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Session: SESSION II: IDS Processing and Plans for the Next ITRF
Presentation type: Oral

Abstract:
The processing for ITRF2014 marked a major milestone for the International DORIS Service (IDS). The IDS Contribution to ITRF2014, and the constituent analysis center solutions processed more than twenty years of data to ten satellites and implemented numerous modeling improvements compared to the previous delivery for ITRF2008 (Moreaux et al., 2016). Nonetheless, the analysis of the IDS combination as well as the individual Analysis Center (AC) time series revealed the presence of systematic error signals in the geodetic products (station time series and Earth Orientation parameters [EOP]) as well in the weekly reference frame parameters (geocenter and scale).

In this paper we summarize the current efforts to improve the DORIS processing with the objective of improving the quality of DORIS products. We concentrate on three topics in this presentation: (1) the use of improved models of the DORIS USO for Jason-2 derived from analysis of Jason-2/T2L2 data; (2) Testing of improved models for Tidal EOP as recommended by the special working group of the IERS; (3) Addition of Sentinel-3A as an operational satellite in the GSC operational combination. We provide a summary of the status of the current operational series, and evaluate prospects for further improvements

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DORIS scale consistency in GOP time series

Petr Stepanek (Geodetic Observatory Pecny, VUGTK, Czech Republic)

Session: SESSION II: IDS Processing and Plans for the Next ITRF
Presentation type: Oral

Abstract:
We analyzed the scale of the DORIS (Doppler Orbitography and Radiopositioning Integrated by Satellite) solutions w.r.t. DPOD (ITRF) 2014 with the main goal to explain the scale inconsistencies and to find the optimal solution reaching low-biased and consistent scale time series. Our analysis profits from 5 different strategies based only on GOP analysis center solution, using DORIS Doppler exchange format data 2.2. A difference in the sequence of the solutions directly corresponds to one of the changes in the solution settings: data elevation dependent weighting (sin2 E), application of data validity indicators and application of phase center - reference point correction. We processed multi-satellite and single-satellite solutions for the time period 2011.0 - 2017.0. Our analysis examines scale inconsistency issues in 2011/2012 and in 2015. 2011/2012 scale increment is explained as a result of the concurrence of changes in satellite constellation and change in the provider data validity standards for Cryosat-2 and Jason-2. The scale increment in 2015 is explained as the effect of change in the standards for phase center - reference center corrections for Saral, Jason-2 and Cryosat-2. Moreover, comparing the solutions with and without elevation dependent data downweighting using the same elevation cut off (10 degrees), we found a significant reduction of scale bias and scale variation applying the data downweighting. We demonstrated that the solution, which is completely free from the additional data associated with observations in DORIS exchange format 2.2, includes the data downweighting law and the corrected value of HY-2A antenna offset, eventuates in a consistent scale time series with the offset w.r.t. DPOD 2014 (version 1.0) under 1cm and its weekly variations around 2 mm.

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IDS Combined Solution: on the way to the ITRF2020

Guilhem Moreaux (CLS, France)

Session: SESSION II: IDS Processing and Plans for the Next ITRF
Presentation type: Oral

Abstract:
Since the delivery of the IDS contribution to the ITRF2014, both the IDS Analysis Centers (ACs) and the IDS Combination Center (CC) implemented new processing strategies which must impact the IDS contribution to the next realization of the ITRF.

At the IDS AC level, one of the major evolutions concerns the mitigation of the sensitivity of the Jason-2/3 and Sentinel-3A to the South Atlantic Anomaly. Combined with the new DORIS data pre-processing from each IDS AC, we will show that these evolutions will i) mostly cancel the DORIS scale increase depicted by the IDS contribution to the ITRF2014 after 2012; ii) reduce the vertical offsets between the DORIS and GNSS coordinate time series for the stations localized in the SAA region (e.g. Arequipa, Cachoeira, Kourou, Saint-Helena) and iii) downsize the amplitude of the Jason's draconitic signal in both the translation parameters and the coordinate time series.

At the IDS CC level, in line with the slight degradation before 2002 of the positioning performance of the IDS contribution to the ITRF2014 with respect to the IDS contribution to the ITRF2008, the IDS CC tested different parameterization of the data editing. Thus, we will present the impact of these new parameterization on the overall performance of the IDS combined solution.

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The new time-variable gravity field model for POD of altimetric satellites based on GRACE+SLR RL04 from CNES/GRGS

Jean-Michel Lemoine (CNES, France); Stéphane Bourgogne (Géode & Cie, France); Richard Biancale (CNES, France); Franck Reinquin (CNES, France)

Session: SESSION III: Precise Orbit Determination
Presentation type: Oral

Abstract:
With the very long altimeter record that is presently available, the emphasis is now placed on the stability of the reference frame and on the control over a long time span of the geographically correlated errors.

This is why the accurate modeling of time-variable gravity and the geocenter is now a requirement of altimetry POD.

We present here the new time-variable gravity field model that has been computed from the fourth release of the CNES/GRGS GRACE+SLR time series of gravity solutions. It is based on GRACE and SLR data from August 2002 to August 2016. The inclusion of SLR data brings the ability to have a precise determination of the degree 2 as well as of the degree 1 (geocenter) of the gravity field. Outside of the GRACE era, the model provides the average annual and semi-annual variations of the gravity coefficients up to degree and order 90. For the sake of the long term stability of the orbits, the SLR-only time series from 1992 to 2002 is also provided for degrees 1 and 2.

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Pre-GRACE era recovery of time-varying DORIS-based mass concentration parameters for TOPEX/Poseidon precise orbit determination.

John Moyard (CNES, France); Alexandre Couhert (CNES, France); Flavien Mercier (CNES, France)

Session: SESSION III: Precise Orbit Determination
Presentation type: Oral

Abstract:
Local mass anomalies, i.e. mascons, are discussed here to complement to the GRACE-derived time-varying gravity field models used in the standard POD solutions. Relying on multi-missions DORIS measurements, both long-term and seasonal variations are investigated.

In this paper, we present the results of an analysis based on the 'mascons' approach to improve the performance of the reprocessed TOPEX/Poseidon (T/P) precise orbits in the last CNES GDR-F standards. The SPOT-2 and SPOT-4 missions, launched in 1990 and 1998, respectively, as well as the T/P DORIS tracking measurements, are used here to leverage these data into the pre-GRACE era (before 2002).

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Copernicus POD Service - Sentinel-3 orbit determination based on DORIS observations

Heike Peter (PosiTim UG, Germany); Jaime Fernández (GMV AD, Spain); Pierre Féménias (ESA/ESRIN, Italy)

Session: SESSION III: Precise Orbit Determination
Presentation type: Oral

Abstract:
The Copernicus POD (Precise Orbit Determination) Service has started to process the Sentinel-3 DORIS observations for orbit determination. The operational Sentinel-3 orbit products are all based on the GPS observations only. The Satellite Laser Ranging (SLR) data are already used for validation of the GPS-derived orbits. In order to have the capability of using all three observation techniques within the Copernicus POD Service effort has been taken to include the DORIS processing as well.

The processing is done with NAPEOS (Navigation Package for Earth Orbiting Satellites), which allows to do technique specific or combined GPS, DORIS, SLR orbit determination. In a first step DORIS-only orbit determination is setup to investigate the performance compared to the operational GPS-derived orbits. Different arc lengths and orbit parametrizations are analysed to find the optimal settings for the DORIS processing.

The resulting orbits are validated with SLR data or are compared to GPS-only, DORIS-only or combined orbits provided by the Copernicus POD Quality Working Group. Results are presented for Sentinel-3A and for Sentinel-3B.

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IDS DORIS RINEX Processing at the European Space Operations Centre

Michiel Otten (ESA/ESOC, Germany); Werner Enderle (ESA/ESOC, Germany)

Session: SESSION III: Precise Orbit Determination
Presentation type: Oral

Abstract:
This presentation will show the first results of the European Space Operation Centre (ESOC) IDS solution that makes use of the DORIS RINEX files. We will show the impact on our IDS solution when switching from the old DORIS format to the new RINEX files for the older missions like Cryosat-2 as well show the results of the first solutions which are completely based on DORIS RINEX files.

With the switch to the DORIS RINEX files the new ESA solution will also for the first time include Sentinel-3A/B and Jason-3 we will also show the impact these new satellites have on the ESA solution.

Further we will also give an overview of the changes that have been made to our processing software (NAPEOS) and our satellite modeling since the previous IDS workshop in 2016.

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Status of SLR and DORIS data processing of Jason satellites at DGFI-TUM

Sergei Rudenko (DGFI-TUM, Germany); Mathis Bloßfeld (DGFI-TUM, Germany); Denise Dettmering (DGFI-TUM, Germany); Frank G. Lemoine (NASA GSFC, USA)

Session: SESSION III: Precise Orbit Determination
Presentation type: Oral

Abstract:
Until recently, it has been possible to process SLR observations of geodetic satellites using “DGFI Orbit and Geodetic parameter estimation Software (DOGS)”. In 2018, DORIS data processing was additionally implemented in DOGS. A short description of DOGS will be given. Status of SLR and DORIS data processing of Jason satellites for precise orbit determination at DGFI-TUM will be presented. Quality of processing SLR-only, DORIS-only and SLR+DORIS orbits and some results of validation will be discussed. An outlook of further possible improvements will be given.

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The impact of low-latency DORIS data on near real-time VTEC modeling

Eren Erdogan (Deutsches Geodätisches Forschungsinstitut der Technischen Universität München (DGFI-TUM), Germany); Denise Dettmering (Deutsches Geodätisches Forschungsinstitut der Technischen Universität München (DGFI-TUM), Germany); Michael Schmidt (Deutsches Geodätisches Forschungsinstitut der Technischen Universität München (DGFI-TUM), Germany); Andreas Goss (Deutsches Geodätisches Forschungsinstitut der Technischen Universität München (DGFI-TUM), Germany)

Session: SESSION IV: Research activities and new applications
Presentation type: Oral

Abstract:
Recently, the demands for atmospheric products (e.g., electron and neutral density), useful as input to real-time applications (e.g., telecommunication, navigation and positioning, satellite mission control, solar event monitoring and forecasting), have been rapidly increasing. In this context, international agencies such as the International GNSS Service (IGS) have been spending efforts to provide raw data with low latency from space-geodetic techniques to support real-time and near real-time (NRT) modelling approaches, e.g., the ionospheric Vertical Total Electron Content (VTEC) modeling. The IGS, for instance, provides global terrestrial GNSS data through its data centers in RINEX format with daily and hourly latencies as well as real time products via Ntrip data streams.

GNSS observations cover the continental regions and due to their spatiotemporal resolution have very high importance for studying VTEC variations. However, large data gaps exist due to the inhomogeneous distribution of the GNSS observation sites, especially over the oceans. Therefore, other techniques such as DORIS, e.g. on board of the satellites Jason-3 and Sentinel-3, can mitigate the data gap problem and improve the accuracy and reliability of ionospheric maps. Furthermore, DORIS can contribute to a data densification in continental regions.

However, data derived from the DORIS system is currently provided with a latency of several days – too late for rewarding an inclusion in (near) real-time ionospheric models. In the frame of the IDS working group on “NRT DORIS data”, our study is devoted to investigate the contribution of NRT DORIS data to ionosphere modelling.

At present, DGFI-TUM’s VTEC model is mainly supported by GNSS hourly data. It is based on a series expansion in two-dimensional B-spline functions constructed as tensor products of two one-dimensional basis functions, namely trigonometric and polynomial B-splines. All observations are exploited in a Kalman filter to estimate the unknown ionospheric target parameters, namely the B-spline coefficients, differential code biases, etc.

In this contribution, we simulate the case that low-latency DORIS data exist and study their impact on the quality of NRT VTEC products. To be more specific, we generate DORIS data of different latencies from 1 hour to 6 hours and include them in our VTEC model by using a multi-filter approach. The different model performances are assessed and compared to the results of the current GNSS-only approach.

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Consistency of the DORIS and GPS assessments for real-time global ionospheric maps

Wang Ningbo (Academy of Opto-Electronics, Chinese Academy of Science, China); Zishen Li (Academy of Opto-Electronics, Chinese Academy of Science, China)

Session: SESSION IV: Research activities and new applications
Presentation type: Oral

Abstract:
With the availability of the International GNSS Services (IGS) global and other regional real-time (RT) data streams containing multi-frequency and multi-constellation GNSS measurements, different techniques have been developed to provide Global Ionospheric Maps (GIMs) of vertical Total Electron Content (TEC) in real-time mode. To validate the qualities of different ionospheric electron content models, the vertical and slant TECs extracted from altimeter and Global Positioning System (GPS) satellites are commonly used as references. When comparing with ground-based GPS TECs over the continental regions, a small set of receivers should be identified to perform an external assessment with the receivers not contributing to GIM generation. When comparing with altimeter TECs, it provides a fairly independent way for the assessment, but only covers the oceanic regions.

The high quality dual-frequency phase measurements from Doppler orthography and radio positioning integrated by satellite (DORIS) system provide a valuable opportunity to examine the Earth's ionosphere, especially given the growing number of satellite missions with DORIS receivers on board as well as the globally homogeneous distribution of DORIS ground beacons. Due to the difference of the two frequencies of DORIS (a relative frequency ratio close to 5), this technique is expected to be more sensitive to detect the ionospheric information and less prone to measurement errors. In this contribution, the consistency of the difference of slant TECs (dsTEC) derived from the dual-frequency phase observations of DORIS and GPS is performed by comparing with the RT-GIMs provided by the Chinese Academy of Sciences (CAS) and Technical University of Catalonia (UPC) at the selected worldwide distributed DORIS and GPS stations, covering the time period of 2017-2018. We expect that the DORIS-derived TEC information is accurate enough to validate the ionospheric electron content models like the GIM products of the IGS in an external and independent way, which can further contribute to global RT ionospheric TEC modeling if RT or NRT DORIS data is coming to be available.

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Architecture for a Combined DORIS-GNSS Receiver

Christian Jayles (CNES, France)

Session: SESSION IV: Research activities and new applications
Presentation type: Oral

Abstract:
Precise Orbit Determination (POD) missions frequently use both DORIS and GNSS measurements made by two different receivers using different time generators. These systems are very accurate, but also very expensive, and have heavy mass-consumption-volume (MCV) requirements.

A deep re-conception of DORIS receivers becomes useful, taking into account recent years evolutions of on-board technologies (electronics, GNSS technologies, ...). New RF and NUM components are now available, designed for on-board applications and conceived to implement a wide set of functionnalities, using Software Define Radio (SDR) solutions. These components and SDR solutions have already been studied in details, suggesting their possible use for such a GNSS / DORIS receiver. Nevertheless, such a POD receiver needs to be carefully examined wrt accuracy specifications as well as MCV and costs requirements, in order to define optimal hardware and software architectures based on these new components and SDR technologies.

This study aims at defining an architecture for a receiver using both DORIS and GNSS signals, based on SDR and presenting a MCV and cost significantly reduced with respect to current DORIS or POD GNSS receivers. The goals are many :

- study the feasibility for DORIS or GNSS receivers, parts or total,

- evaluate the complexity of integrated functions, potentially common to both DORIS and GNSS receivers,

- identify the possible impact on performances of such an implementation,

- quantify the improvements in terms of mass-consumption-volume and cost (prototype or series),

- in a second phase, if feasibility is shown, realise a prototype of critical functions.

Main goals for such a receiver are :

- significantly reduce the cost of such a system, in order to allow access to new missions,

- reduce MCV requirements in order to facilitate integration on space platforms.

For the future, GNSS and DORIS systems are complementary and their association in real-time processing should improve the efficiency of independant solution (initialisation delays, observability, reduction of error sources, ...)

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A model for DORIS USO in the SAA

Eva Jalabert (CNES, France)

Session: SESSION IV: Research activities and new applications
Presentation type: Oral

Abstract:
The processing of the DORIS measurements relies on a precise model of the on board Ultra Stable Oscillator (USO) frequency. Unfortunately the important radiations in the South Atlantic Anomaly (SAA) perturb the USO behavior and produce localized in time (~20 minutes) peaks in the frequency when the satellite flies through it. These peaks are not modelled in standard DORIS processing, as the DORIS USO model is a third degree polynomial computed over 7 to 10 days. Therefore, DORIS measurements are not correctly processed when the satellite passes through SAA, and this can degrade significantly the orbits and station positioning (as on Jason 1).

On Sentinel3A, the GPS and DORIS receiver use the same USO. It is therefore possible to estimate independently the frequency of the USO using GNSS measurements. From the observation of this frequency anomaly, we constructed a model which can be used independently in the DORIS processing, by adjusting parameters related to the USO sensitivity to SAA.

This this model improves significantly Sentinel3A residuals.

The presentation will show how the model has been constructed, and the effects on DORIS phase residuals and station positioning.

Satellites are not impacted the same way by the SAA. It depends on the altitude and on the oscillator hardware. A model has been derived for Jason-1 in 2006 (“A corrective model for Jason-1 DORIS Doppler data in relation to the South Atlantic Anomaly”, JM Lemoine, H. Capdeville, 2006, DOI : 10.1007/s00190-006-0068-2). This study aims at trying to determine a model for Jason-3. The results and the main problems will be shown. One of the main issue is to properly place the SAA impacted area.

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A Neural Networks Approach for DORIS Time Series Prediction

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Session: SESSION I: DORIS network and constellation: status and evolution
Presentation type: Poster
Poster number: IDS1_001

Abstract:
Generally, permanent station time series also include various types of signals, as both real and apparent causes (such as miss-modeled errors, effects of observational environments, random noise or any other effects produced by analysis software and settings of a prior stochastic models). Data analysis to the station time series aims to extract useful signals, such as crustal deformation, seasonal variations of station dynamics etc. During the past few years numerous models for analyzing and forecasting of time series have been developed by researchers. The study investigates a possibility to utilize artificial neural networks (ANN) in DORIS time series seasonal component analysis. Multilayer perceptron model is proposed for time series forecasting. The series of weekly SINEX solutions grgwd40 and ign17wd05, provided by GRG and IGN Analysis Centers respectively were used for analysis.

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NASA CDDIS: Important Changes to User Access

Carey Noll (NASA GSFC, United States); Benjamin Patrick Michael (NASA GSFC, USA)

Session: SESSION I: DORIS network and constellation: status and evolution
Presentation type: Poster
Poster number: IDS1_002

Abstract:
The Crustal Dynamics Data Information System (CDDIS) supports data archiving and distribution activities for the space geodesy and geodynamics community. The main objectives of the system are to make space geodesy and geodynamics related data and derived products available in a central archive, to maintain information about the archival of these data, to disseminate these data and information in a timely manner to a global scientific research community, and to provide user based tools for the exploration and use of the archive. Since its inception, the user community has utilized anonymous ftp for accessing and downloading files from the CDDIS archive. Although this protocol allows users to easily automate file downloads, many organizations, data systems, and users have already migrated from ftp or are actively pursuing a move away from the protocol due to problems from a system and security standpoint. Furthermore, U.S. Government agencies have become increasingly concerned about this legacy protocol and ensuring data integrity for the user community have begun recently to disallow the use of the ftp protocol. The CDDIS, operated by NASA GSFC, must therefore address these concerns and provide alternative methods for access to its archive for continued easy and automated download of its contents. This poster will discuss the upcoming changes at CDDIS and provide examples on transitioning from anonymous ftp.

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About the DORIS station in Ponta Delgada

Guilhem Moreaux (CLS, France); Jérôme Saunier (IGN, France); Christian Jayles (CNES, France); Philippe Yaya (CLS, France)

Session: SESSION I: DORIS network and constellation: status and evolution
Presentation type: Poster
Poster number: IDS1_003

Abstract:
Late 1998, in cooperation with University of the Azores, the DORIS project started a DORIS station in Ponta-Delgada, São Miguel island, Portugal. The location of this DORIS site is very interesting as it is close to the boundary of the African and Eurasian tectonic plates and is co-located with a GNSS receiver and a tide gauge.

This paper will first present the history and the status of the DORIS station in Ponta Delgada. Then, taking account of the successive configurations of the DORIS station, both the orbit and positioning performances will be assessed from the IDS official products.

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An Atlantic Network of Geodynamic and Space Stations (project RAEGE)

Susana Garcia-Espada (Instituto Geográfico Nacional (IGE), RAEGE Santa Maria, Portugal); Ruben Bolano Gonzalez (Instituto Geográfico Nacional (IGE), RAEGE Santa Maria, Portugal); Luis R. Santos (RAEGE Santa Maria, Portugal); Sara V. Pavão (RAEGE Santa Maria, Portugal); Pablo de Vicente (Instituto Geográfico Nacional (IGE), Spain); José Antonio López Fernández (Instituto Geográfico Nacional (IGE), Spain)

Session: SESSION I: DORIS network and constellation: status and evolution
Presentation type: Poster
Poster number: IDS1_004

Abstract:
The Atlantic Network of Geodynamic and Space Stations (RAEGE) is a project developed by the National Geographic Institute of Spain (IGN) and the Regional Government of Azores (Portugal). It consists of the deployment of four stations in which coexist several geodetic techniques. Each station is equipped with a 13-m diameter radio telescope of VGOS technology (fast switching and broadband receivers), a GNSS receiver, a superconducting gravimeter, with the possibility to also incorporate other systems such as SLR, DORIS, etc.

Currently two stations are operational: first one in Yebes Observatory (Guadalajara, Spain), which has already achieved the VLBI broadband first results, and since beginning of 2018 the Santa Maria station (Santa Maria island, Azores) is fully operational using a tri-band receiver. The station in Gran Canaria (Canary Islands, Spain) is under construction (full operation expected in 2019), and for the Flores station (Flores island, Azores), the site has been already chosen and during 2018 the project will be developed (expected to start building the new site during 2019).

In this poster the project and first results will be presented in detail. We will discuss its impact on the creation of a Global Geodetic Observing System of the Earth (GGOS).

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