Highlights of IGS Contribution to ITRF2020

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Outline

- ITRF2020 timeline
- Expected sites & colocations
- ITRF2020: an augmented parametric frame
- Key points of IGS contribution to the ITRF
- Some preliminary results

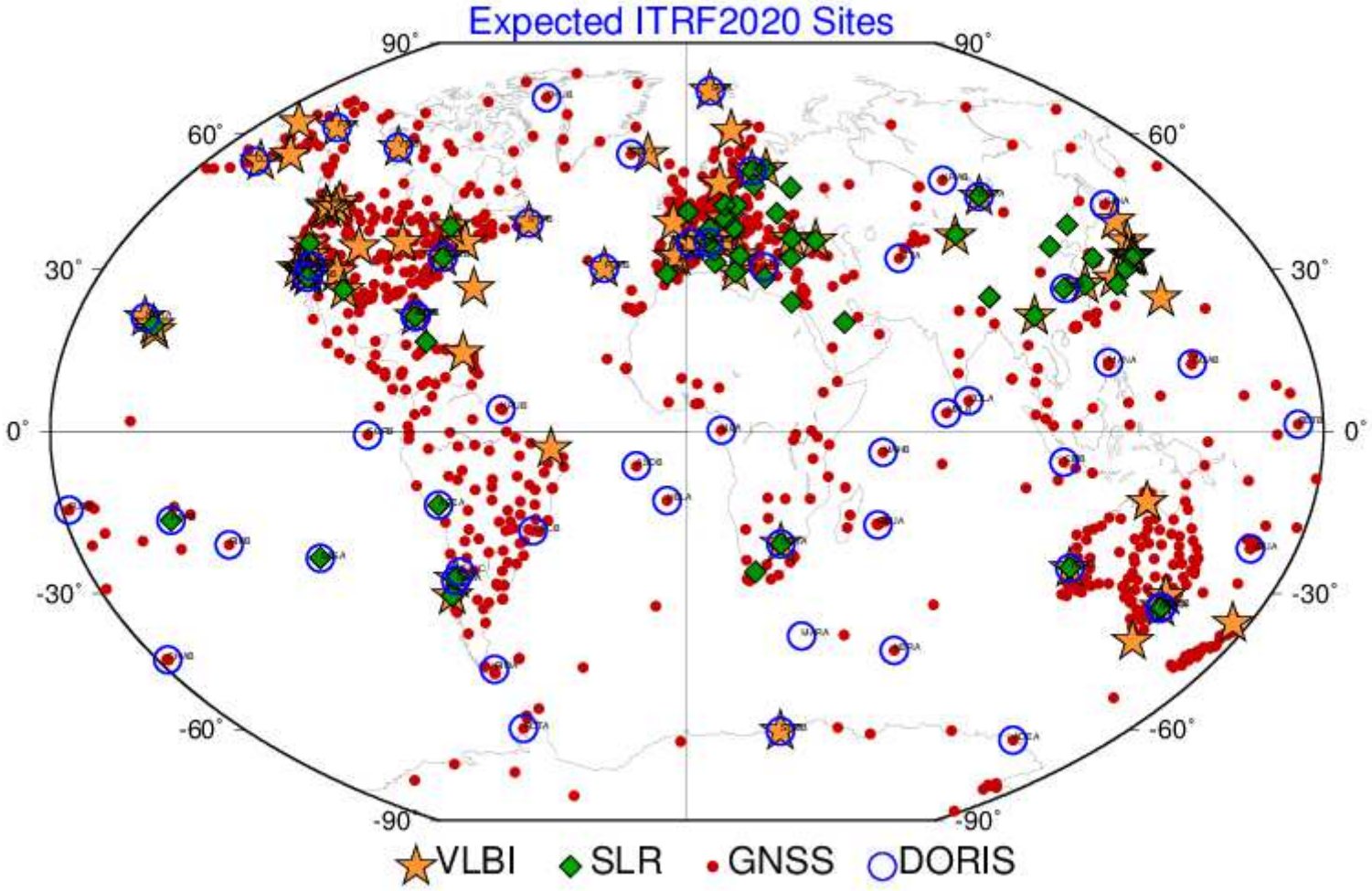
ITRF2020: Initial Schedule & time-line

Date	Action
January 10, 2019	Dissemination of the Call for Participation
February 10, 2021	Deadline for solution submissions by Technique Centers. Earlier submissions are welcome
April 2021	First and early results to be shared and discussed with the TCs.
Until end of May, 2021	Inter comparisons of the ITRF CCs solutions
~June, 2021	Preliminary ITRF2020 solution available for evaluation by TCs
Sep-Oct, 2021	Final ITRF2020 solution released by the ITRS Center

- Technique submissions are complete, except IVS and ILRS
- Deadline for submission extended to end of May, 2021
- The subsequent milestones will be delayed

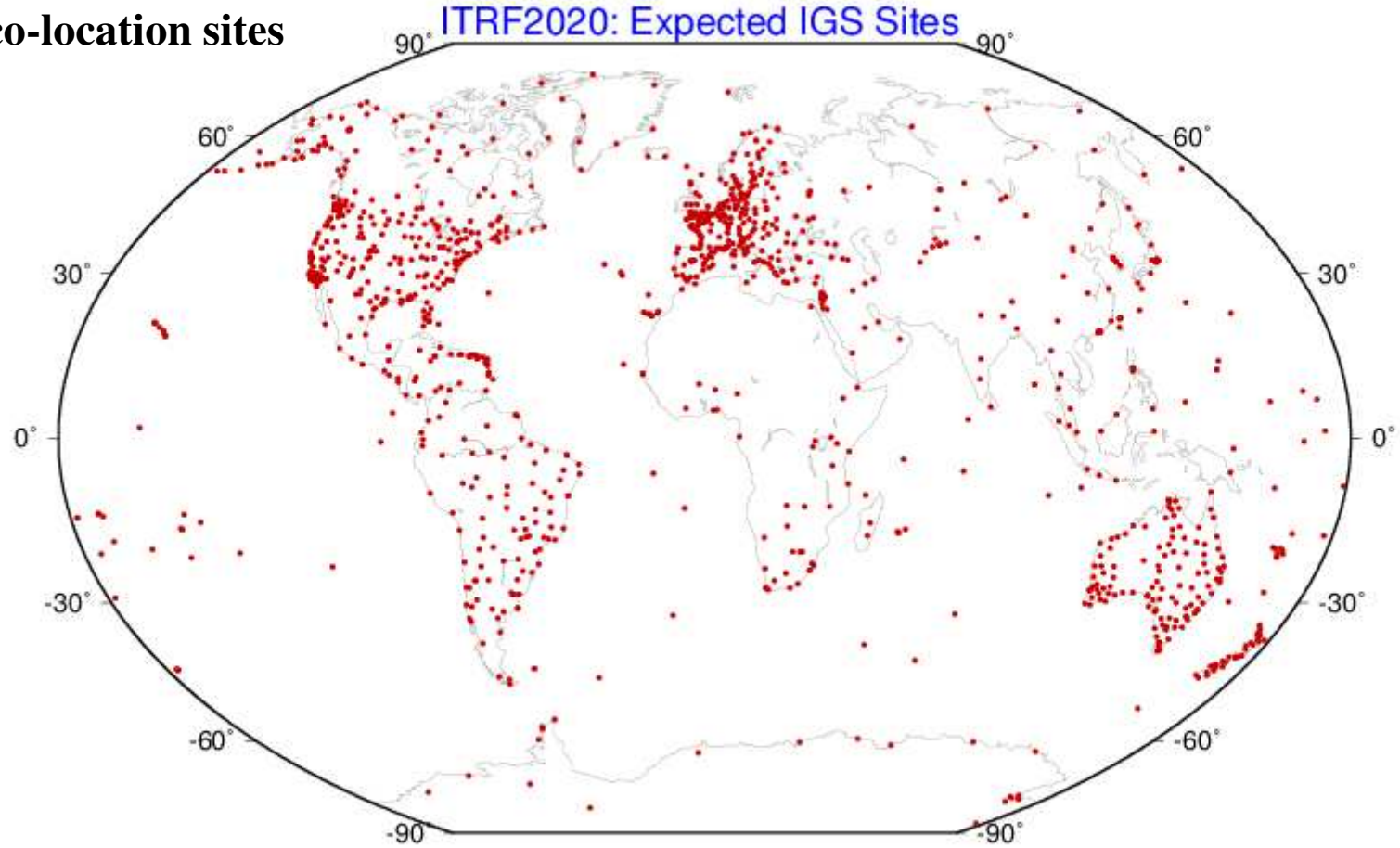
ITRF2020: Expected Sites

- **~1200 sites**

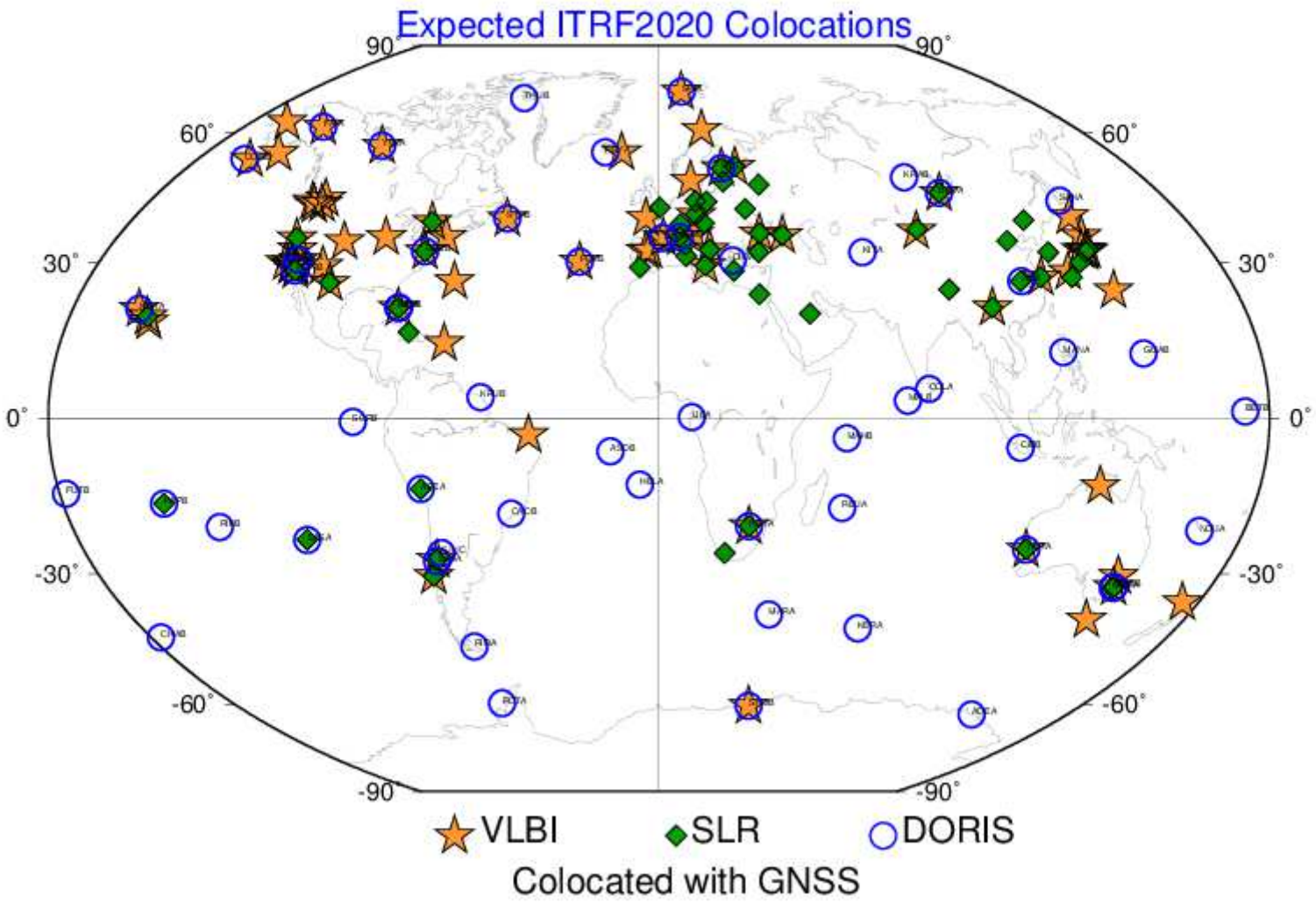


ITRF2020: Expected IGS Sites

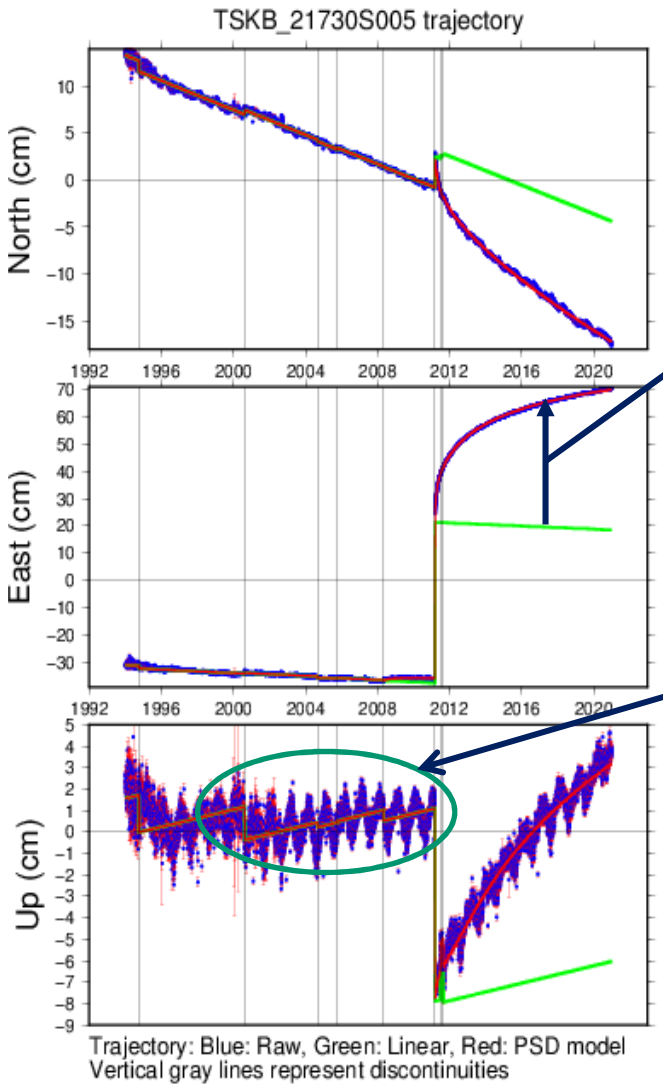
- ~1100 GNSS/IGS sites
- 93 co-location sites



ITRF2020: Expected Colocation Sites



ITRF2020: Augmented Parametric Reference Frame



Regularized position

$$X(t) = X(t_0) + \dot{X}.(t - t_0) + \delta X(t)_{PSD} + \delta X(t)_S$$

∑ Post-Seismic Deformations (PSD) Parametric models will be refined

∑ Periodic Signals will be provided in the CM-SLR frame

But there are discrepancies in the annual signal between techniques at some colocation sites.

Key Points of the IGS Contribution to the ITRF

1. **Inter-Technique link : reinforcing the ITRF definition (origin, scale & orientation)**

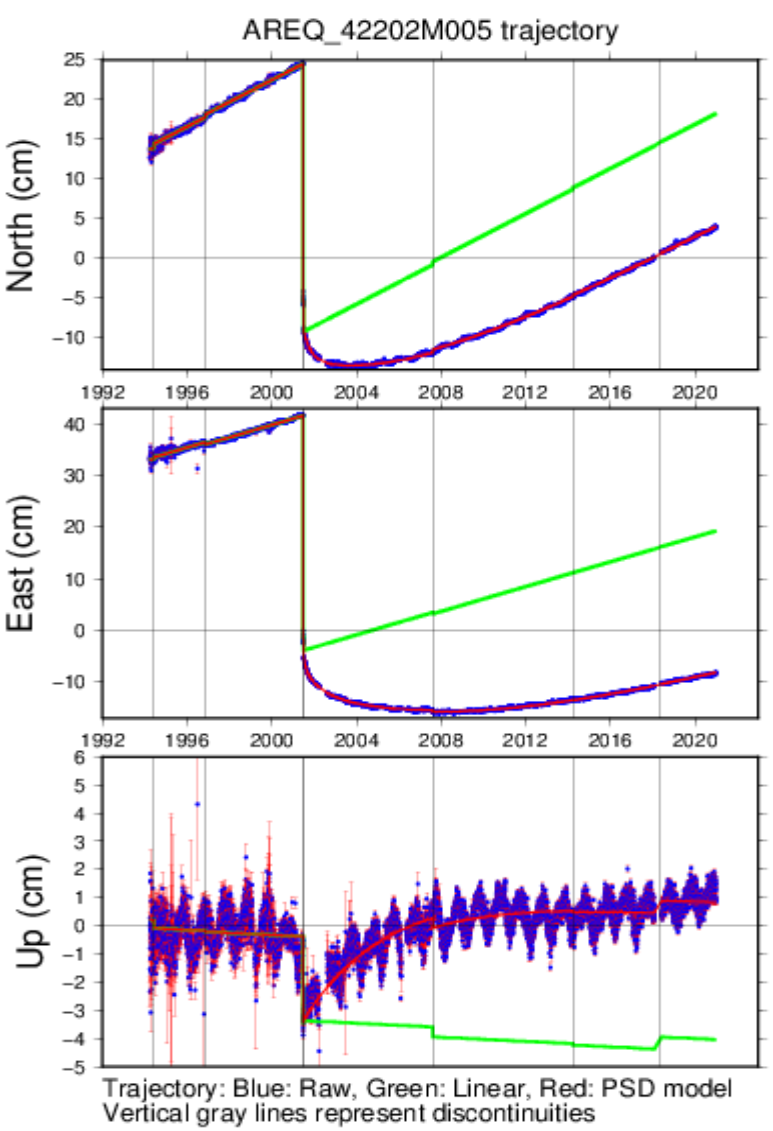
2. **Determination of Post-Seismic Deformation Models**

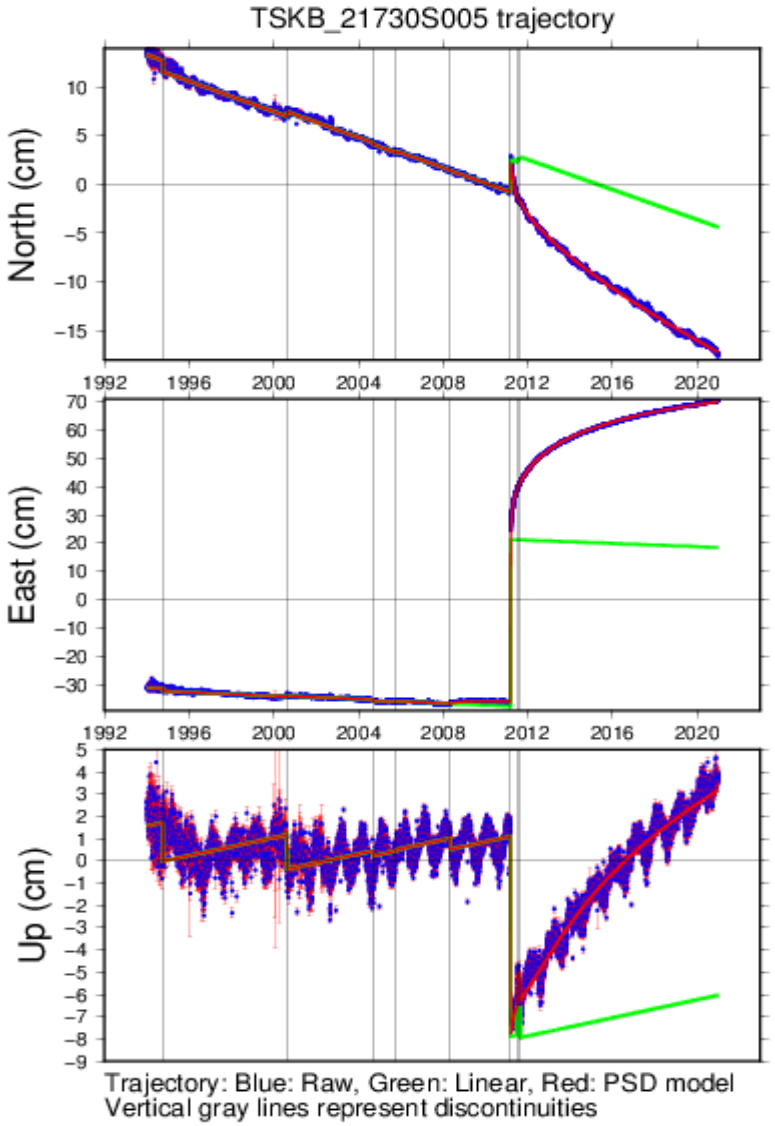
3. **ITRF Plate Motion Models**

4. **Polar Motion**

5. **ITRF Access & densification through the IGS Products:**
   - **Using IGS Products provides Universal access to and densification of the ITRF**
   - **More than 80% of National RFs are aligned to the ITRF**

Arequipa & Tsukuba trajectories: Repro3 data + PSD models of ITRF2014





Scale of ITRF2020?

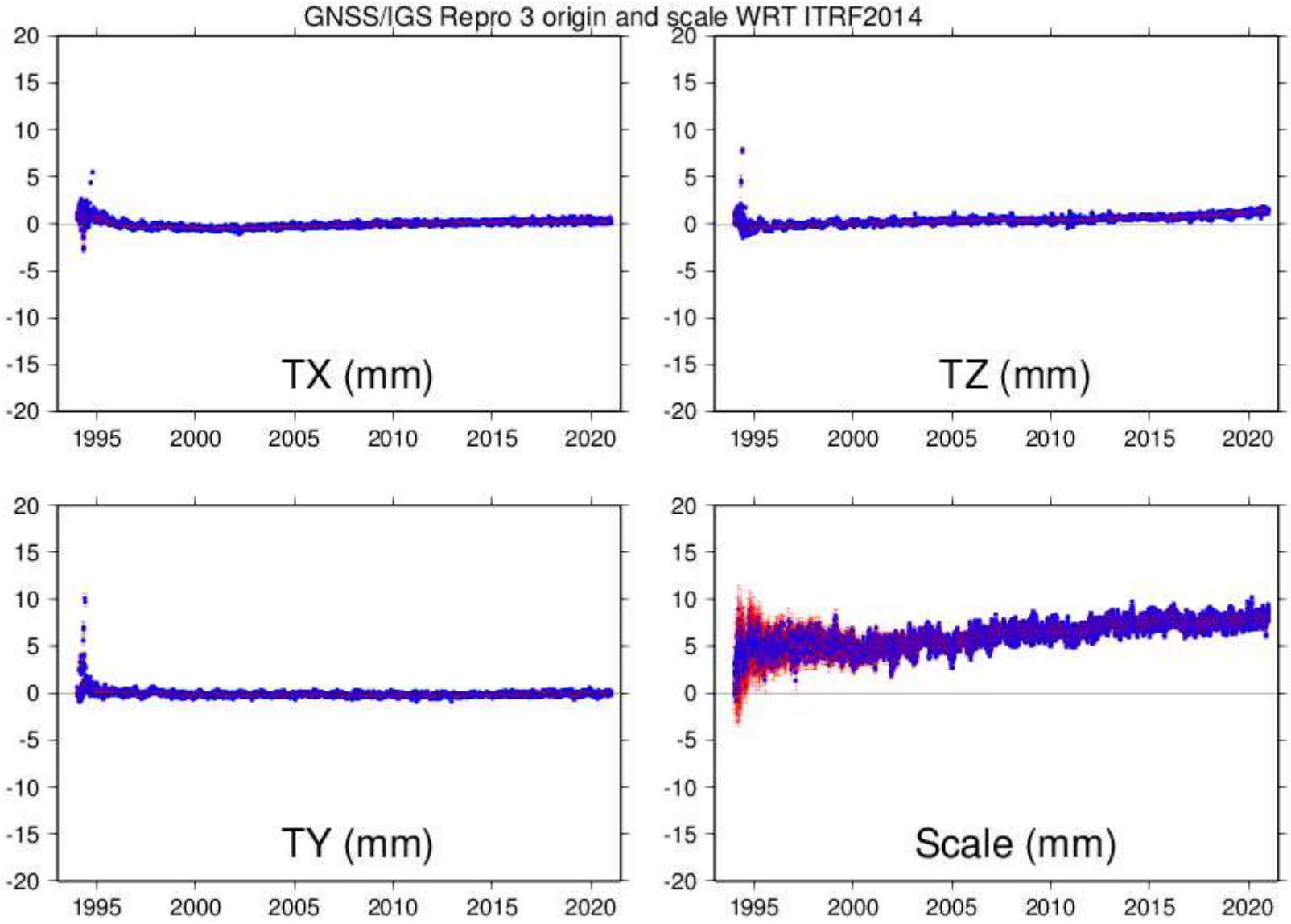
- This is the first time of ITRF history where we have 4 independent and competitive scales stemming from the 4 techniques (DORIS, GNSS, SLR and VLBI)

- IGS / GNSS scale is based on z-PCOs for Galileo Satellites, using 3.7 yrs of Galileo data

- Improved ILRS / SLR scale determination with enhanced handling of range biases

IGS Repro3 origin & Scale wrt ITRF2014

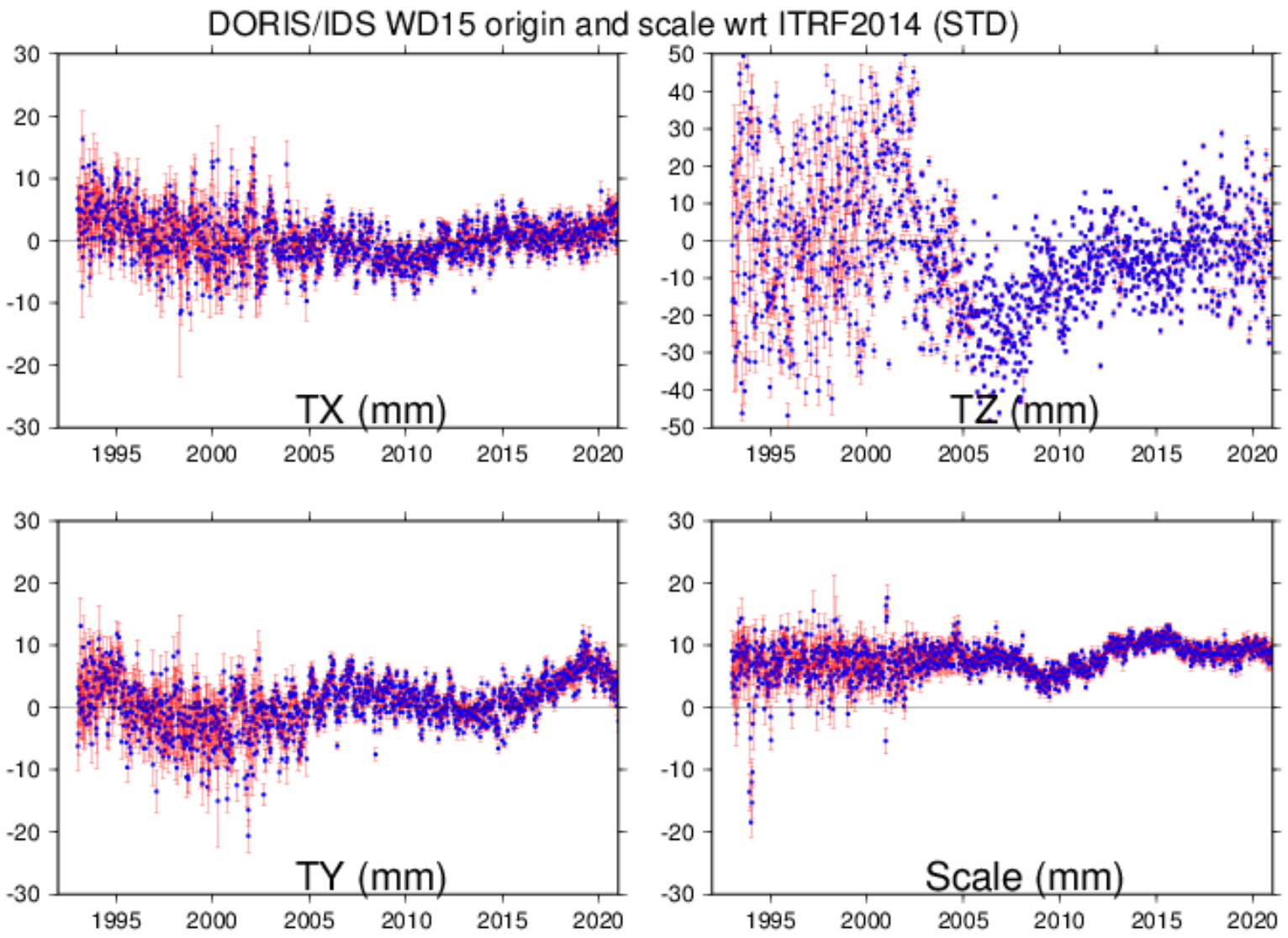
Preliminary



Preliminary

IDS 2020 origin & scale wrt ITF2014

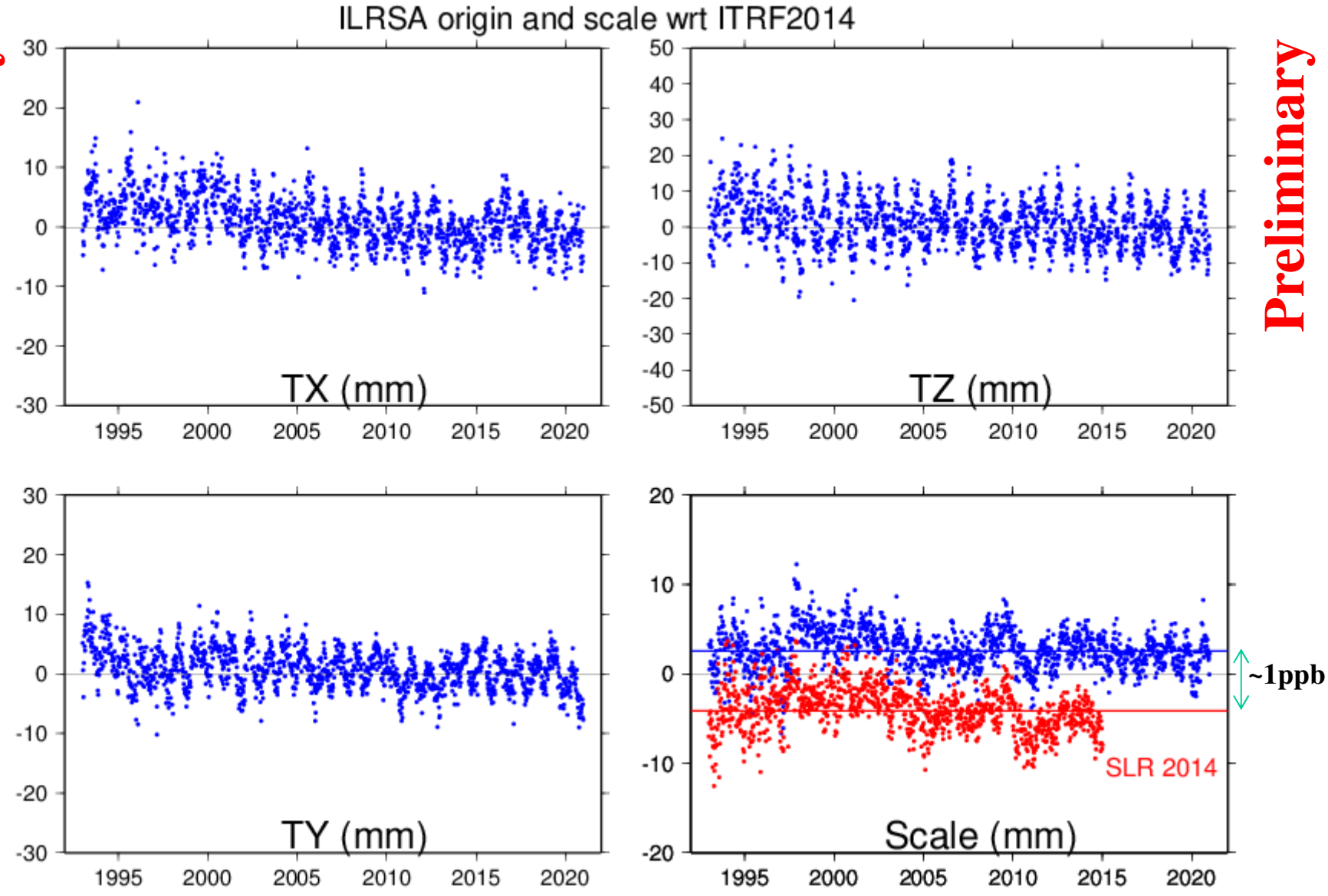
Preliminary



Preliminary

ILRSA 2020 origin & Scale wrt ITRF2014

Preliminary



Preliminary

Conclusion

- **ITRF2020: an augmented parametric frame**
- **IGS Contribution is fundamental to the ITRF**
- **Analysis of ITRF2020 input data is still ongoing:**
  - **Nonlinear/aperiodic variation in the IDS scale**
  - **IGS apparent scale offset/drift with respect to ITRF2014 needs to be understood: probably due to the assumption of constant z-PCOs**
  - **1 ppb offset of SLR 2020 compared with 2014 data**
  - **Expected scale difference between SLR & VLBI:**

    ≤ 0.5 ppb (~3mm), versus 1.37 ppb (~8.2 mm) in ITRF2014
- **ITRF2020 Scale ? : too early to know**
- **ITRF2020 Release: fall 2021**