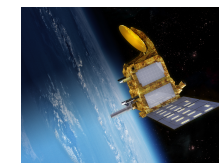
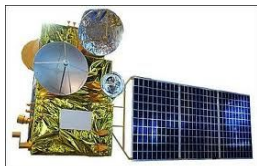


The international DORIS Service (IDS) Recent developments in preparation for ITRF2013

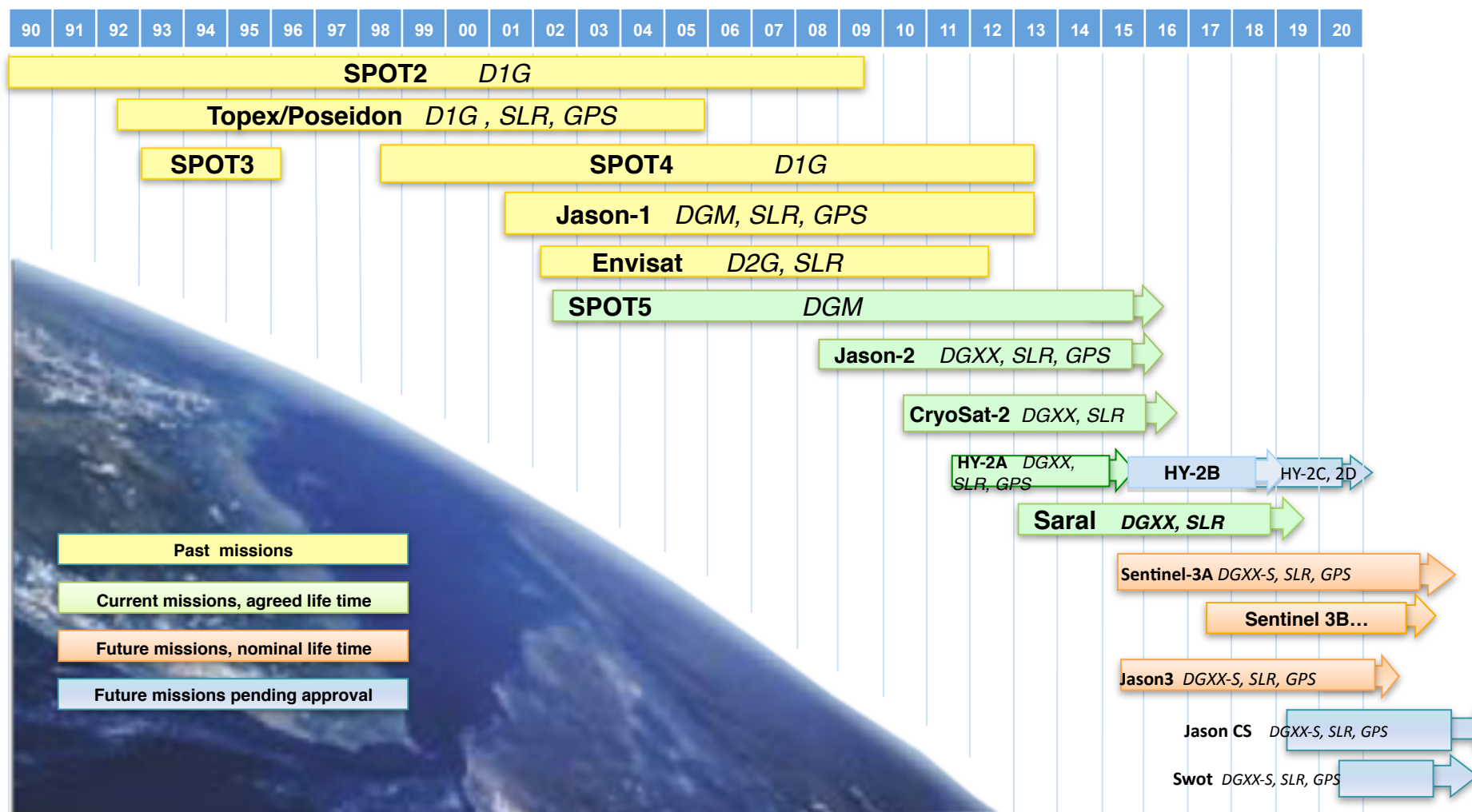
Pascal Willis (IGN+IPGP), Frank Lemoine (NASA),
Guilhem Moreaux (CLS), Laurent Soudarin (CLS), Pascale
Ferrage (CNES), John Ries (UT/CSR), Michiel Otten (ESA),
Jerome Saunier (IGN), Carey Noll (NASA/CDDIS), Richard
Biancale (CNES), Brian Luzum (USNO)

OUTLINE

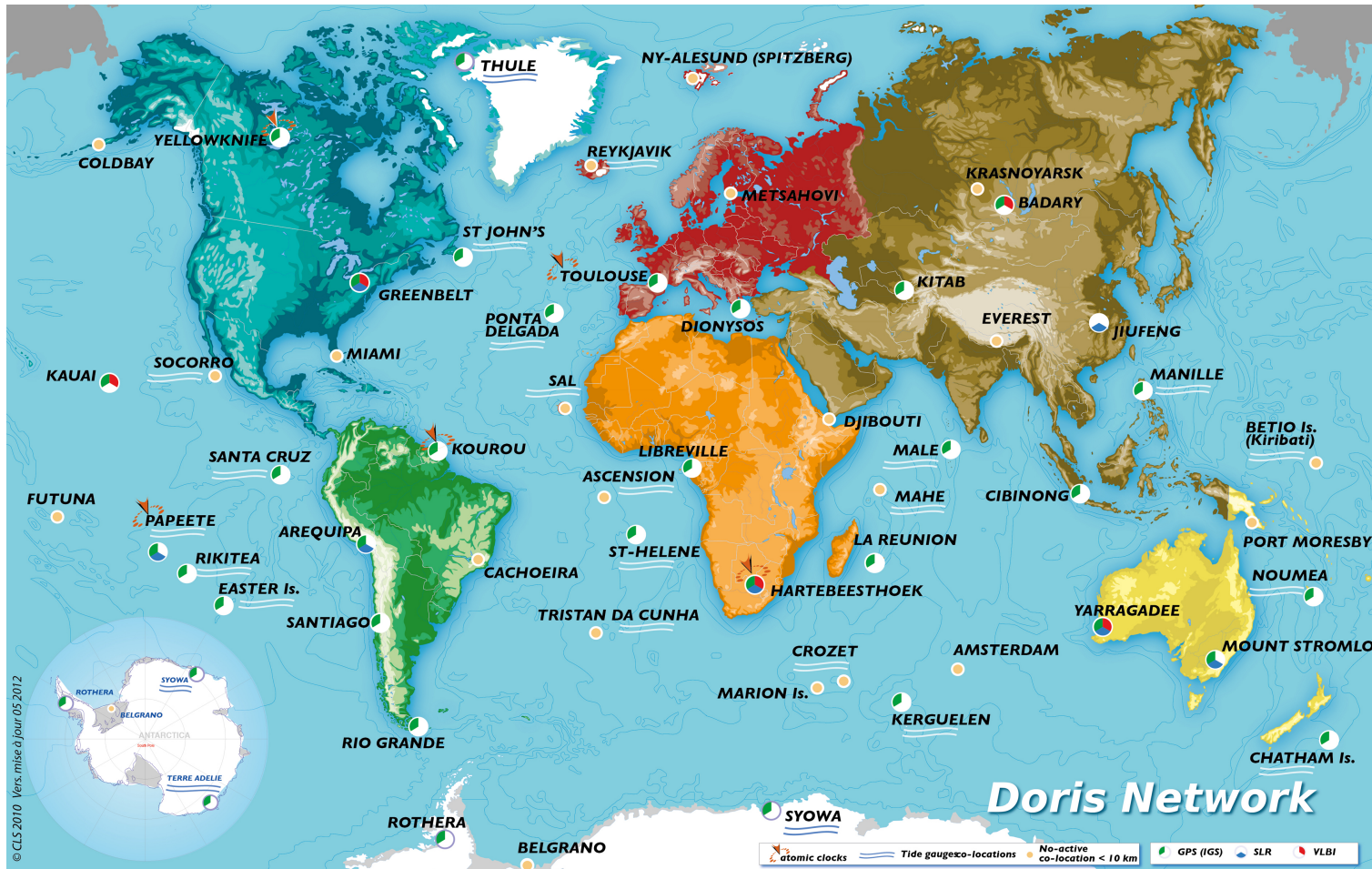
- DORIS system
 - Infrastructure (satellites and ground network)
 - Recent developments (DGXX receivers)
- International DORIS Service
 - Scientific goals (IAG, IERS, GGOS)
 - Current organization
 - Available scientific products
 - Preparation of ITRF2013



DORIS satellites

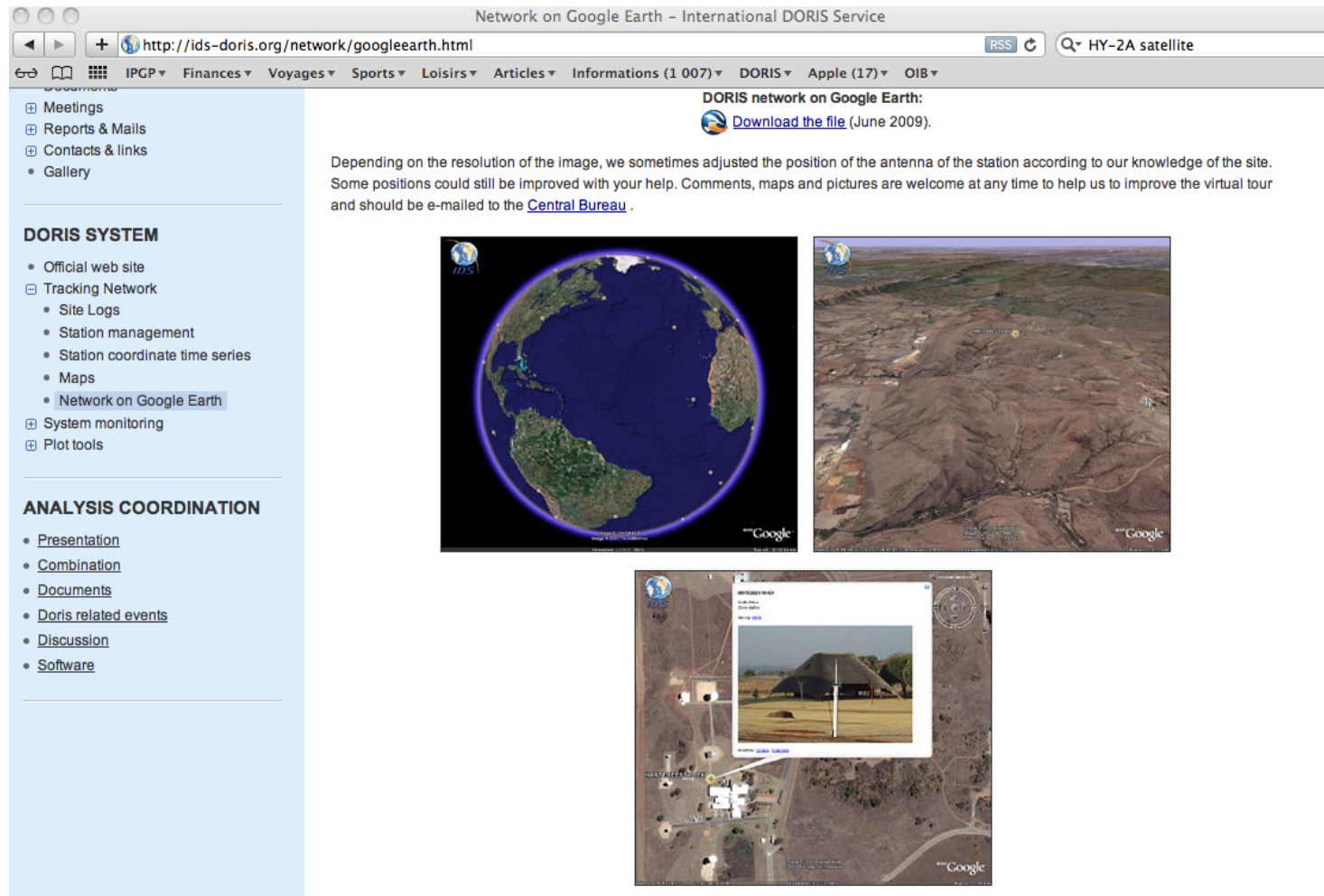


DORIS tracking network (2013)



NB: Also explore network through **GoogleEarth** :
<http://ids-doris.org/network/googleearth.html>

Exploring DORIS Network through GoogleEarth



Example of DORIS stations



Yarragadee (Australia)



Jiufeng (China)



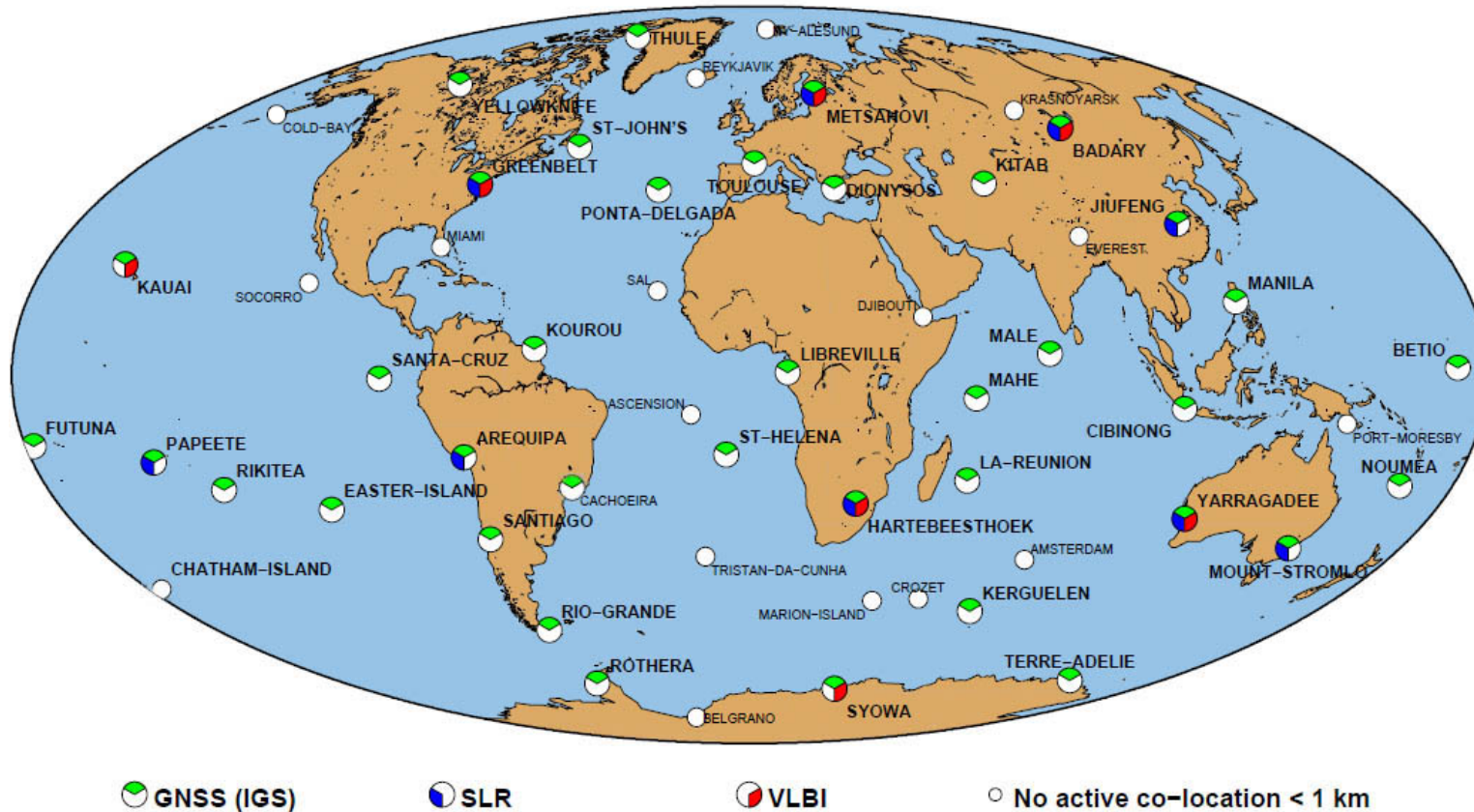
Cibinong (Indonesia)

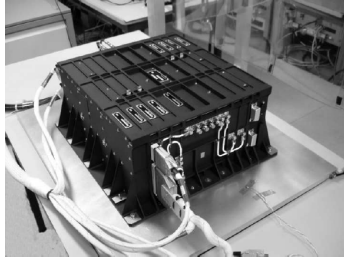


Betio (Kiribati)

DORIS co-locations

DORIS stations co-located with other IERS techniques (VLBI, SLR or GNSS)





Recent developments (DG-XX receivers)

- New Capabilities:
 - Digital receiver
 - Phase measurement (vs. Doppler)
 - 7 channel-receiver
 - RINEX type format

See **Auriol and Tourain, Adv. Space Res., 2010**

IDS Scientific Goals

- Provide scientific products derived from DORIS data
- IAG Service since 2003 (IAG Pilot Project created in 1999)
- Submit DORIS solutions to IERS (since 1994)
- Participate in GGOS
- Annual reports available upon request
 - Contact : ids.central.bureau@ids-doris.org

IDS organization

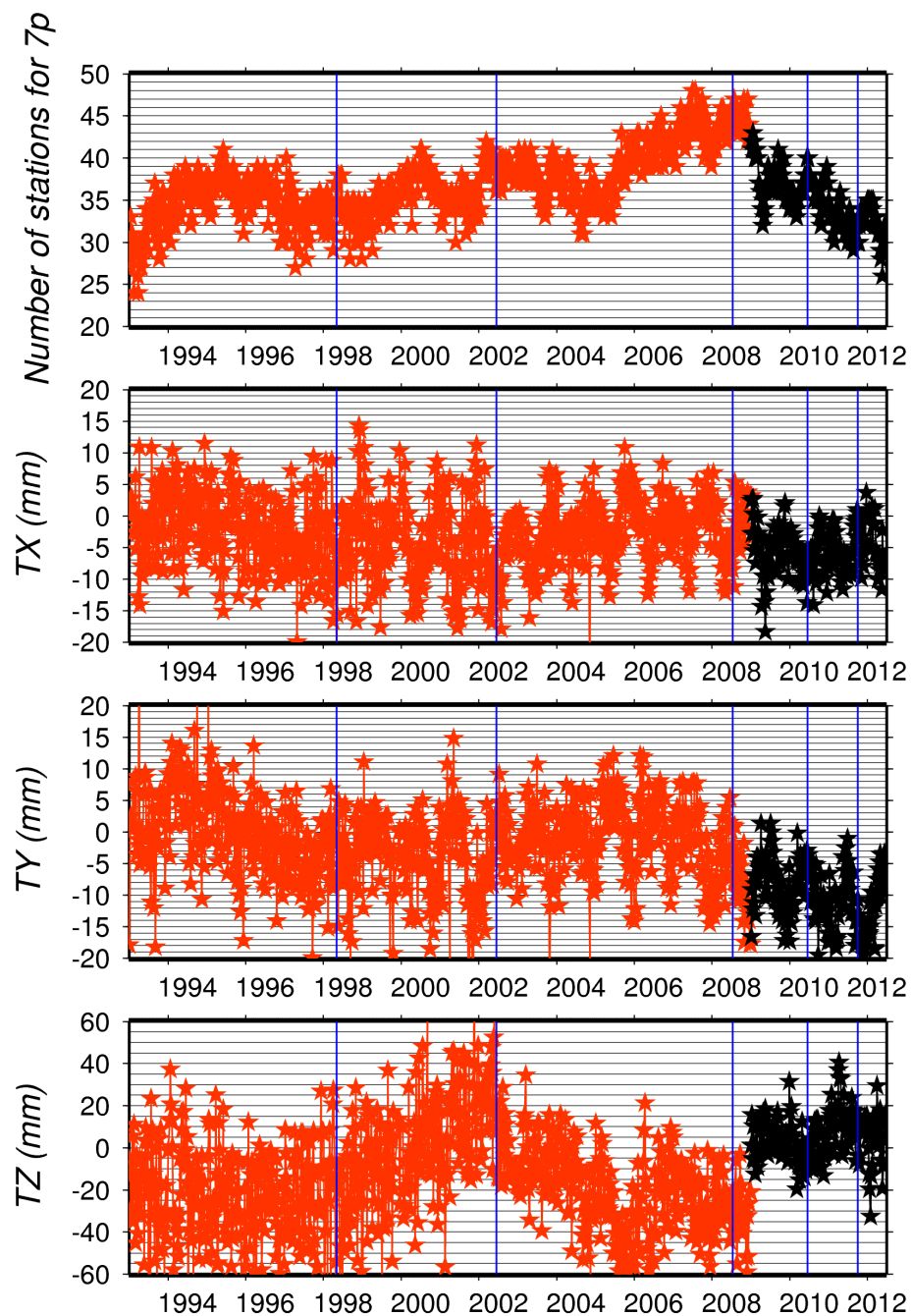
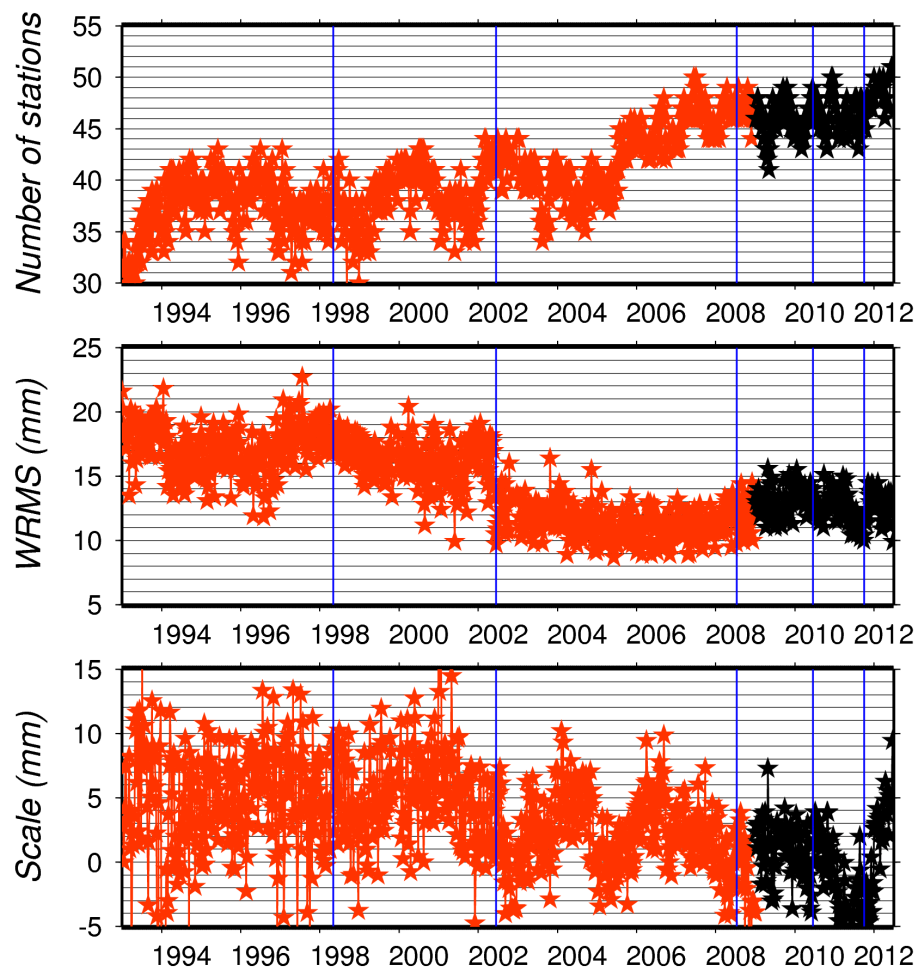
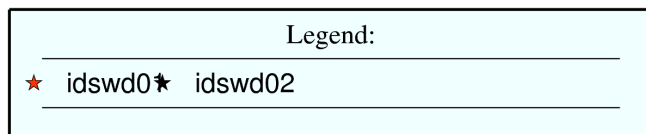
(similar to all IAG Services)

- Central Bureau at CNES+CLS+IGN (France)
- 2 data centers : CDDIS (USA) and IGN (France)
- 7 Analysis Centers : ESA (Germany), GFZ (Germany), GOP (Czech Rep.), IGN (France), INASAN (Russia), CNES/CLS (France), NASA (USA)
 - (using 5 different software packages)
- 1 Combination Center (CLS, France)
- Governing Board

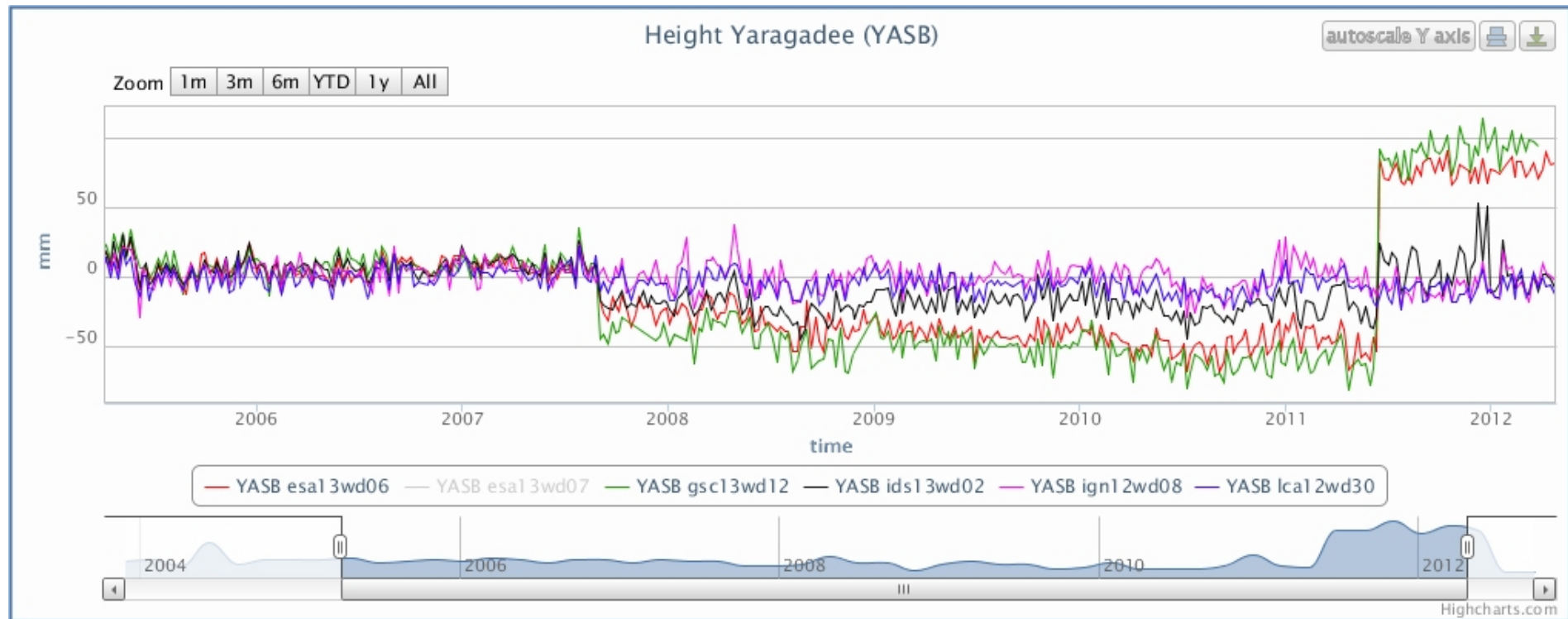
IDS Products

- Station coordinates (weekly time series)
 - Precision better than 10 mm (@ 1 week)
 - (also available through **interactive Web tool**)
- Station velocities
 - Precision better than 0.5 mm/yr (20 years)
- Earth Orientation Parameters (Polar Motion)
 - Precision better than 0.5 mm/yr
- Geocenter Motion

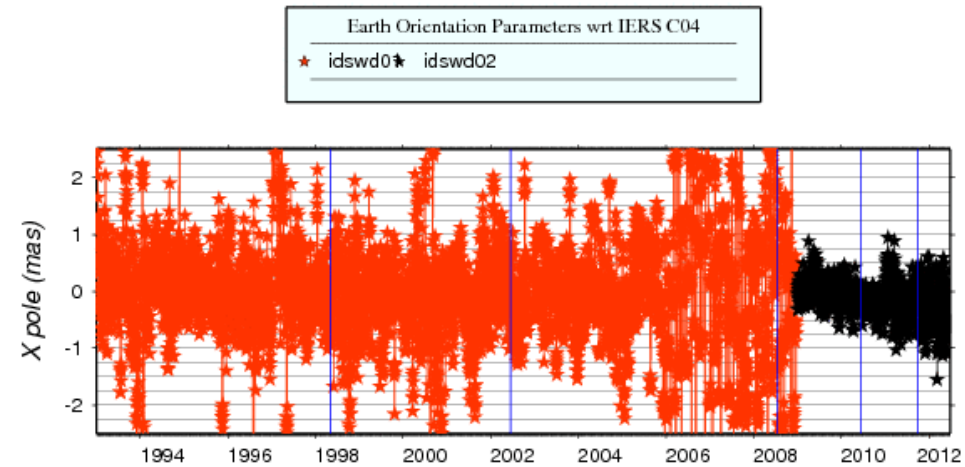
Per week comparison to ITRF2008



(previous) jumps in DORIS station heights - Problem solved



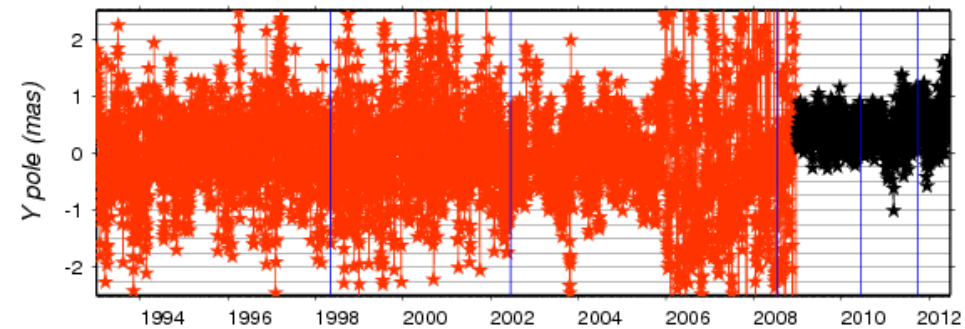
XPOLE (mas)



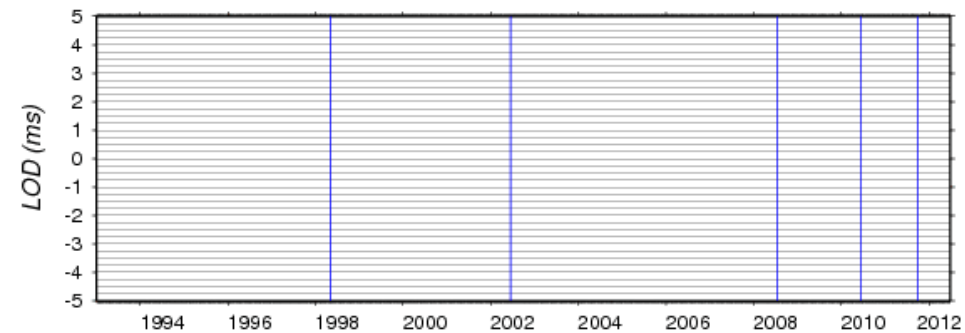
Red = ids01

Black = ids02

YPOLE (mas)



Same data
 New reprocessing
 + Jason-2 data



AC	serie	# days	X pole (mas)		Y pole (mas)		LOD (ms)	
			mean	std	mean	std	mean	std
ids	01	5748	-0.026	1.146	0.009	1.121	-----	-----
ids	02	1272	-0.127	0.304	0.411	0.309	-----	-----

Preparation of ITRF2013 (1/2)

- Goal
 - Reprocess all available DORIS data (1993-2013)
 - Provide IERS with a time series of weekly SINEX files
- Schedule:
 - 4-5 April 2013 : AWG Meeting, Toulouse, France
 - July 2013 : start of reprocessing (7 individual solutions)
 - September 2013: Combine available DORIS solutions
 - October 15-16, 2013 : AWG meeting, Greenbelt, USA
 - January 2014 : Preliminary delivery to IERS
 - April 2014 : Final delivery to IERS

Preparation of ITRF2013 (2/2)

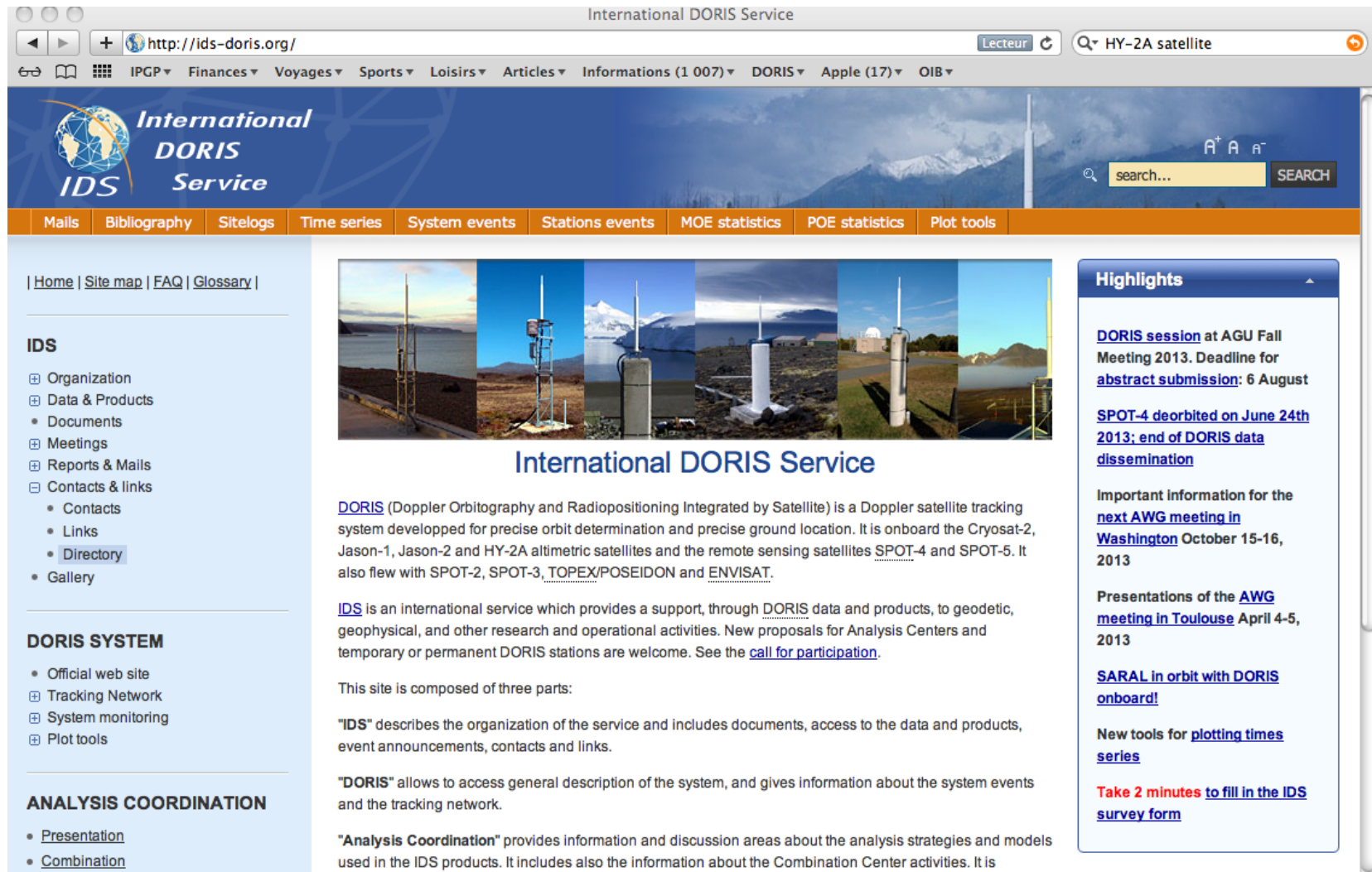
- Major improvements
 - (More data – 5 more years)
 - Improved Gravity Fields (EIGEN-6, GOC3)
 - Including drifts and seasonal corrections
 - South Atlantic Anomaly corrections for SPOT5 and Jason-1 ([see Stepanek et al., 2010](#))
 - Height jumps artefacts (few groups only) solved
 - Antenna elevation dependency (ANTEX-file)
 - Solar Radiation Pressure
 - Atmospheric Drag

CONCLUSIONS

- DORIS system working since 1990 (7 satellites)
- New satellites planned until 2020+
- Internal DORIS Service (IDS) since 2003
 - 7 Analysis Centers, 2 data centers
 - Current preparation of ITRF2013
- Products available at IDS Web site (<http://ids-doris.org>)
 - Coordinate time series (SINEX + plot tools)
 - Results are improved when more satellites are available (since 2002.5)
 - Station information (site logs, local ties,...)
 - Earth Orientation Parameters
 - Geocenter Time Series
 - Etc.
- Contact: pascal.willis@ign.fr

BACK-UP SLIDES

IDS Web site (<http://ids-doris.org/>)



The screenshot shows the homepage of the International DORIS Service website. The browser window title is "International DORIS Service". The address bar shows "http://ids-doris.org/". The page features a blue header with the IDS logo and a search bar. Below the header is an orange navigation bar with links to various sections. The main content area is divided into three columns. The left column contains a sidebar with links to Home, Site map, FAQ, and Glossary, as well as sections for IDS, DORIS SYSTEM, and ANALYSIS COORDINATION. The middle column features a large image of DORIS stations and a detailed description of the service. The right column contains a "Highlights" section with several news items.

International DORIS Service

Search: HY-2A satellite

Navigation: Mails, Bibliography, Sitelogs, Time series, System events, Stations events, MOE statistics, POE statistics, Plot tools

IDS

- Organization
- Data & Products
 - Documents
- Meetings
- Reports & Mails
- Contacts & links
 - Contacts
 - Links
 - Directory
- Gallery

DORIS SYSTEM

- Official web site
- Tracking Network
- System monitoring
- Plot tools

ANALYSIS COORDINATION

- Presentation
- Combination

International DORIS Service

DORIS (Doppler Orbitography and Radiopositioning Integrated by Satellite) is a Doppler satellite tracking system developed for precise orbit determination and precise ground location. It is onboard the Cryosat-2, Jason-1, Jason-2 and HY-2A altimetric satellites and the remote sensing satellites SPOT-4 and SPOT-5. It also flew with SPOT-2, SPOT-3, TOPEX/POSEIDON and ENVISAT.

IDS is an international service which provides a support, through DORIS data and products, to geodetic, geophysical, and other research and operational activities. New proposals for Analysis Centers and temporary or permanent DORIS stations are welcome. See the [call for participation](#).

This site is composed of three parts:

"IDS" describes the organization of the service and includes documents, access to the data and products, event announcements, contacts and links.

"DORIS" allows to access general description of the system, and gives information about the system events and the tracking network.

"Analysis Coordination" provides information and discussion areas about the analysis strategies and models used in the IDS products. It includes also the information about the Combination Center activities. It is

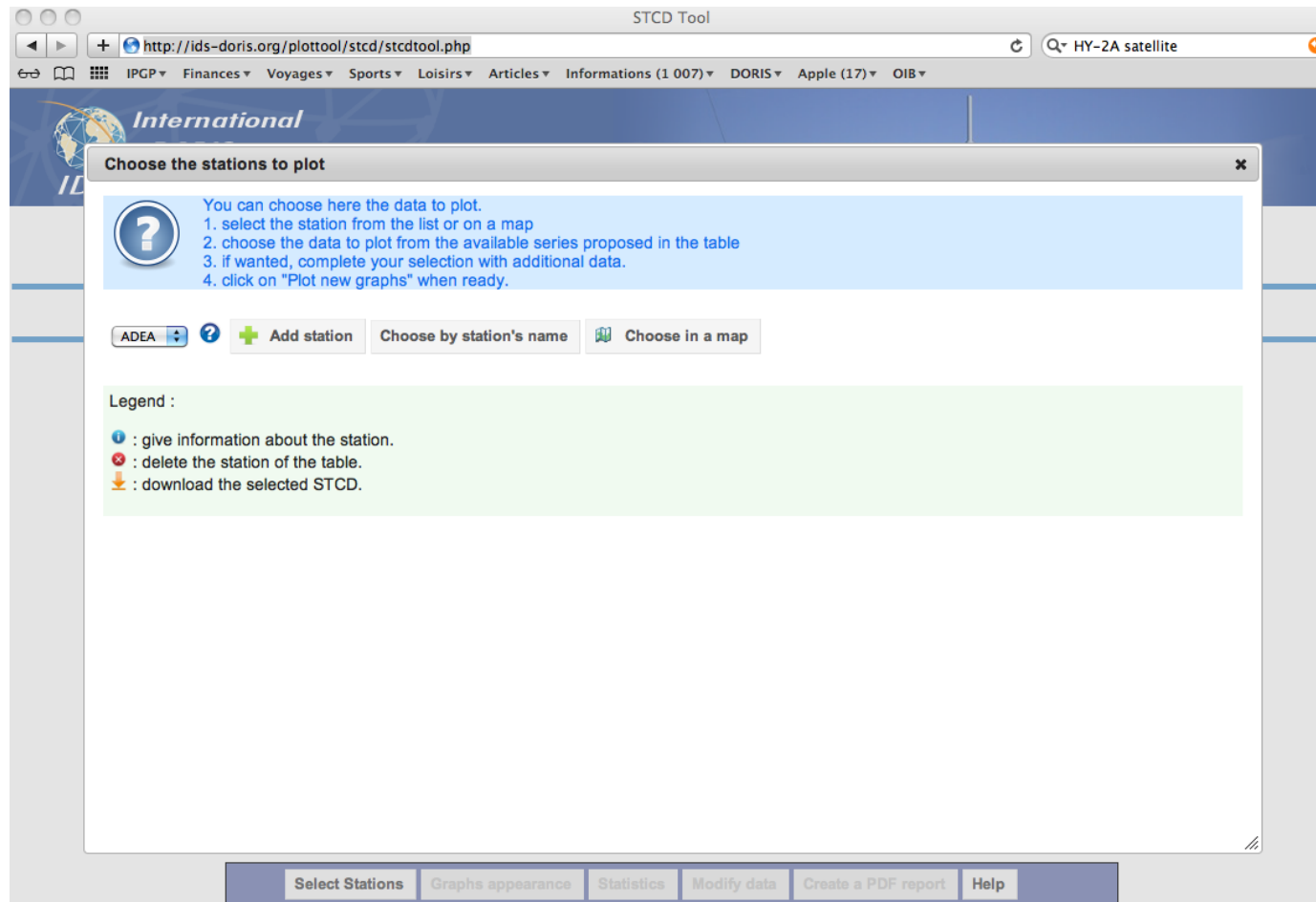
Highlights

- [DORIS session at AGU Fall Meeting 2013](#). Deadline for [abstract submission](#): 6 August
- [SPOT-4 deorbited on June 24th 2013; end of DORIS data dissemination](#)
- Important information for the [next AWG meeting in Washington](#) October 15-16, 2013
- Presentations of the [AWG meeting in Toulouse](#) April 4-5, 2013
- [SARAL in orbit with DORIS onboard!](#)
- New tools for [plotting times series](#)
- [Take 2 minutes to fill in the IDS survey form](#)

Plot Tools

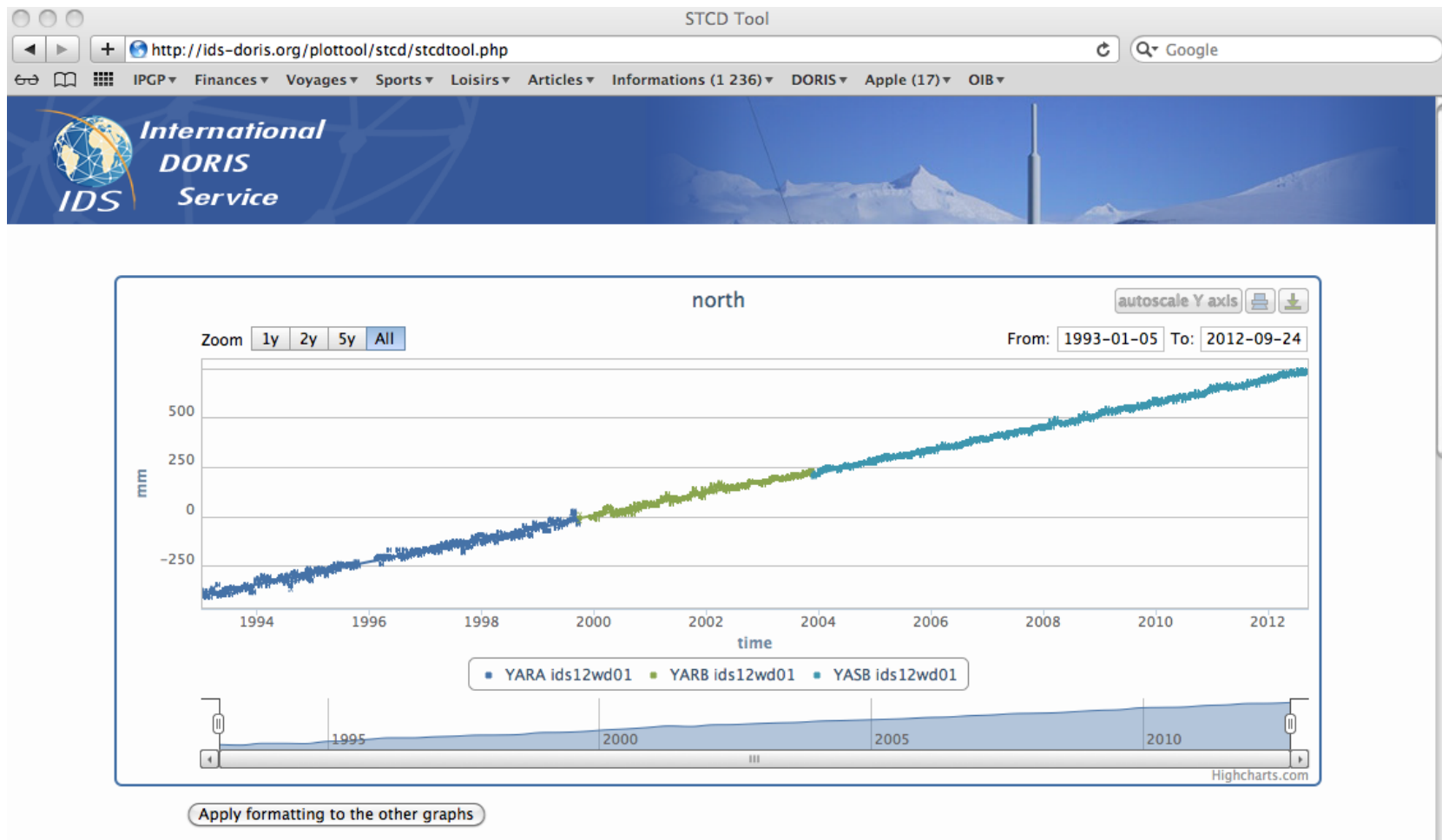
(A new Web tool for scientific users)

<http://ids-doris.org/plottool/stcd/stcdtool.php>



Plot Tools

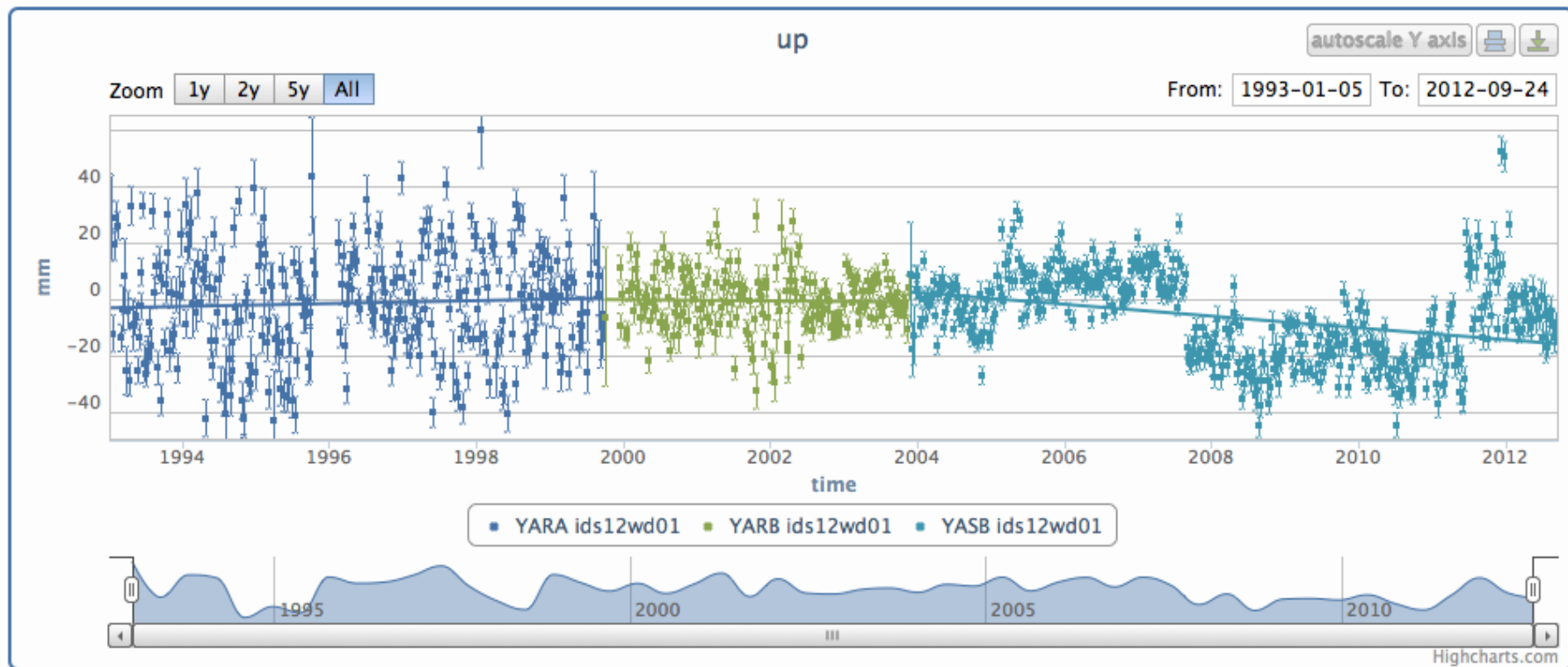
(ex: Yarragadee, North)



NB: improvement after 2002 is due to new satellites (ENVISAT, SPOT-5)

Plot Tools

(ex: Yarragadee, North)

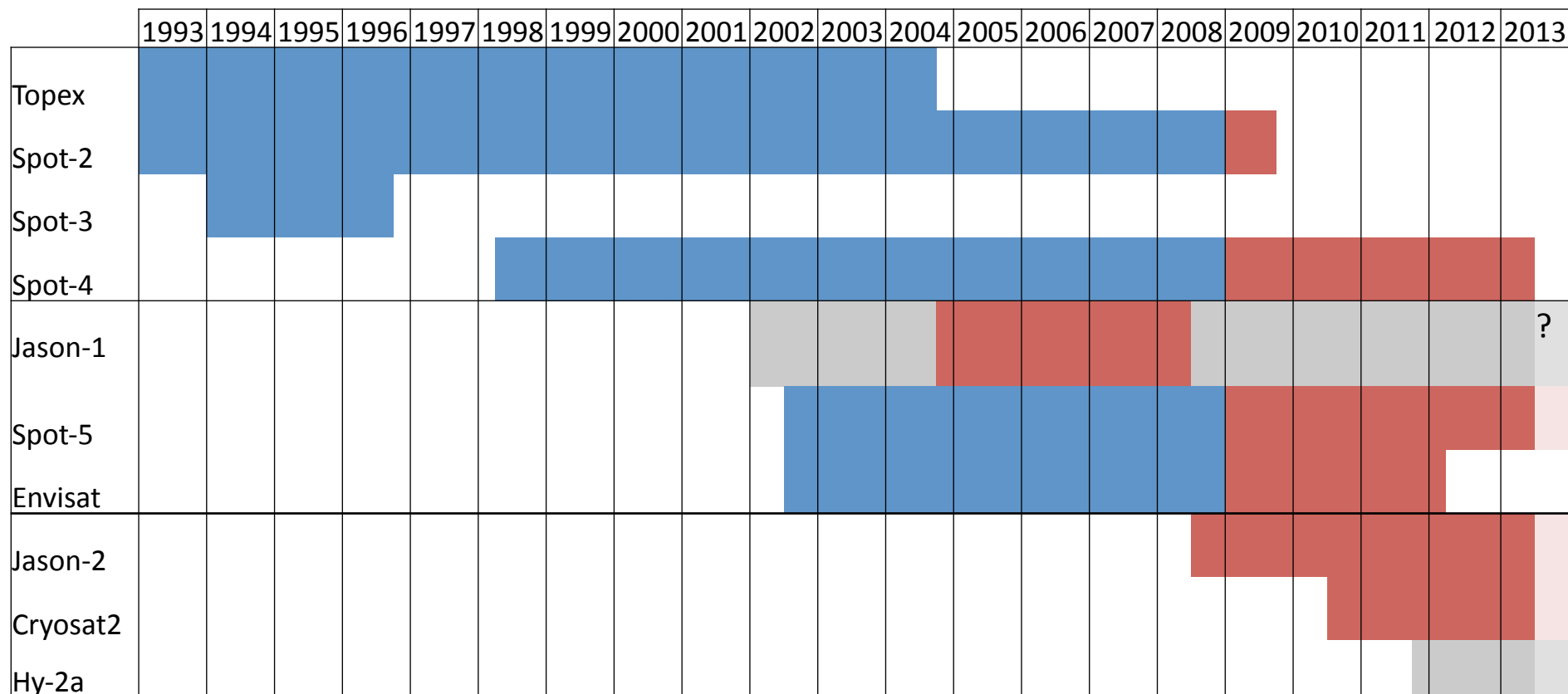


NB: improvement after 2002 is due to new satellites (ENVISAT, SPOT-5)

Data for ITRF2013

ITRF 2013 →

ITRF2008 →



- latest version of DORIS 1B files (redeliveries for ENV in 2012, JA2 and CS2 in 2011, SP4 1998 in 2010)
- no data of 1992; HY-2A not included
- Jason-1 (back-up chain) 2004/11 (end TOP) → 2008/07 (start JA2)