IDS plot tools for time series of DORIS station positions and orbit residuals

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Introduction

In order to promote the use of the DORIS products, the International DORIS Service (IDS) has made available on its web site ids-doris.org a new set of tools, called Plot tools, to interactively build and display graphs of DORIS station coordinates time series and orbit residuals.
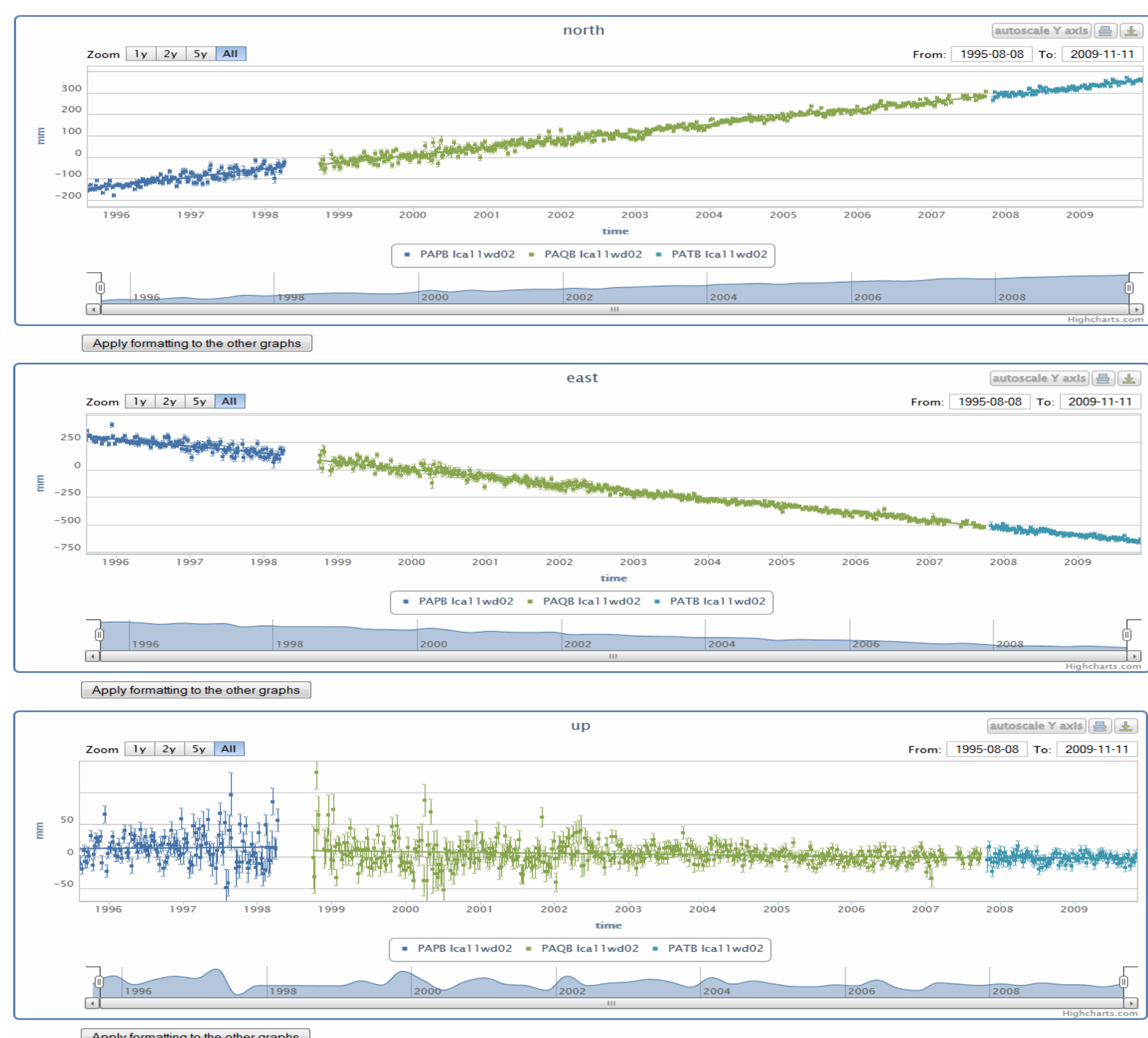
These web tools are:

STCDtool providing station coordinates time series (North, East, Up position evolution) from the IDS Analysis Centers

POEtool providing statistics time series (orbit residuals and number of measurements for the DORIS stations) from CNES (the French Space Agency) Precise Orbit Determination processing.

Complementary data about station and satellites events can also be displayed (e.g. antenna changes, system failures, degraded data...). Information about earthquakes obtained from USGS survey service can also be superimposed on the position time series. All these events can help in interpreting the discontinuities in the time series.

About the data

Station coordinates time series are generated from the STCD (time series format of IDS) files provided by IDS Analysis Centers and available on the IDS Data Centers.

Orbit performance time series are outputs of the CNES POE processing for the DORIS missions.

Satellite events are extracted from the list of the main events that occurred on the DORIS system elements with the exception of the station network.

Station events are extracted from the list of the main events that occurred on the DORIS station network (new sites, new antennas, removed sites, failures...) with information on data gaps, invalidated data...

Information about recent earthquakes in the vicinity of the DORIS stations are obtained from USGS survey service

Overview

STCD tool and POE tool contain utilities for selecting sites or satellites, displaying time series, editing data, changing plot appearance, specifying scaling, downloading data, plots and graph statistics in several formats.

They are equipped with statistic tools for the calculation of mean, slope and weighted rms.

Several series can be viewed and compared on the same graph. Complementary data about station and satellites events can also be displayed.

A help online is available for both tools.

•Library: Highcharts/ Highstock

•Langage: javascript

•Input data in XML format

•Web browsers : Firefox, Google Chrome, Safari, IE

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

Exemple of time series for the site of Papeete (French Polynesia).

Data and plot export

Data can be uploaded from the list of time series in STCD format but also in CSV (modified series) and XML (complete series) formats.
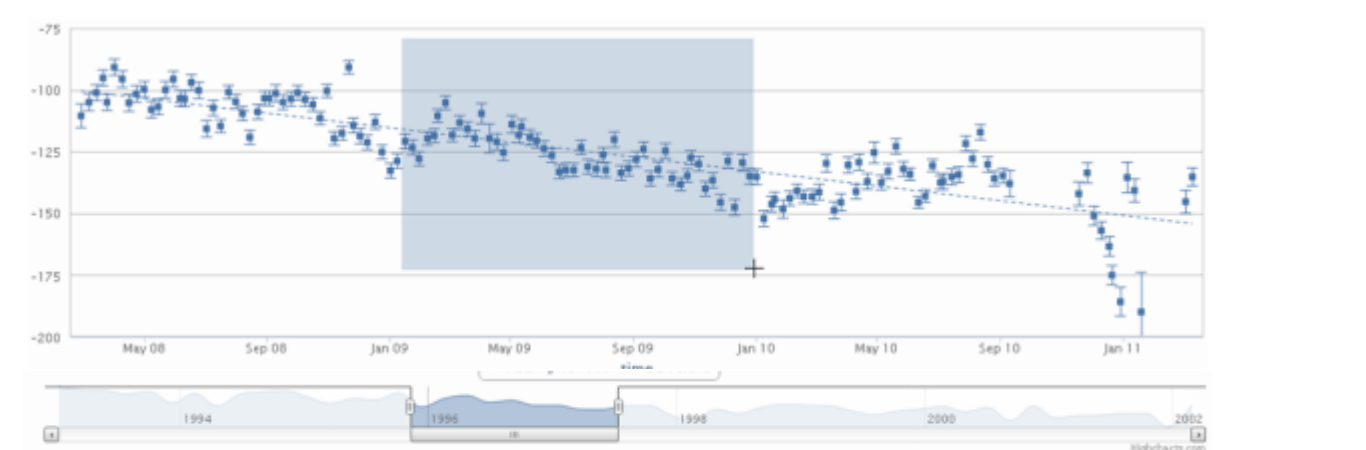Each plot can be exported in PNG or JPEG format

export data in CSV
export data in XML
export plot in PNG
export plot in JPEG
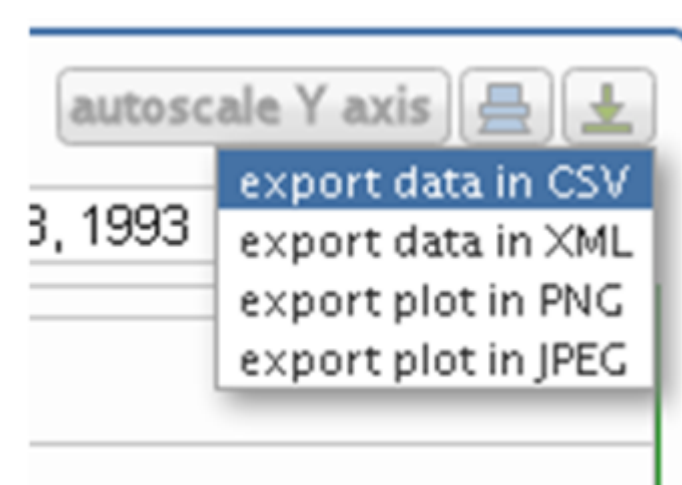
A PDF report including the North, East and Up plots and the statistics table can be get from the menu bar

Plot browsing

Different ways for zooming,:

-"Ctrl" key and mouse
- navigator below graph
- range selector

-For hiding a series, just click on its legend

Statistics display

The menu bar proposes to get statistics for the displayed series. They are given for the plotted points. They are determined again after each modification of the plots (zoom, data removed, selection...). Hence, it is possible paste series of successive stations of one site and obtained the RMS and slope of the concatenated series

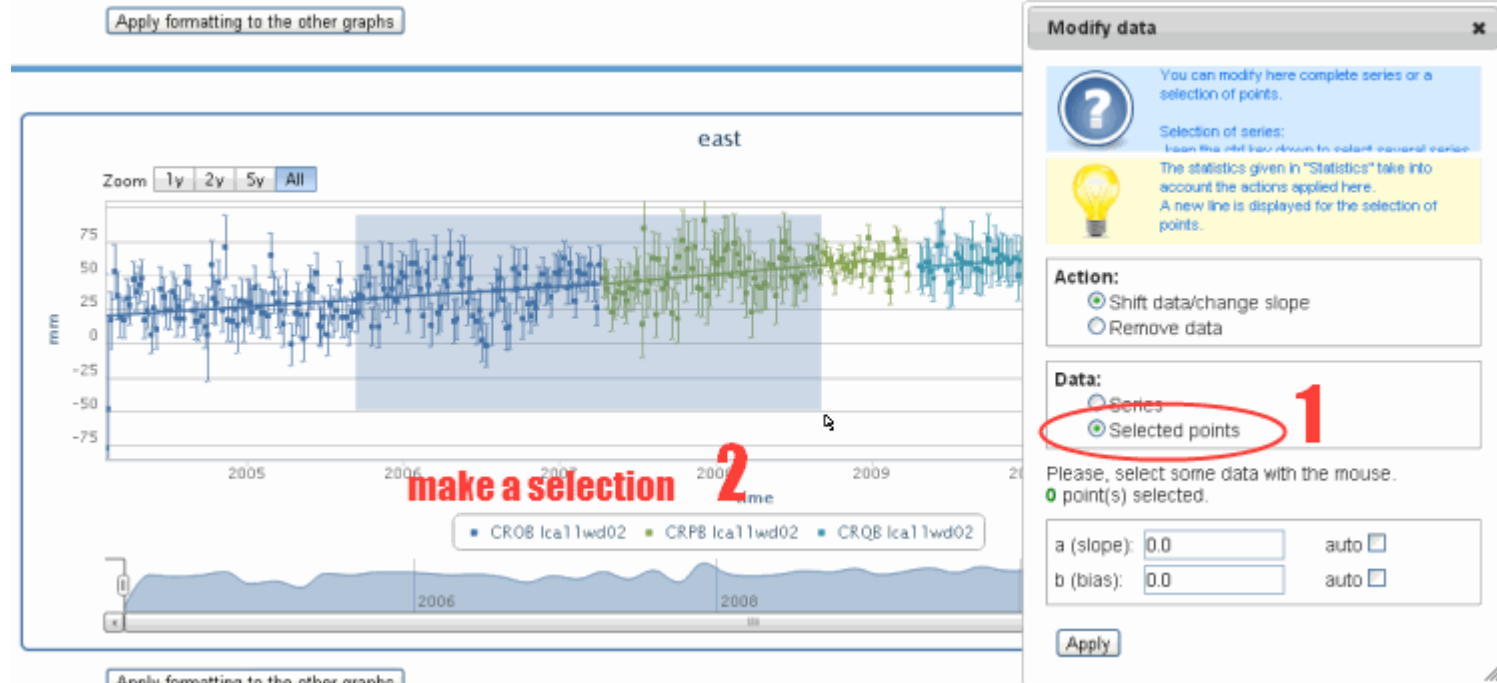« Statistics » button in the menu bar

Data selection
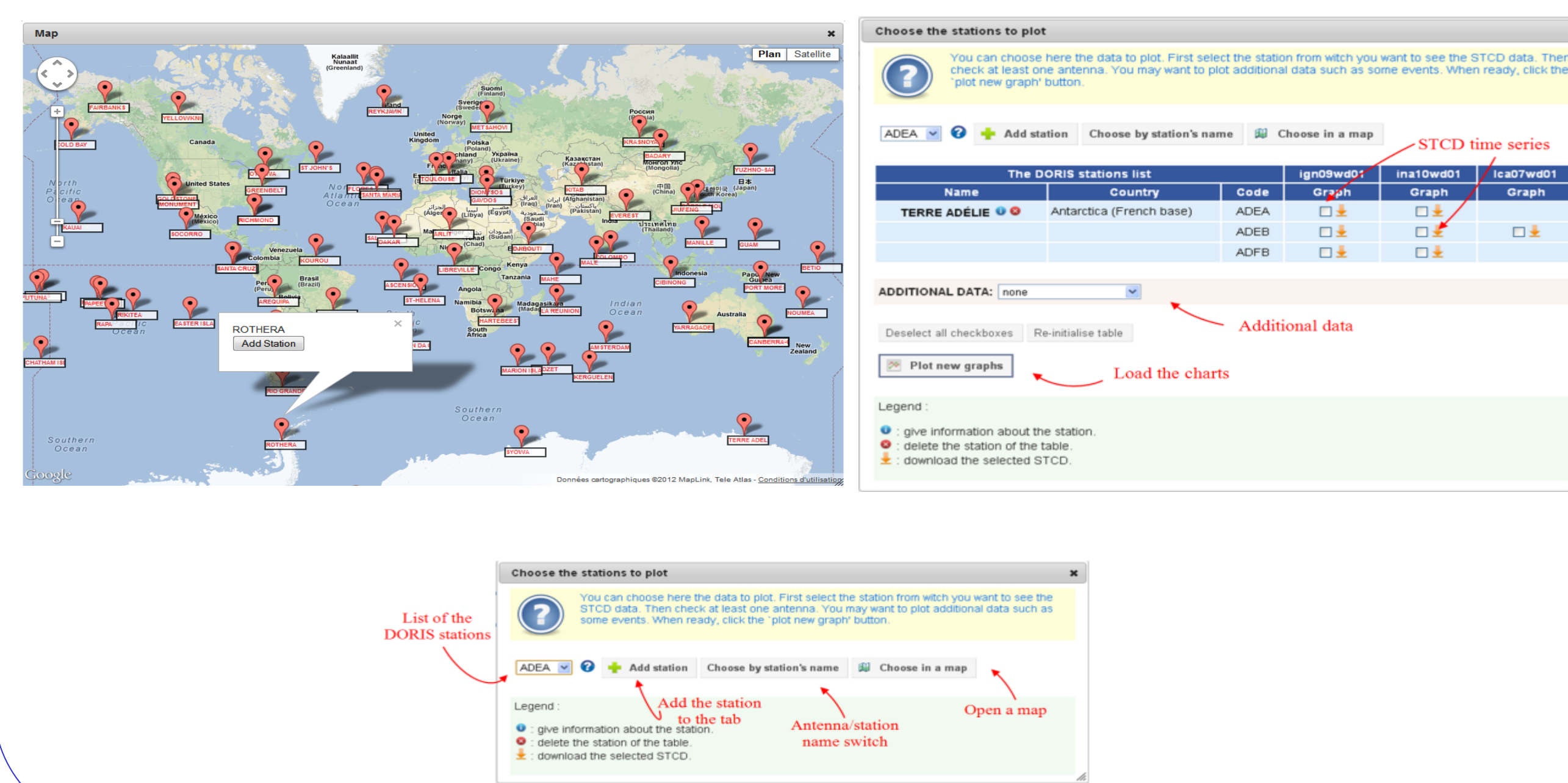
make a selection

Complete series from selected points

Statistics for each series and selection

north :

Station	Mean	WRSD	Slope	Period
CRQB lca11wd02	-1.34mm	8.56mm	0.84+0.85mm/year	2004/2/3-2007/4/6
CRPB lca11wd02	-3.71mm	8.73mm	-5.45+/-1.63mm/year	2007/4/13-2009/3/26
CRQB lca11wd02	-9.9mm	7.07mm	-3.69+/-0.63mm/year	2009/4/24-2012/5/30

east :

Station	Mean	WRSD	Slope	Period
CRQB lca11wd02	31.79mm	14.68mm	7.41+/-1.51mm/year	2004/2/3-2007/4/6
CRPB lca11wd02	53.23mm	10.76mm	10.13+/-2.33mm/year	2007/4/13-2009/3/26
CRQB lca11wd02	89.65mm	7.82mm	3.49+/-0.66mm/year	2009/4/24-2012/5/30
selected	51.73	11.81	7.16+/-0.25	2004/2/17-2012/5/30

Velocity

up :

Station	Mean	WRSD	Slope	Period
CRQB lca11wd02	7.79mm	10.14mm	1.89+/-1.19mm/year	2004/2/3-2007/4/6
CRPB lca11wd02	-2.88mm	9.48mm	-9.16+/-1.82mm/year	2007/4/13-2009/3/26
CRQB lca11wd02	-12.34mm	7.22mm	-3.47+/-0.64mm/year	2009/4/24-2012/5/30

How to load data?

Selection on a map
or
Selection in a list

Selection of the time series to plot

List of the DORIS stations

Add the station to the tab

Antenna station name switch

Open a map

Event content

Event marker

POEtool   http://ids-doris.org/plottool/stcd/poetool.php

Statistics for the HY-2A mission from CNES POD: DORIS orbit residuals for each arc, number of measurements
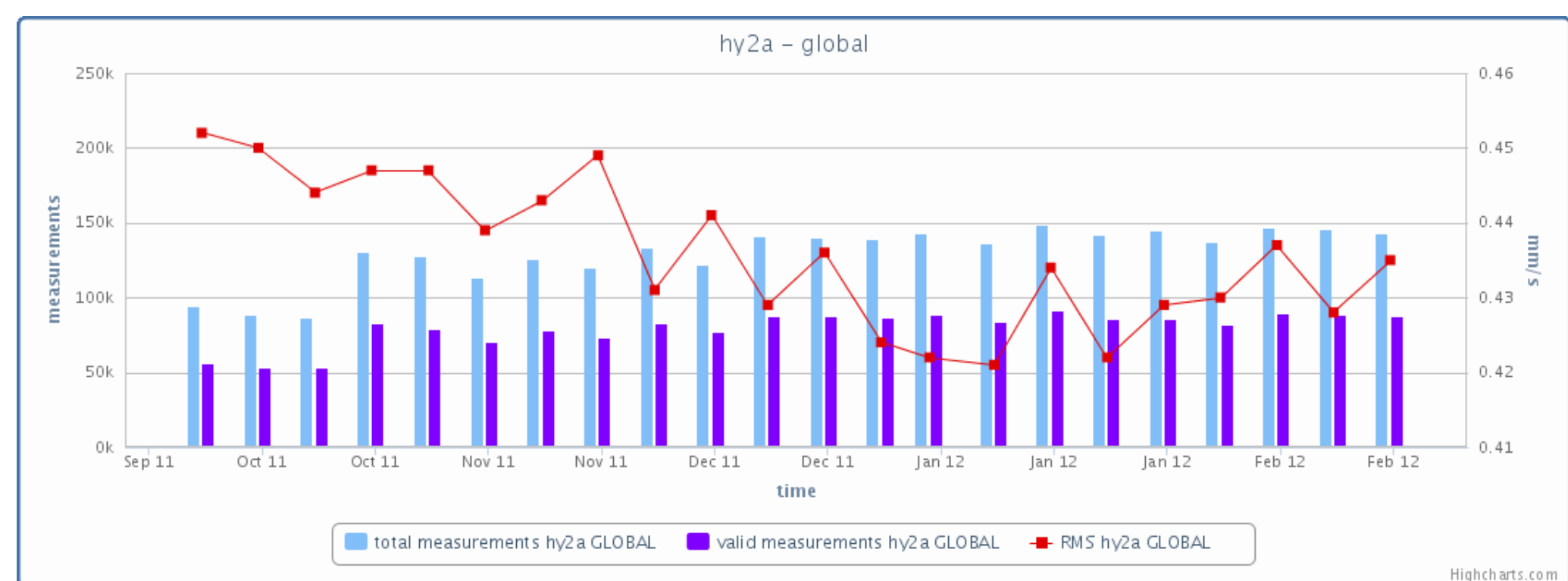
Future developments

Station time series
•ensure that the same position reference is used dor all the time series (fix cause of some bias)
•add future « ITRF2013 » combined times series of the IDS Combination Center
•add series for GNSS, SLR and VLBI stations colocated with DORIS (to be done in coordination with IGS, ILRS and IVS combination centers)

Orbit residuals
•add SARAL statistics

Geocenter, scale
•develop a dedicated version for outputs of the IDS Combination Center