ITRF2020 Updates and the IDS Contribution

Zuheir Altamimi
Paul Rebischung, Xavier Collilieux, Laurent Métivier, Kristel Chanard, Julien Barnéoud
IGN-IPGP, France

Presenter: Arnaud Pollet

Key Points

- Regular (yearly) updates of ITRF2020
- Motivation
- ITRF2020 Update Specifications
- Some Early Results
  - IDS Contribution
- Conclusion

Motivation for regular (yearly) updates of ITRF2020

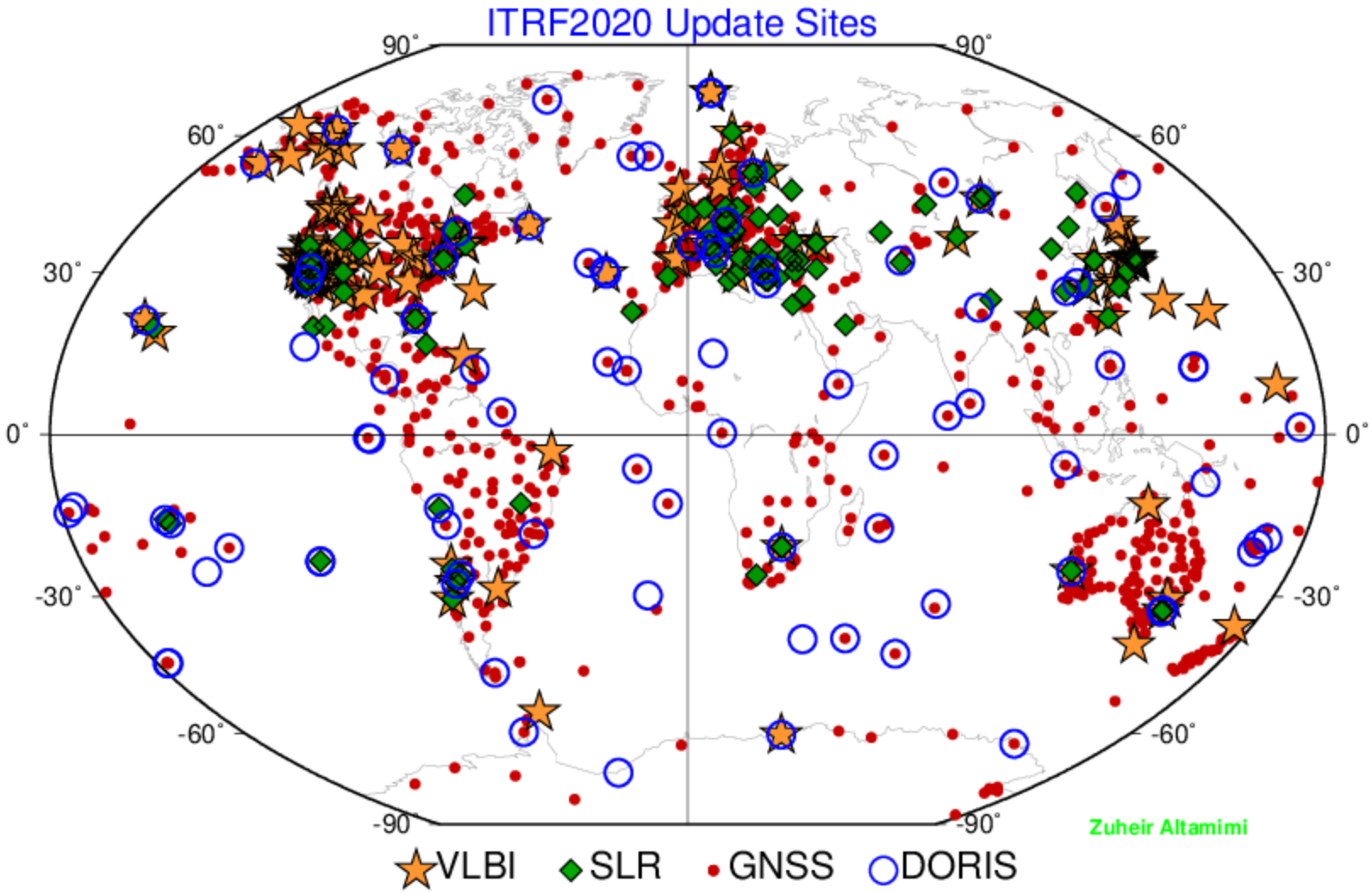
1. Errors in ITRF station coordinates are more and more amplified as they are extrapolated after the end of the ITRF input data;
2. ITRF stations subject to equipment changes or earthquakes posterior to the end of the ITRF input data cannot be used anymore as reference frame stations;
3. Most of the TCs regularly update their own realizations of the ITRF;
4. Increase ITRF2020 lifetime and postpone the need for the next version of the ITRF;
5. The scale agreement between SLR and VLBI is now at the level of 1 mm
6. ITRF origin and scale are now stabilized at the level of or better than 5 mm.
7. ==> This will simplify the life of a number of users, with no “datum” change in their applications

ITRF2020 Update Specifications

- Same analysis strategy as for ITRF2020: Accumulate the full 4 technique time series all together, adding local ties and co-motion constraints
- Plan to preserve the frame and seasonal signal defining parameters in origin, scale, and orientation
- ITRF2020 updates will be delivered using the same file format as ITRF2020
- IAG TCs used the same models and strategy as for their contribution to the ITRF2020

Analysis is still ongoing

Sites ITRF2020 Update 1



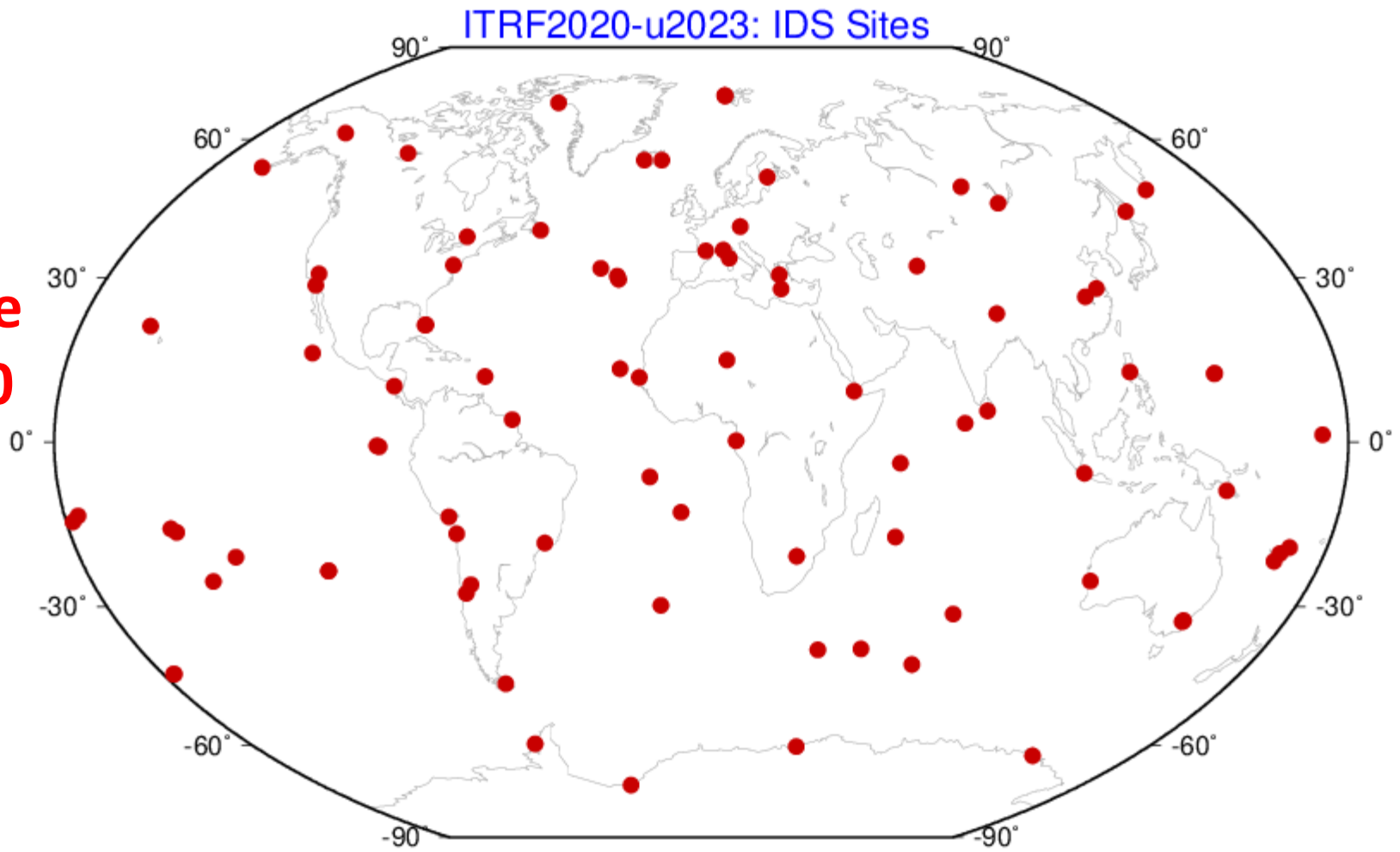
ITRF2020 Update 1: DORIS Sites

89 sites

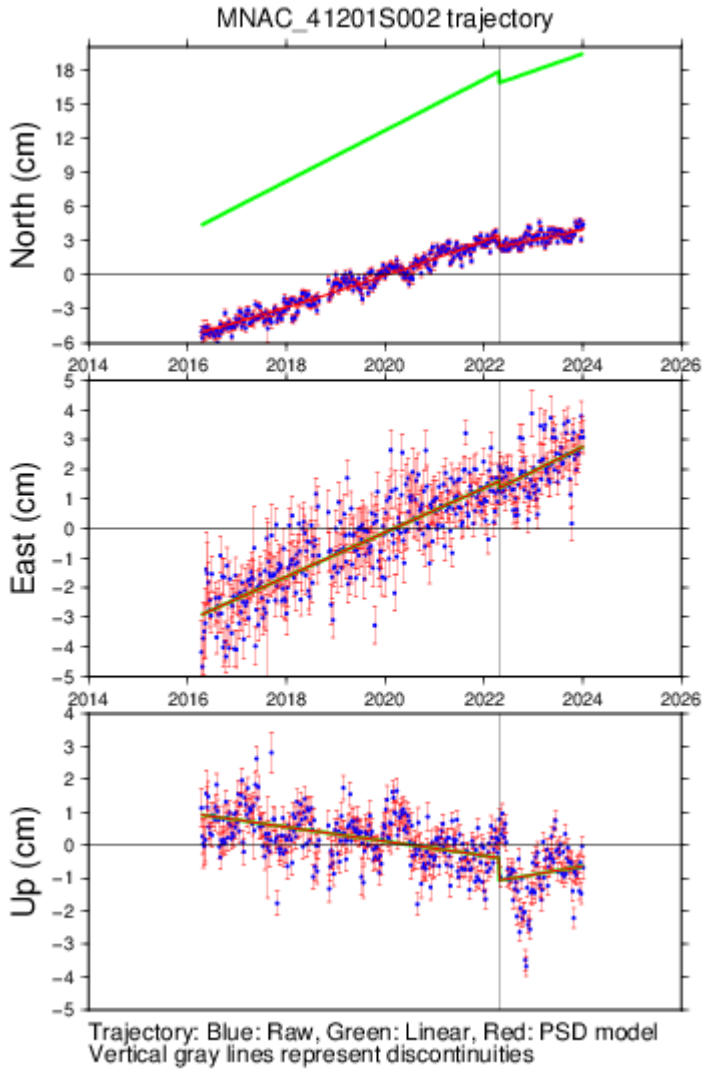
215 stations

96 discontinuities

10 discontinuities identified during the analysis of ITRF2020 Update

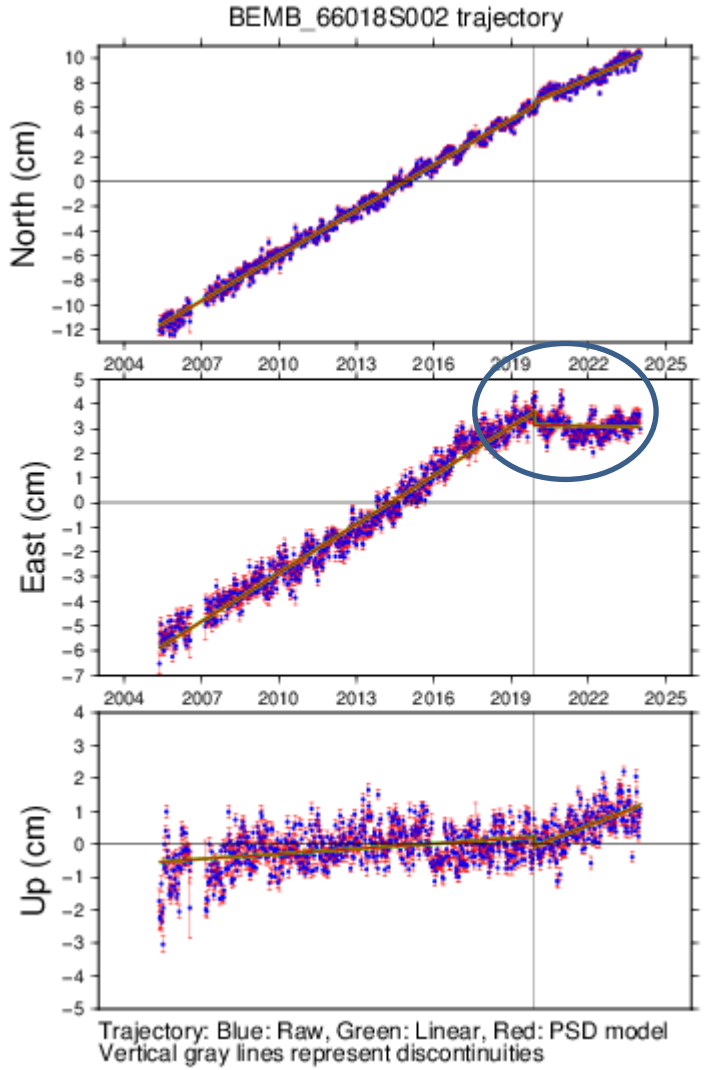


MNAC Managua



PSD caused by a number of EQs

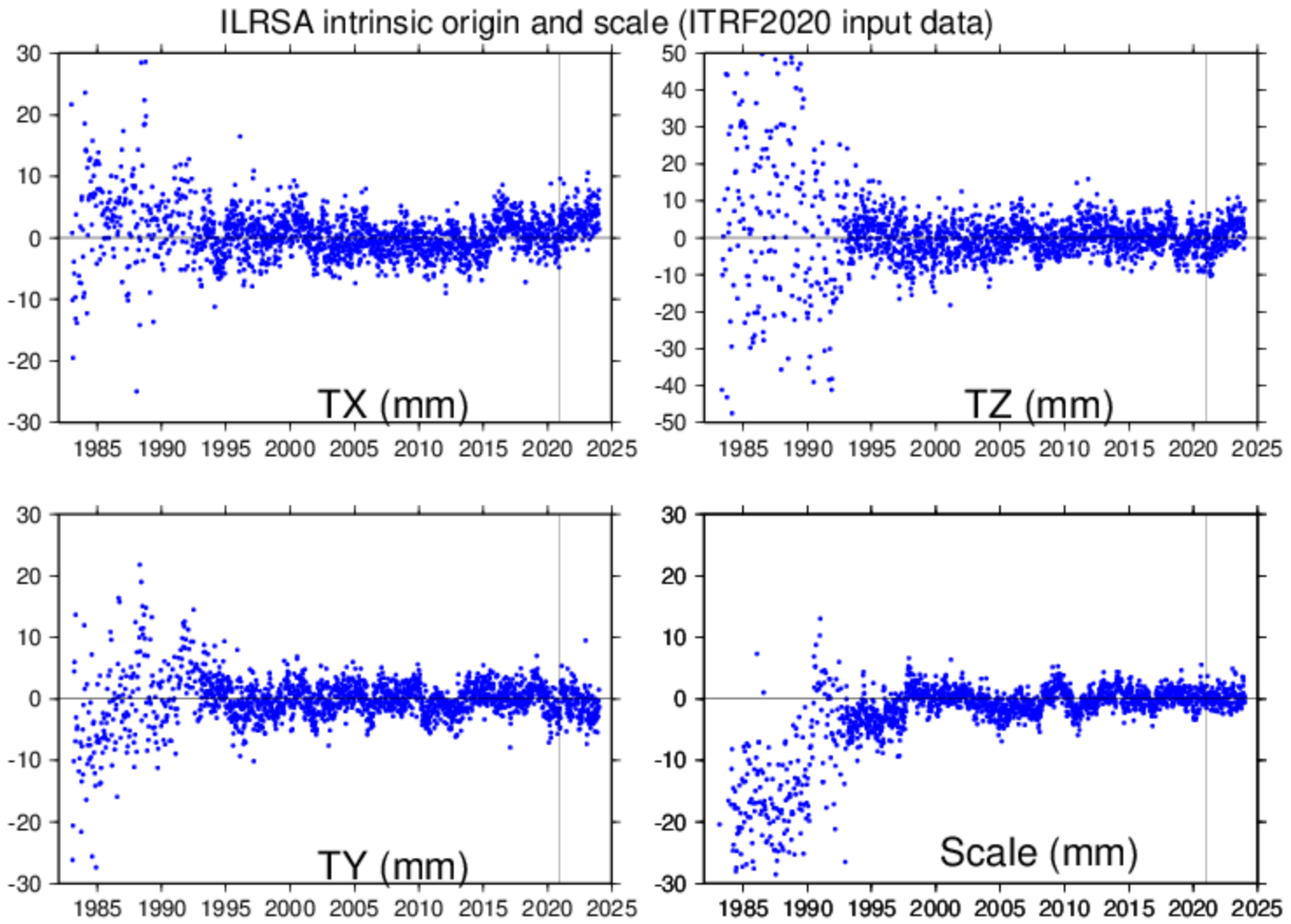
BEMB Belgrano, Antarctica



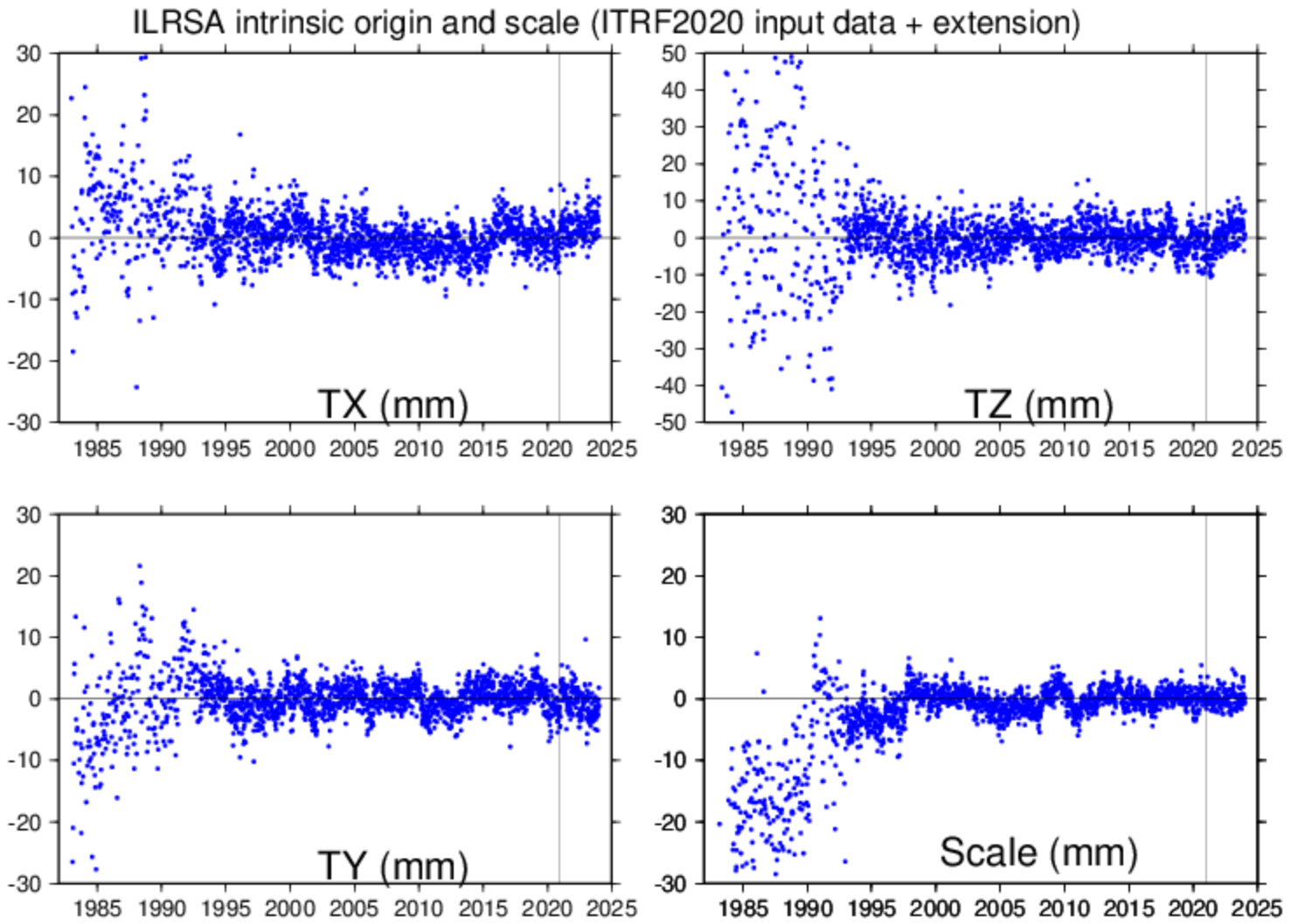
Nonlinear trajectory after 2019

Some preliminary results using the extended data

ILRS/SLR intrinsic (ITRF2020 input data) origin & scale

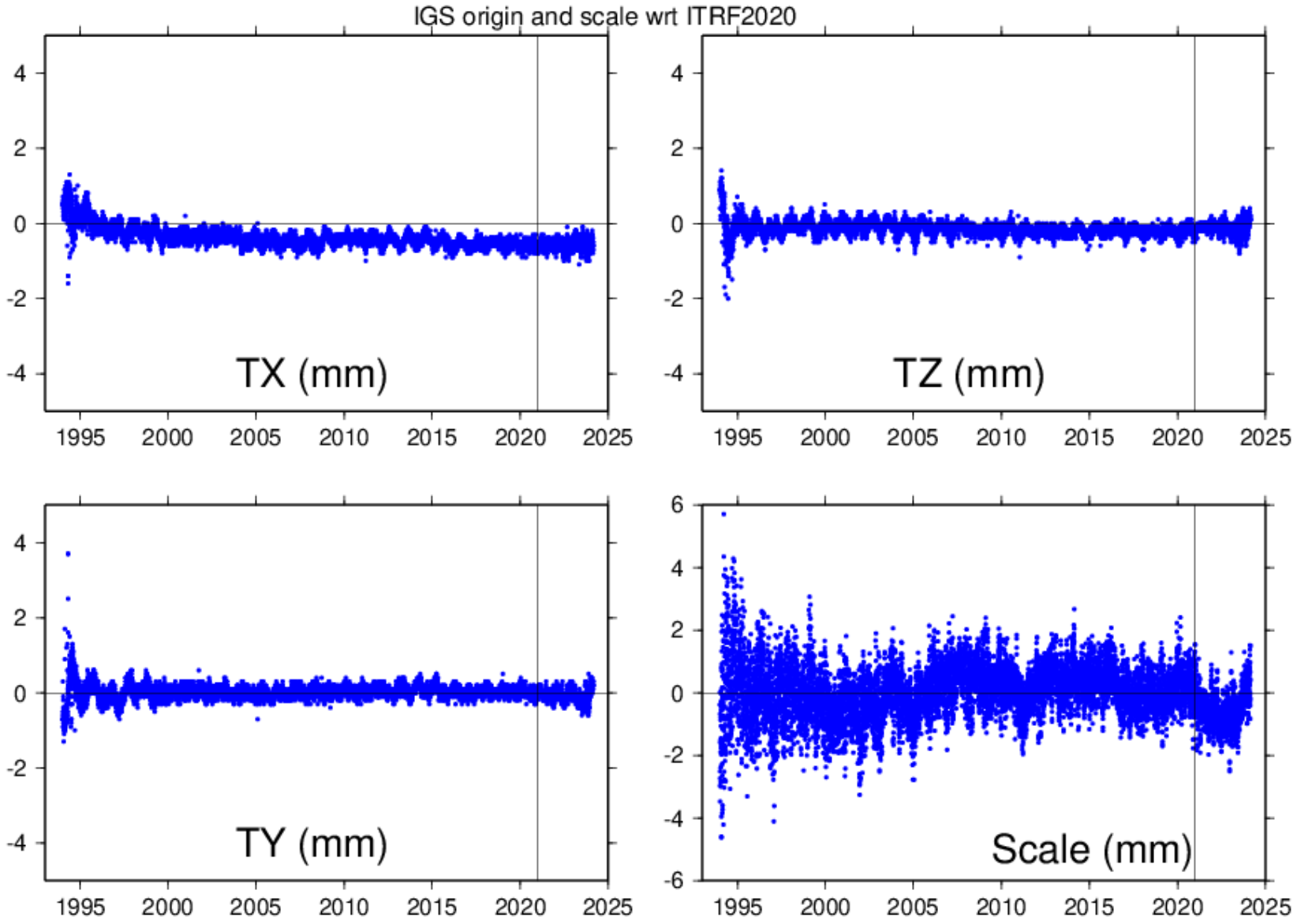


ILRS/SLR intrinsic origin & scale with extension

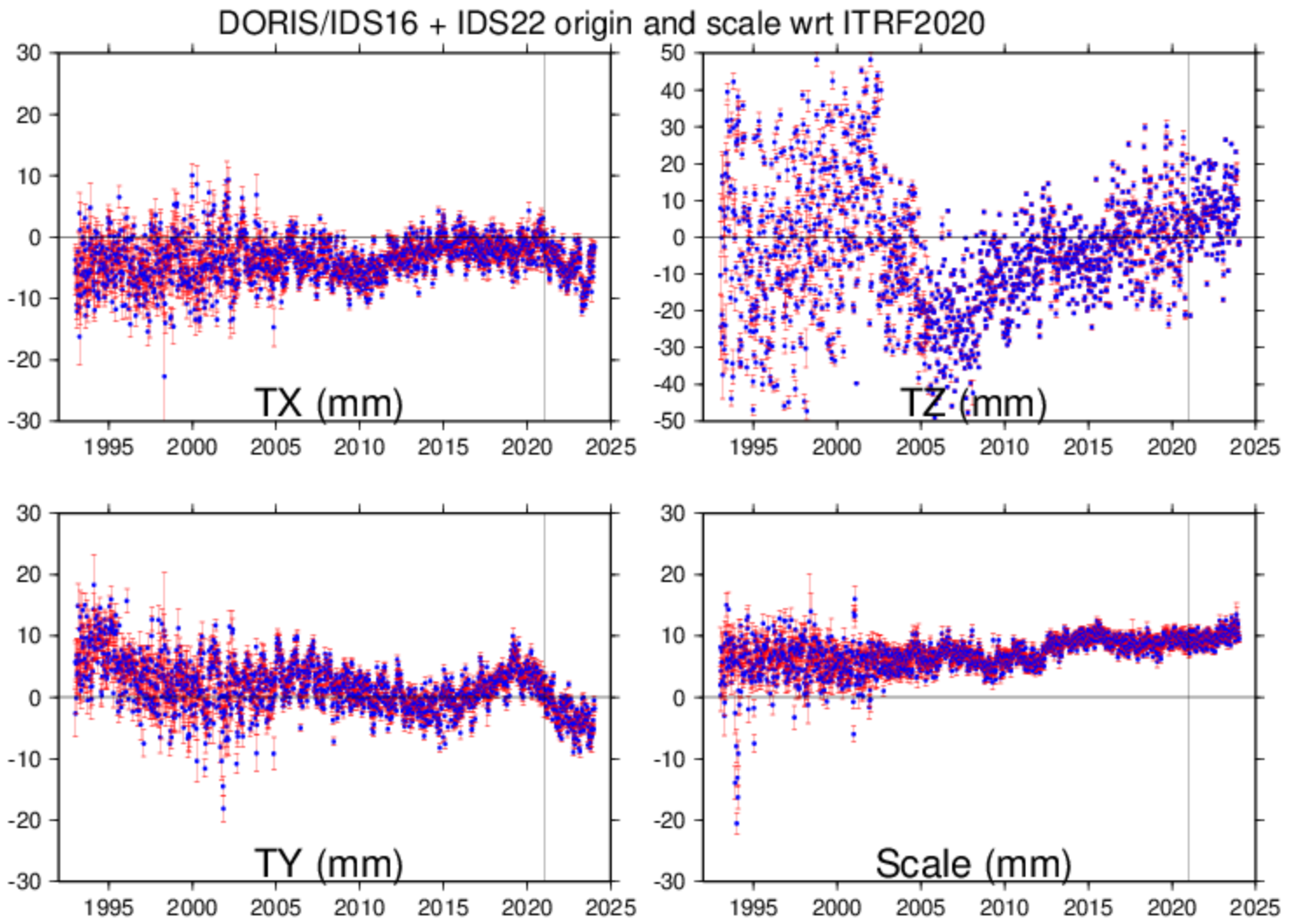


SLR Origin & scale accuracy at 2015.0 below 1 mm and scale stability at the level of 0.1 mm/yr

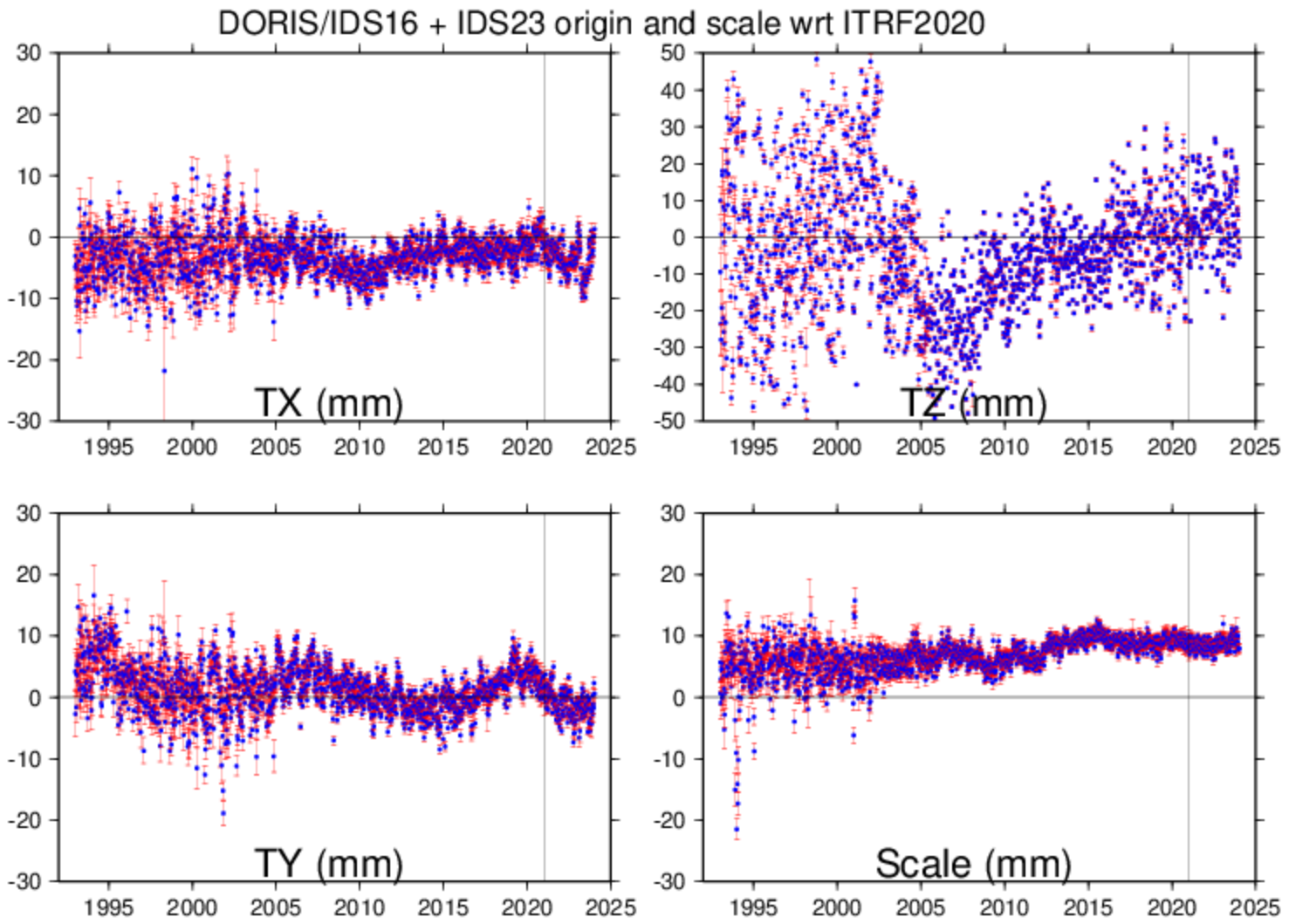
IGS/GNSS origin & scale wrt ITRF2020



IDS16 + ID22 origin & scale wrt ITRF2020 with extension

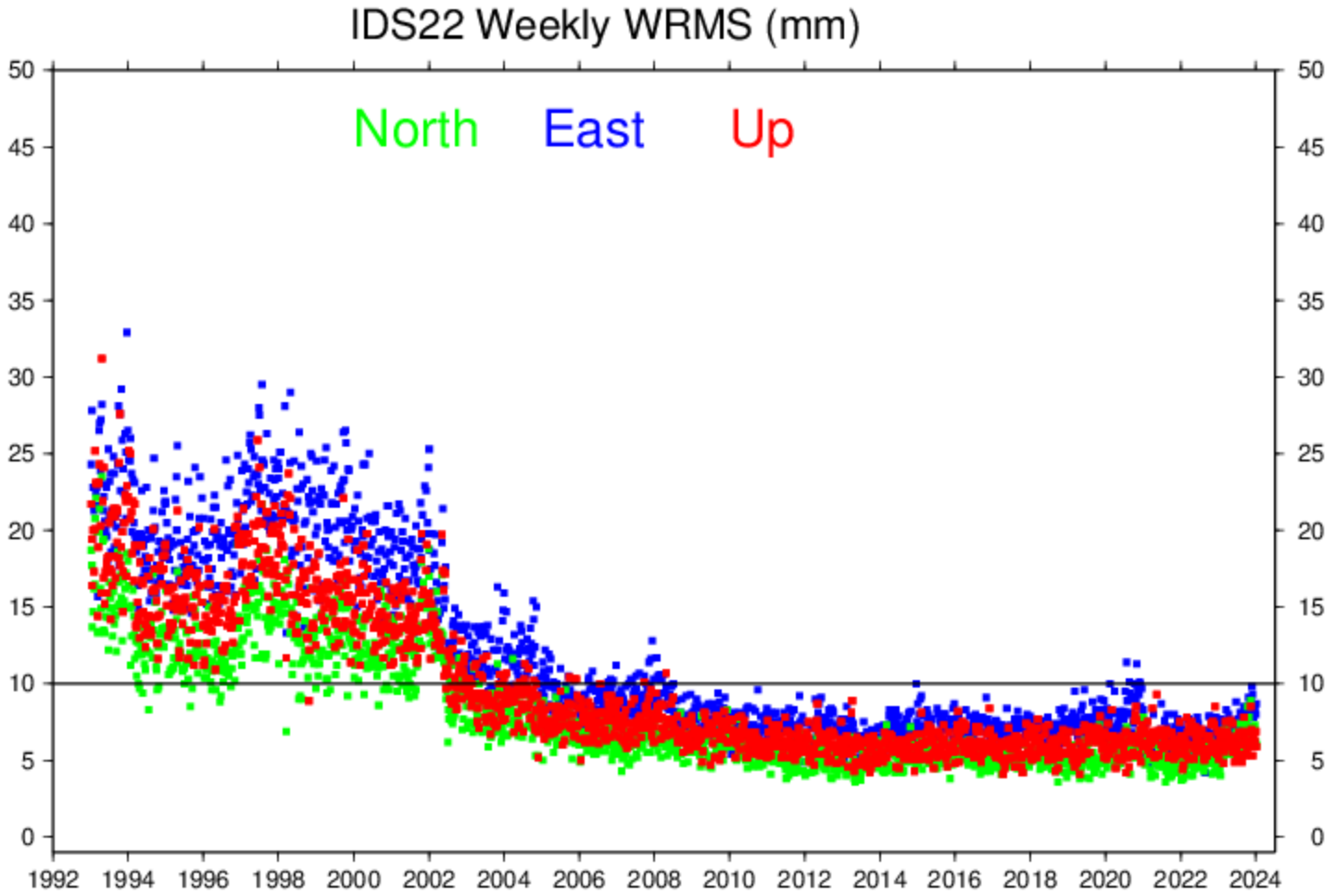


IDS16 + ID23 origin & scale wrt ITRF2020 with extension

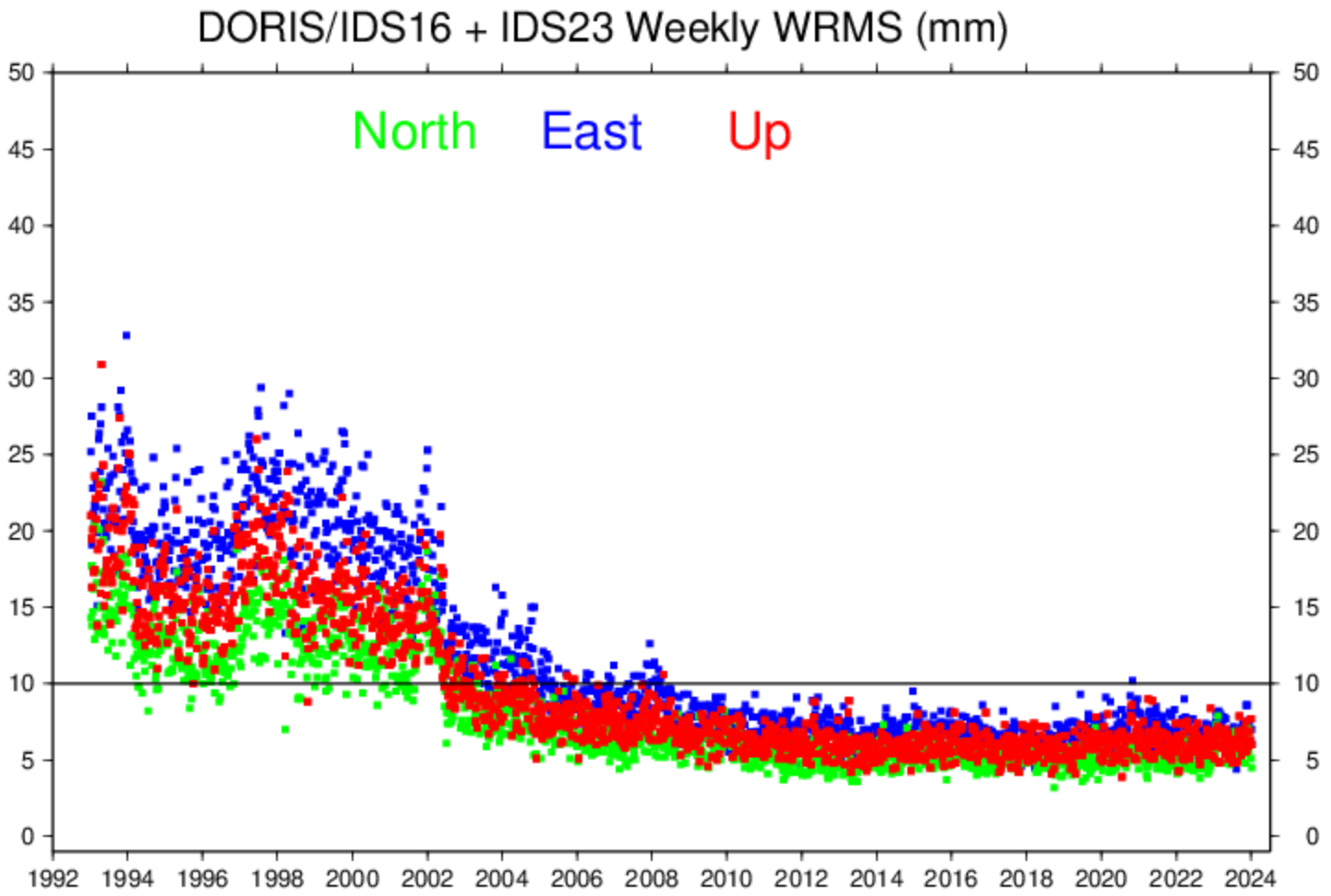


IDS23 seems to be an improved series, compared to IDS22 : decrease of TY and Scale offsets

IDS16 + ID22 WRMS



IDS16 + ID23 WRMS



IDS23 seems to be an improved series, compared to IDS22 : Reduced WRMS

Conclusion

- No major issue so far with technique extended data
- Stability of SLR/ILRS origin and scale, with the extension, is at the level of or better than 0.1 mm/yr
- The IVS/VLBI scale comes back to “normal”, after the extension, starting at 2021.0
- IDS23 series shows improved results
- Expected release date : Autumn 2024!

- There will be no changes to the defining parameters of the frame and seasonal signals (origin, scale, orientation) between ITRF2020 and its 1st update

- Proposed name: ITRF2020-u2023