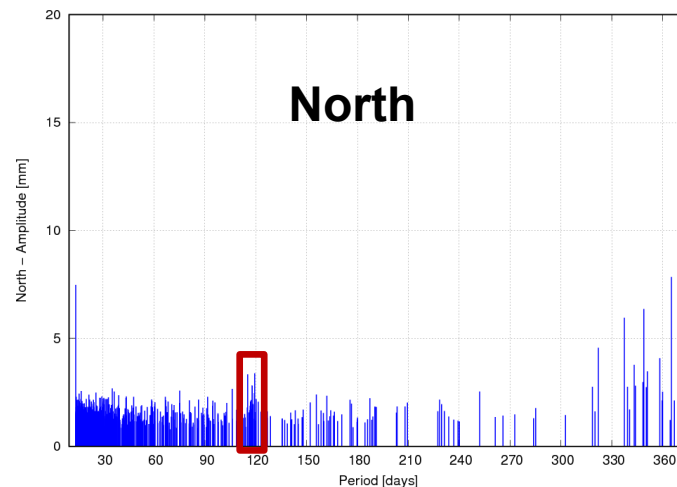
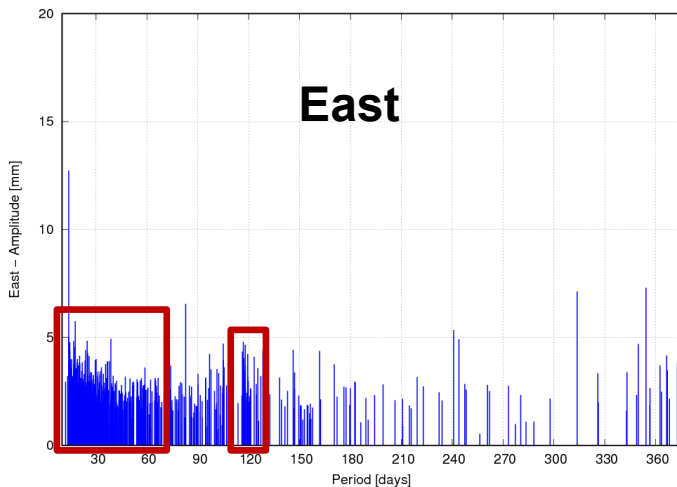




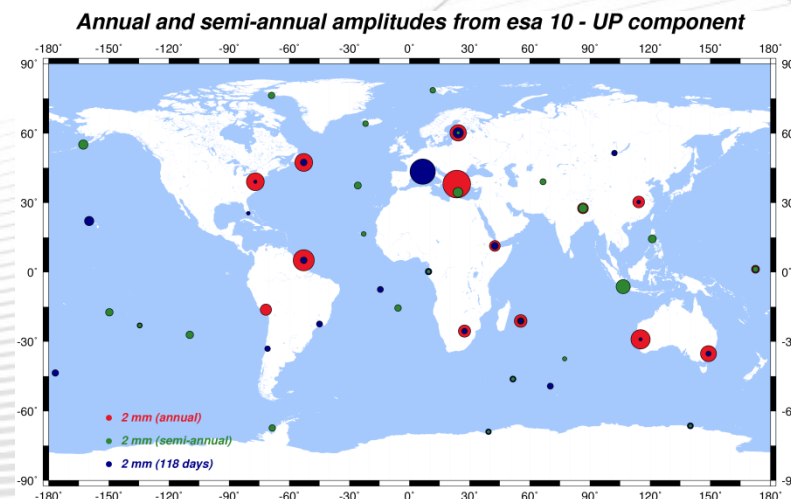
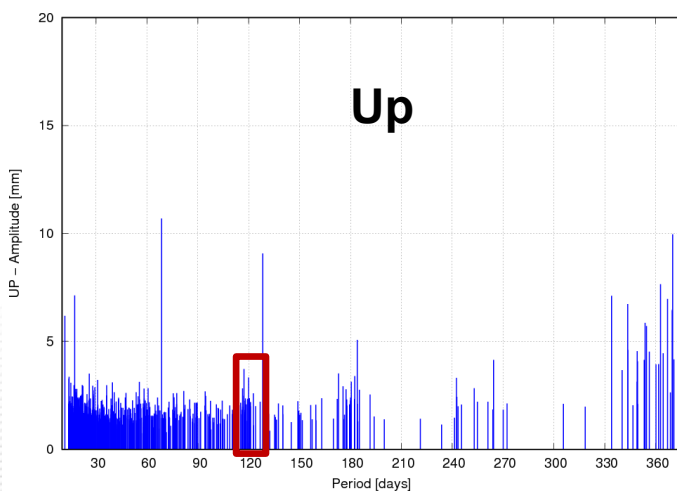
Review of Error Signals in DORIS data seen as a result of ITRF2014

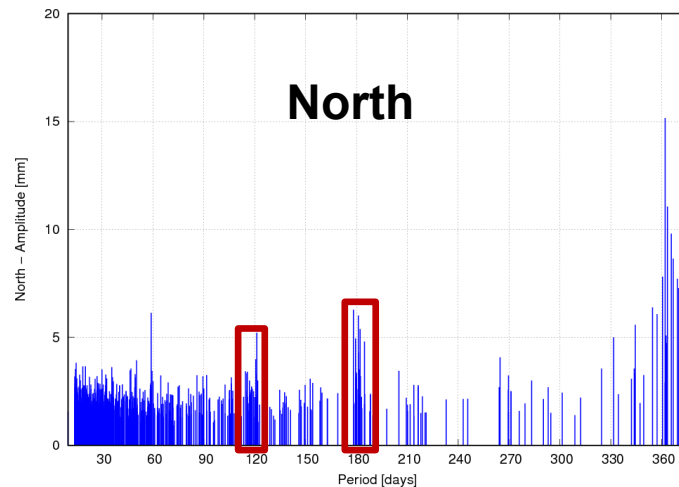
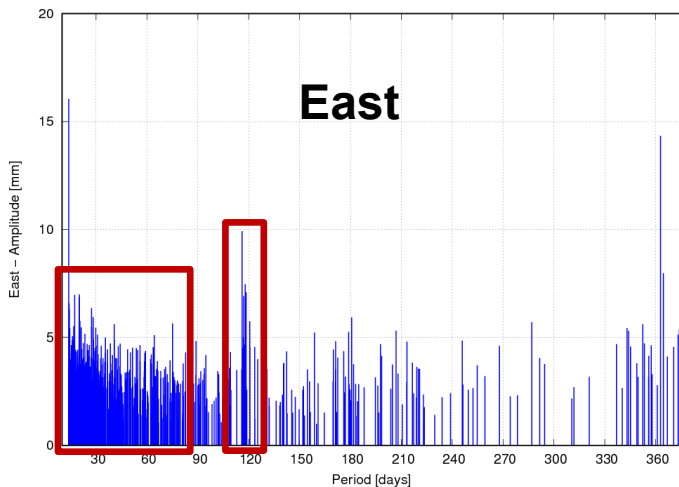
Guilhem Moreaux (CLS), Frank Lemoine (NASA), Jean-Paul Boy (EOST)

- **Subject: estimation and analysis of the signal content of the DORIS coordinate time series delivered for the realization of the ITRF2014.**
- **DORIS Series: esa10, gop43, grg40, gsc26, ign15, ina10 and ids09 (== IDS contribution to ITRF2014).**
- **Methodology:**
 1. **Construction of the DORIS position and velocity cumulative solution over the time period 1993.0-2015.0.** The position discontinuities and velocity constraints are the same as in Moreaux et al. (2016).
 2. **Estimation of the DORIS station position residuals (differences between the coordinate time series and the mean velocities).**
 3. **Selection of the residuals from Jason-2 including (2008/06/20).**
 4. **Gathering of residuals per DORIS site.**
 5. **Rejection of sites with less than 120 weeks or with mean time interval larger than 10 days.**
 6. **Estimation of the top 25 periodic signals w.r.t. S/N ratio larger than 2. Software: FAMOUS from Mignard (2005).**

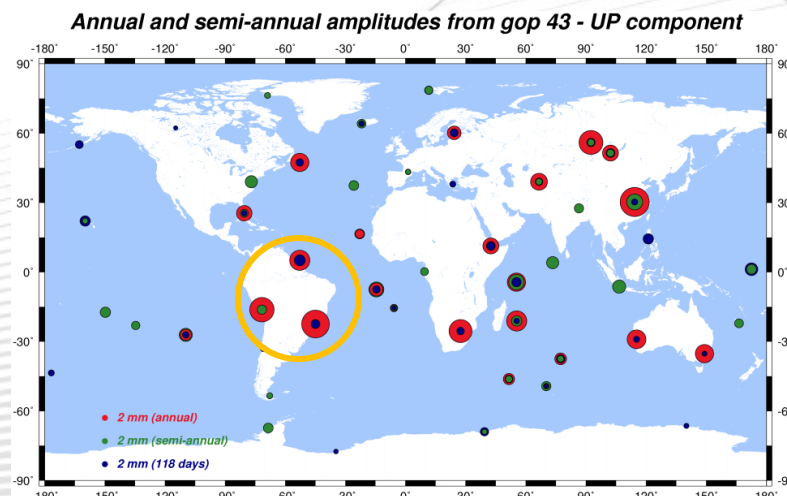
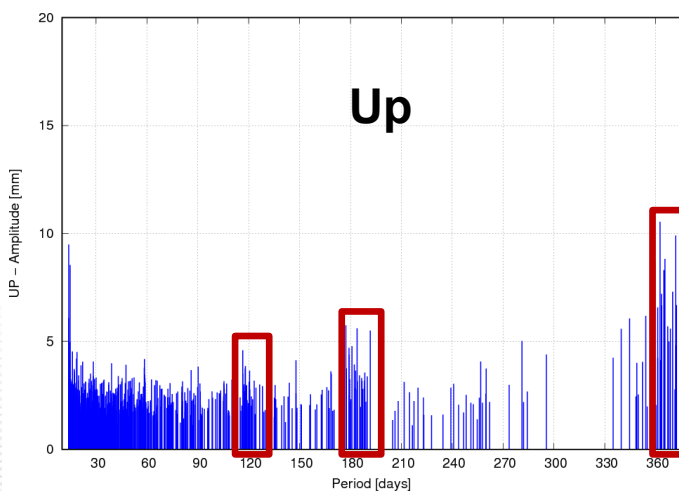


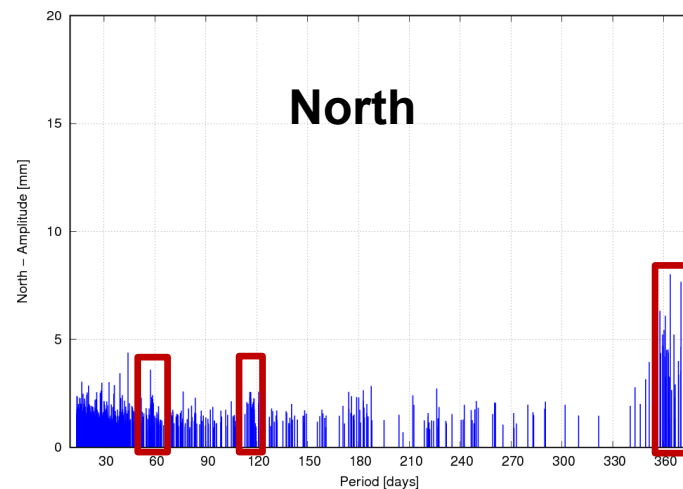
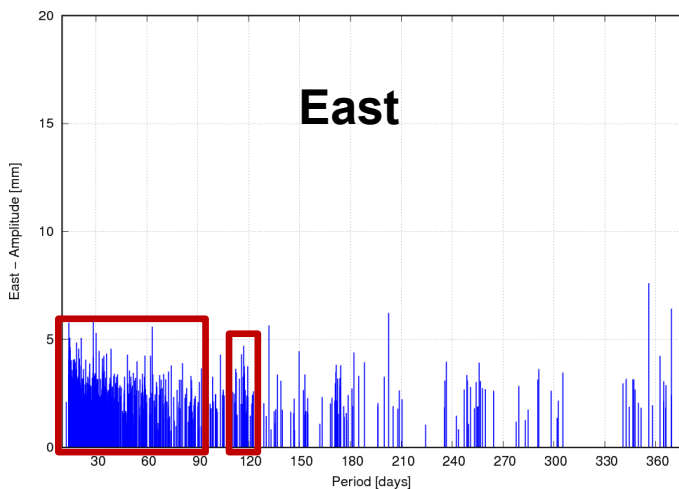
Jason-2 draconitic in all the directions. /Geographical coherence / Smaller amplitudes on the islands.



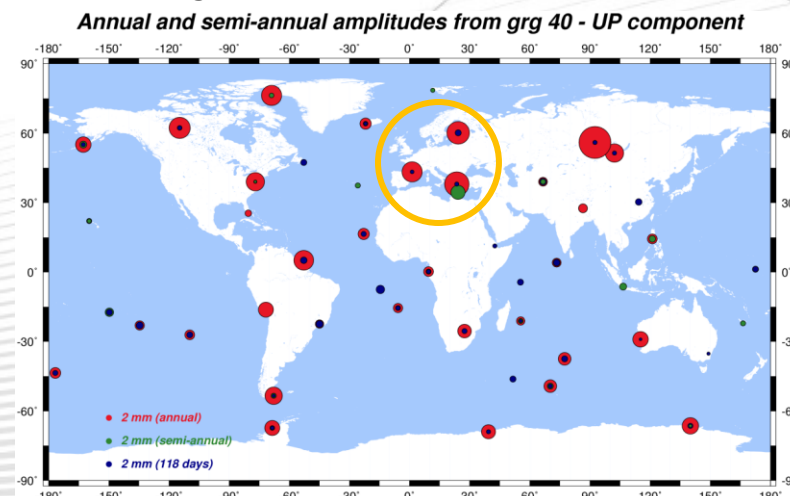
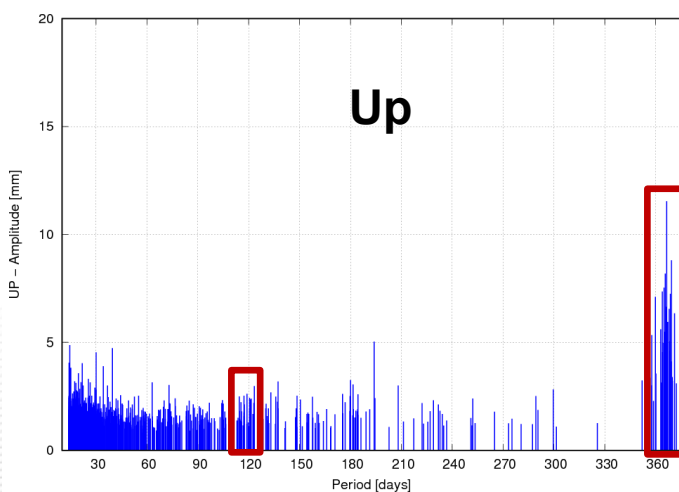


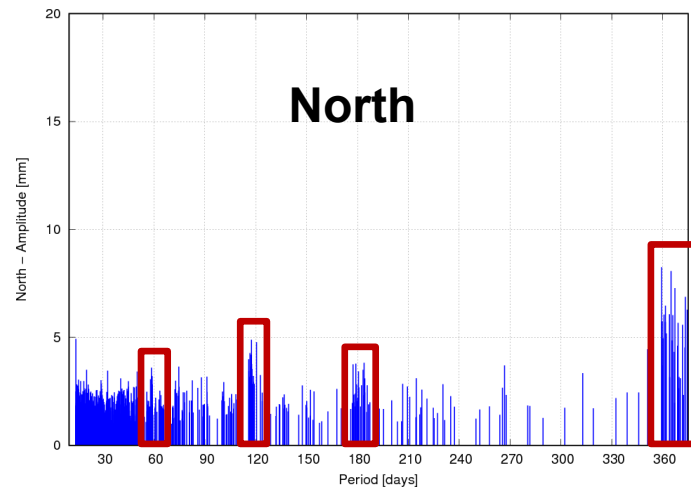
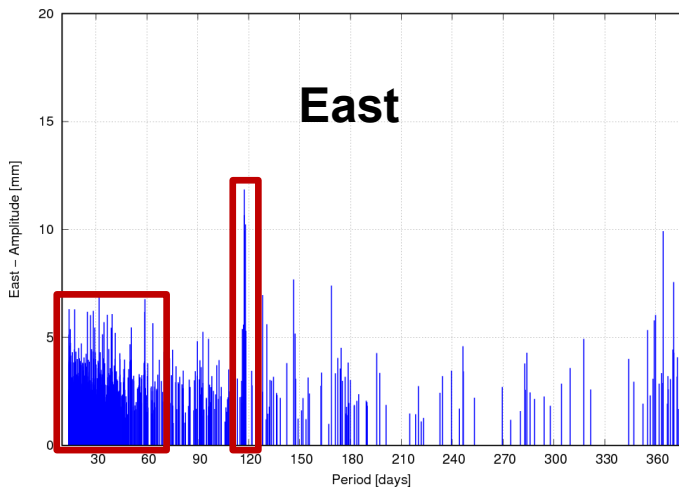
Jason-2 draconitic in all the directions. / Geographical coherence / Smaller amplitudes on the islands / Strong signal for Cachoiera, Kourou and Santiago



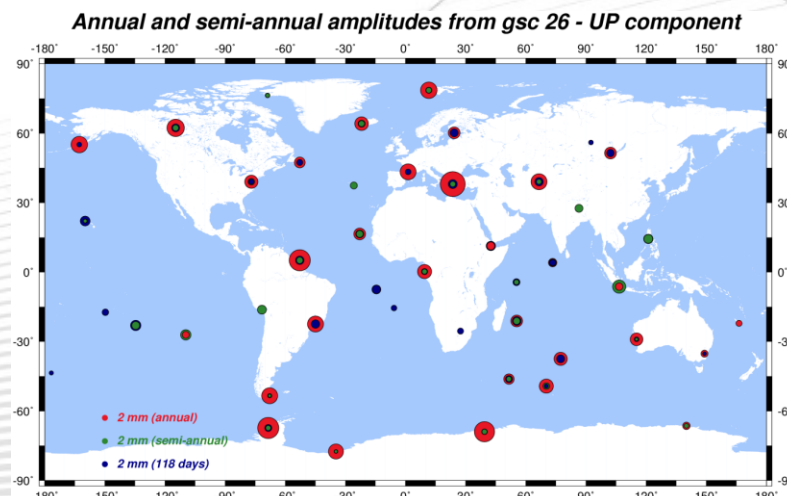
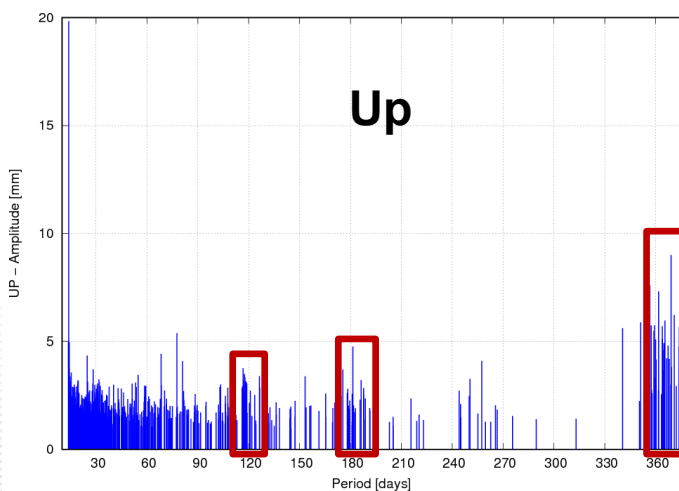


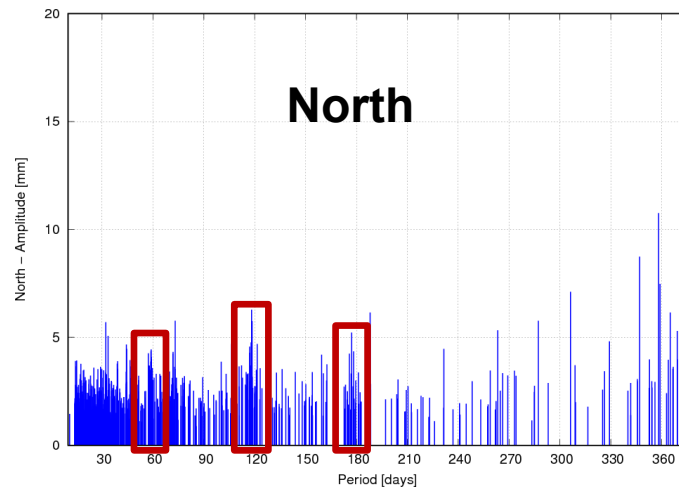
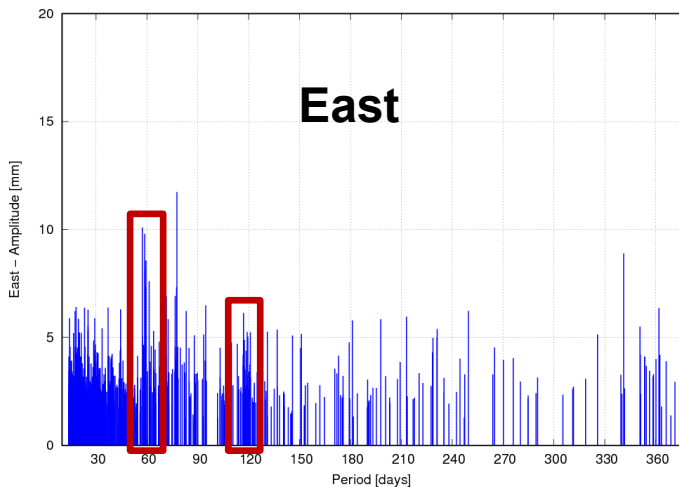
Jason-2 draconitic in all the directions. / Geographical coherence / Smaller amplitudes on the islands / Strong signal for Dionysos, Metsahovi and Toulouse



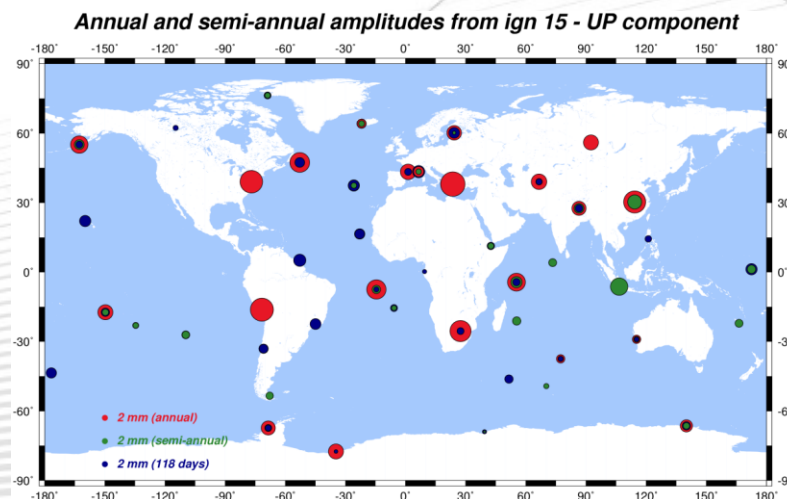
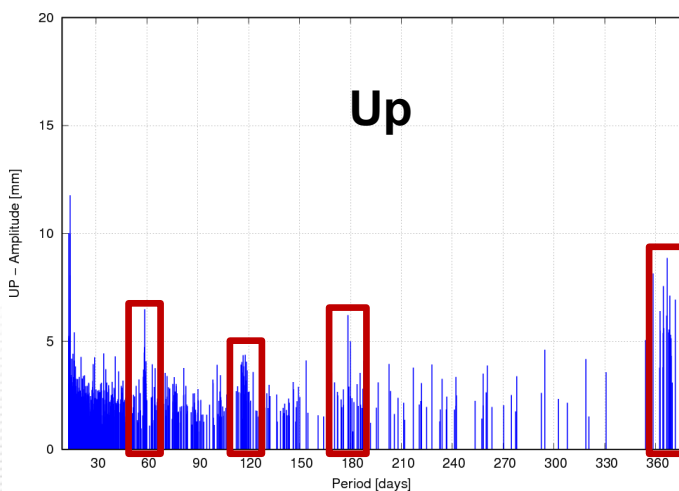


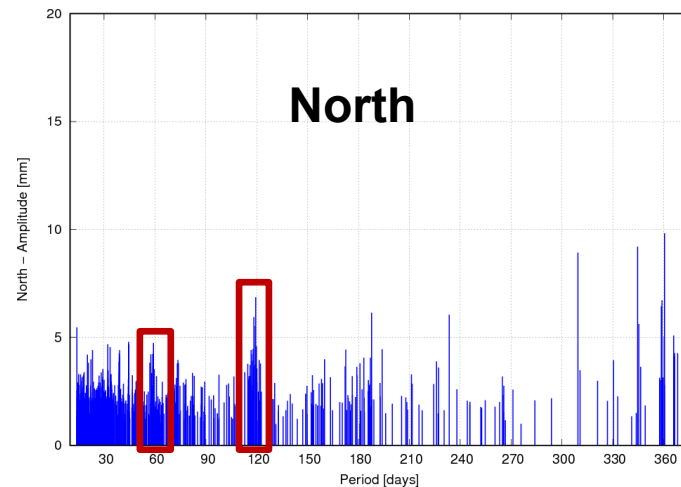
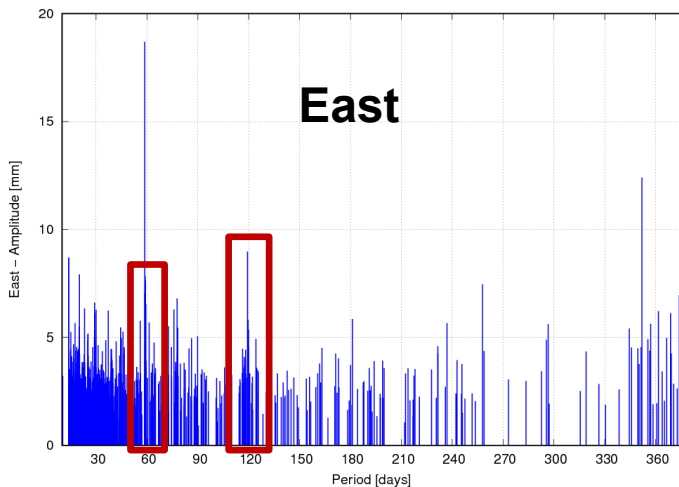
Jason-2 draconitic in all the directions + first overtone in the North direction / Geographical coherence / Smaller amplitudes on the islands



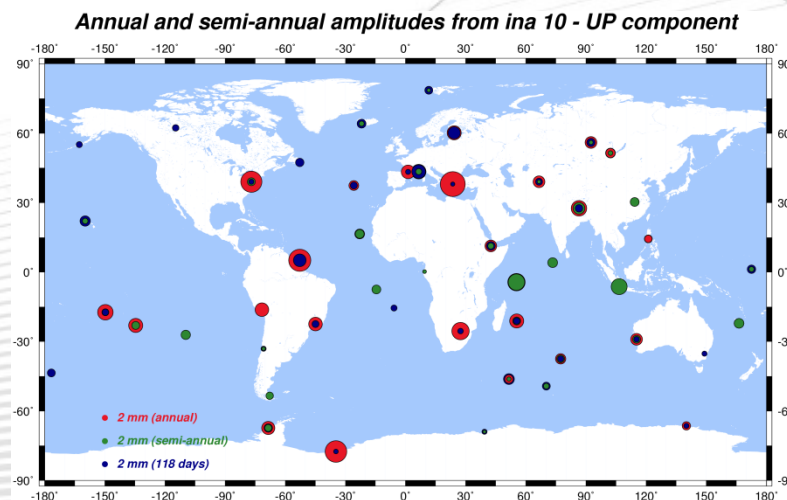
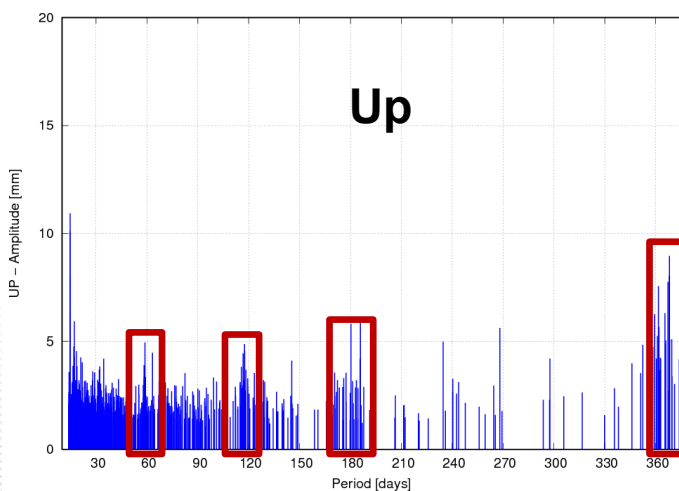


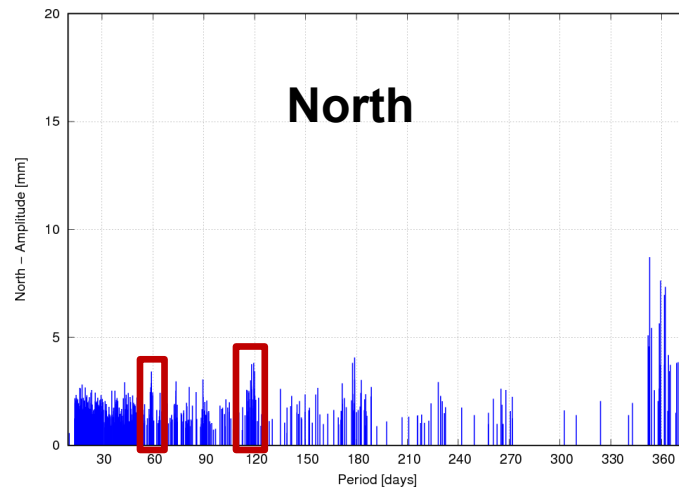
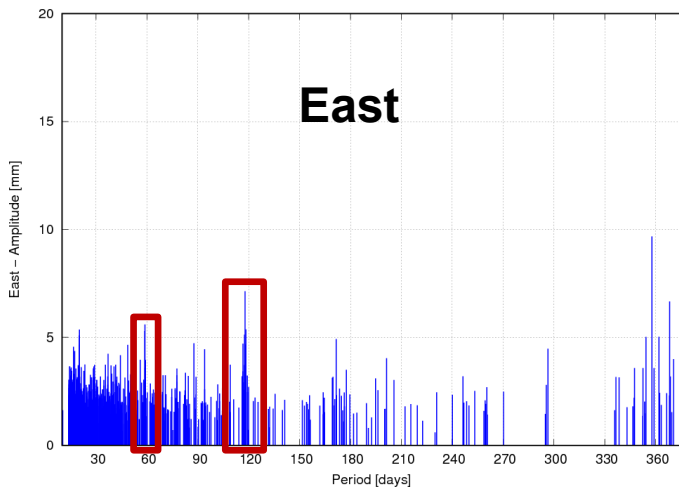
Jason-2 draconitic in all the directions + first overtone in all the directions / Geographical coherence / Smaller amplitudes on the islands



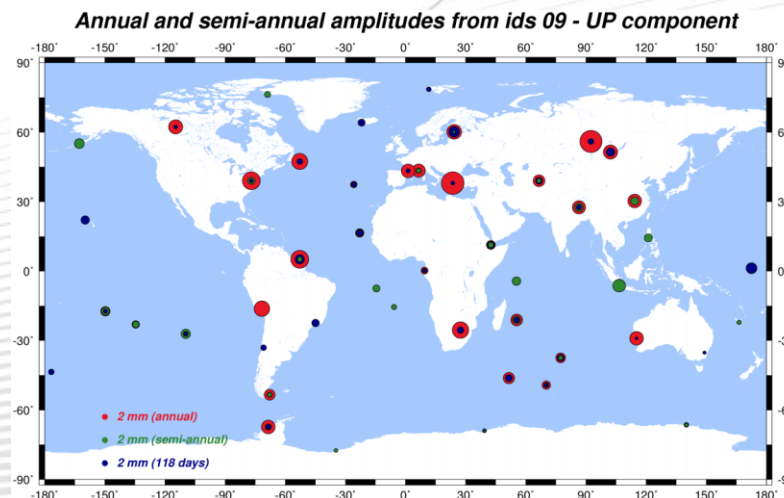
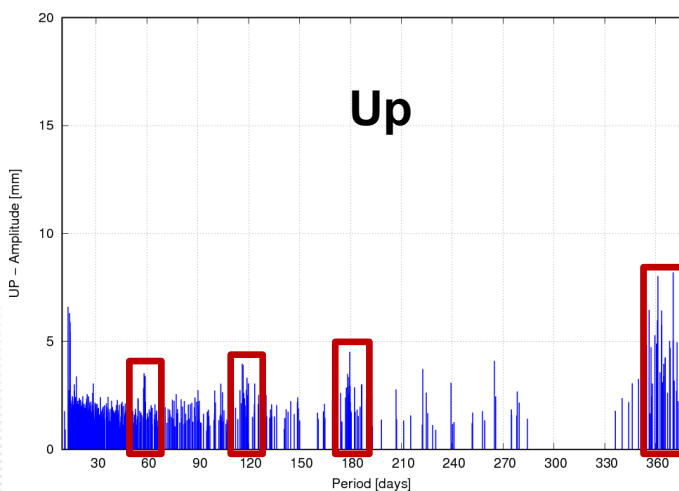


Jason-2 draconitic in all the directions + first overtone in all the directions / Geographical coherence / Smaller amplitudes on the islands





Jason-2 draconitic in all the directions + first overtone in all the directions / Geographical coherence / Smaller amplitudes on the islands



Bloßfeld M., Seitz M., Angermann D., Moreaux G. (2016). Quality assessment of IDS contribution to ITRF2014 performed by DGFI-TUM. *Advances in Space Research* 58 (2016) 2505–2519, doi: 10.1016/j.asr.2015.12.016.

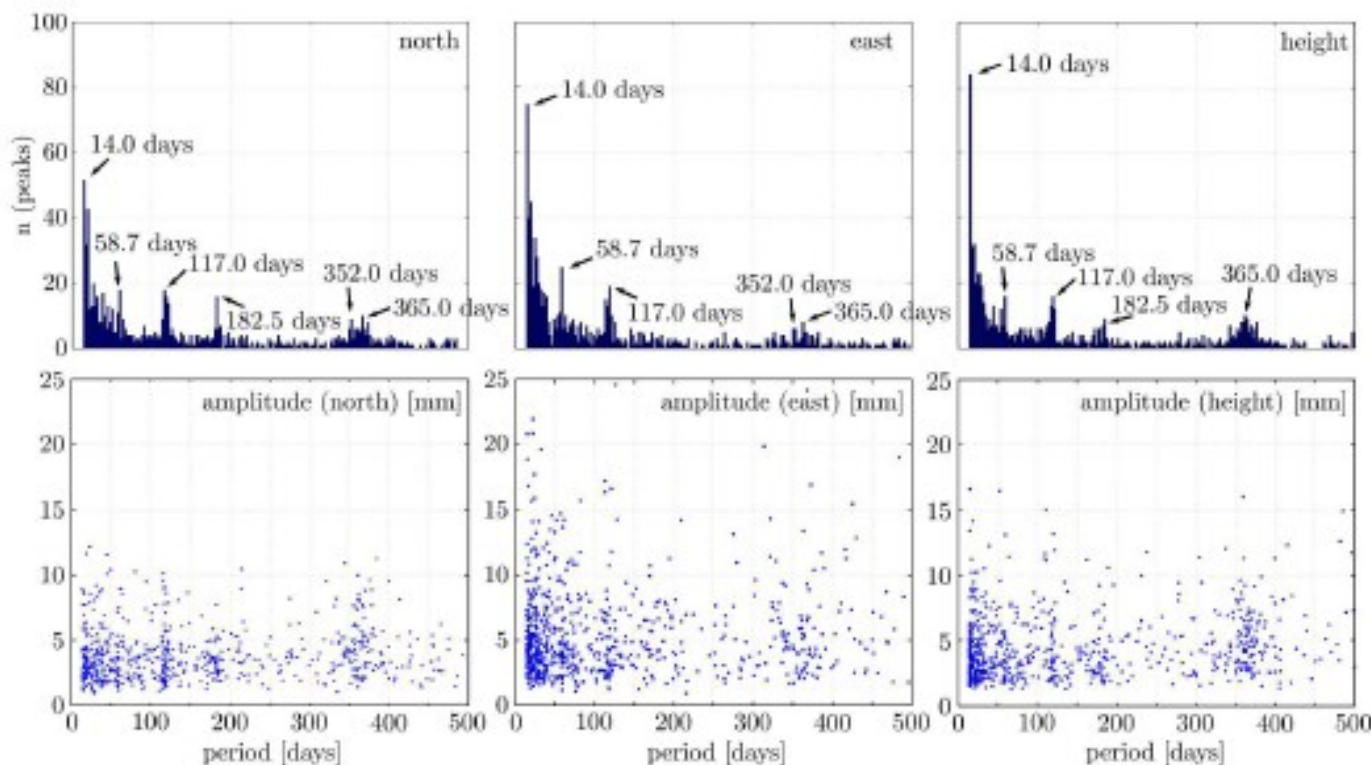
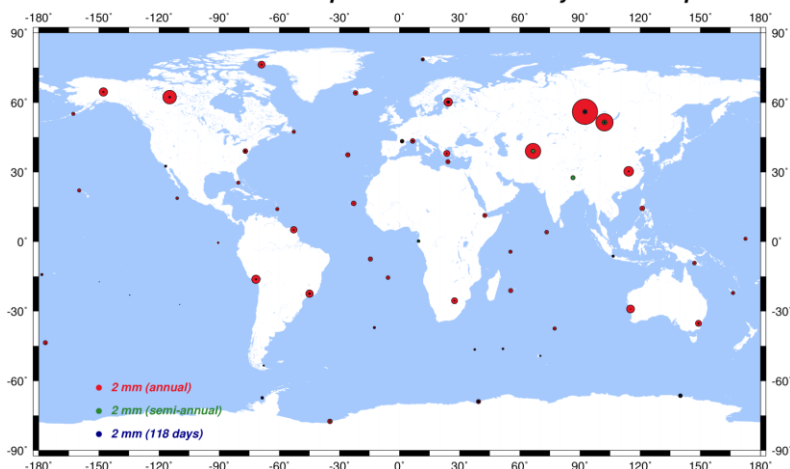


Figure 13: Upper three plots: histograms of the five largest significant peaks per station in north, east and height. Lower three plots: significant five largest amplitudes in north, east and height.

→ Similar Results + 14 day signal

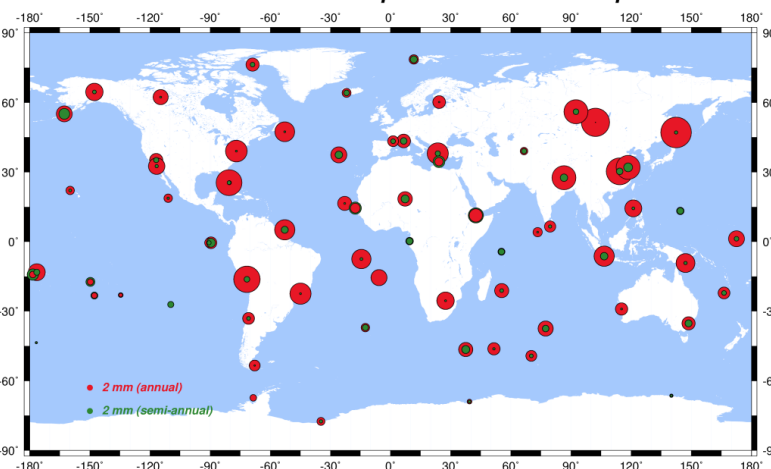
Up signal content

Annual and semi-annual amplitudes from ERA inHyd - UP component



From ITRF2014 (courtesy Z. Altamimi)

Annual and semi-annual amplitudes from - U component

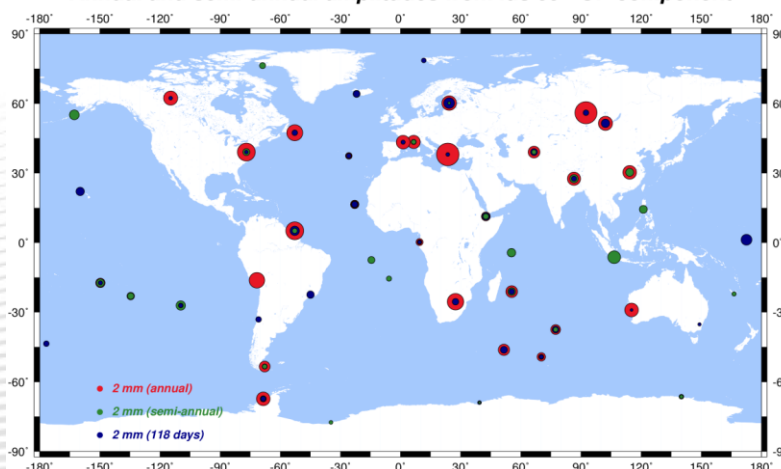


ERA inHyd = Atmospheric and hydrologic loading from ECMWF ERA Interim reanalysis. Weekly time series at DORIS sites from J.P. Boy.

- ❑ Coherence between IDS 09 and atmosphere and hydrologic annual signals in Yellowknife, Badary, Kitab and Krasnoyarsk.
- ❑ Higher amplitudes for IDS 09 in Cachoeira, Kourou, Santiago and Hartebeesthoek may be explained the South Atlantic Anomaly sensibility of SPOT-5, Jason-1 and Jason-2 Ultra Stable Oscillators.
- ❑ Differences with ITRF2014 estimations may reflect differences in the time span as well as in the estimation strategy.

Annual and semi-annual amplitudes from ids 09 - UP component

IDS 09





<http://ids-doris.org>

Conclusions

Page 12

- **The East component shows higher amplitudes at lower frequencies. This is most likely a consequence of the orbit configuration of the DORIS satellite constellation.**
- **The IDS NEU coordinate time series show annual, semi-annual and 117.3-day (Jason satellite draconitic) periodic signals.**
- **Overtones (58.7 days, 29.3 days) of the Jason draconitic period are also observed in the three components (NEU).**
- **The Jason draconitic is most likely explained by mismodeling of the solar radiation pressure, however errors in the DORIS measurement model could also contribute at some level.**
- **Maps of the amplitudes of the periodic signals show geographic regional coherences (North America, West Eurasia, Europe).**
- **The smallest amplitudes are obtained for the stations situated on islands.**
- **Next: analysis of the new GSC 28 series using new Jason-2 modelling.**