Status of ITRF2013 Prepararation

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Next ITRF solution (ITRF2013)

- To be ready by summer 2014
- All techniques to submit solutions by Jan-Feb, 2014, but some (hopefully small) delays are expected from the techniques
- Solutions with no load corrections
- Evaluation of NT-ATML (+) will be repeated with ITRF2013 input data

Preparation for ITRF2013

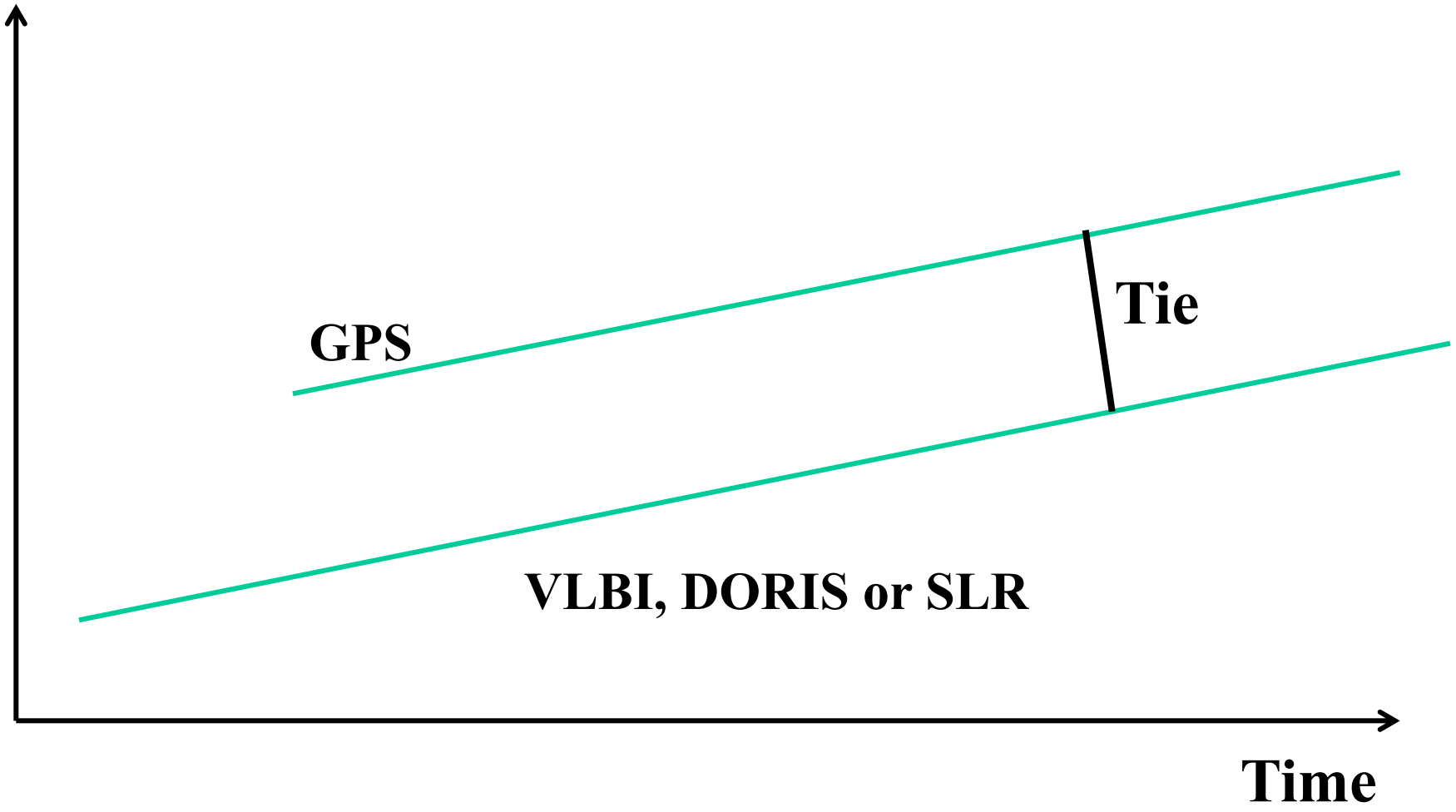
- **Expected Improvements & Developments:**
  - **Reprocessed solutions from the 4 techniques ;**
  - **Revisiting the weighting of Local Ties and Space Geodesy solutions included in the ITRF combination;**
  - **Improving the process of detection of discontinuities in the time series;**
  - **Modeling the non-linear station motions**
    - **Seasonal signals**
    - **Co- & Post-seismic deformation**

New ties since ITRF2008

- Brewster : VLBA & GNSS
- Greenbelt (4 techniques)
- McDonald/Fort Davis (VLBI, SLR & GNSS)
- Warkworth (New Zealand): VLBI & GNSS
- 4 Australian Co-location sites (Hobart, Katherine, Mt. Stromlo, Yarragadee)
- Medicina: (VLBI & GNSS)
- Noto: (VLBI & GNSS)
- Riyadh : (SLR & GNSS)
- (GNSS & DORIS): (Rikitea, Papeete, Rothera, Kourou, Dionysos)

Reports Available at the ITRF WEBSITE

Schematic of velocity discrepancy at a co-location site



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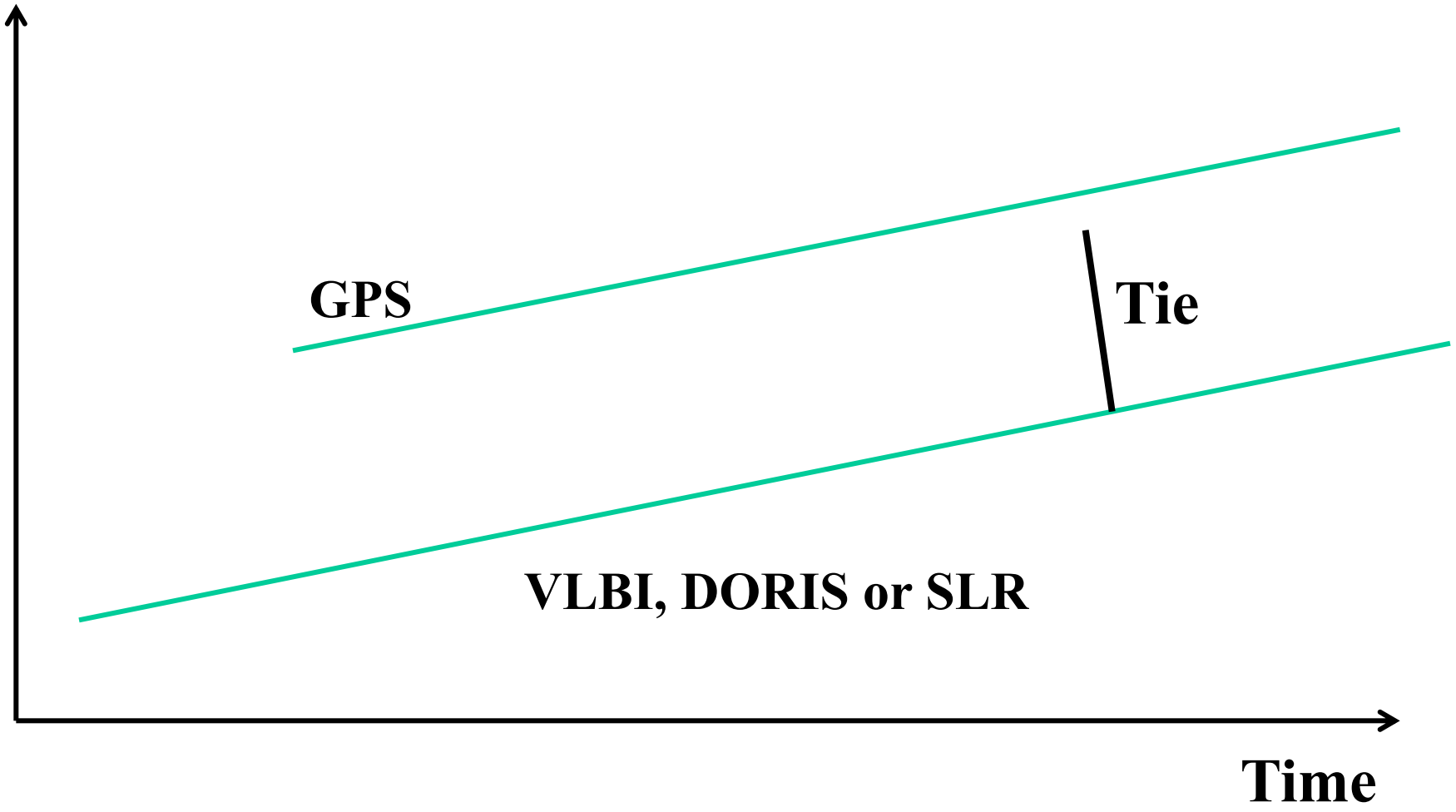

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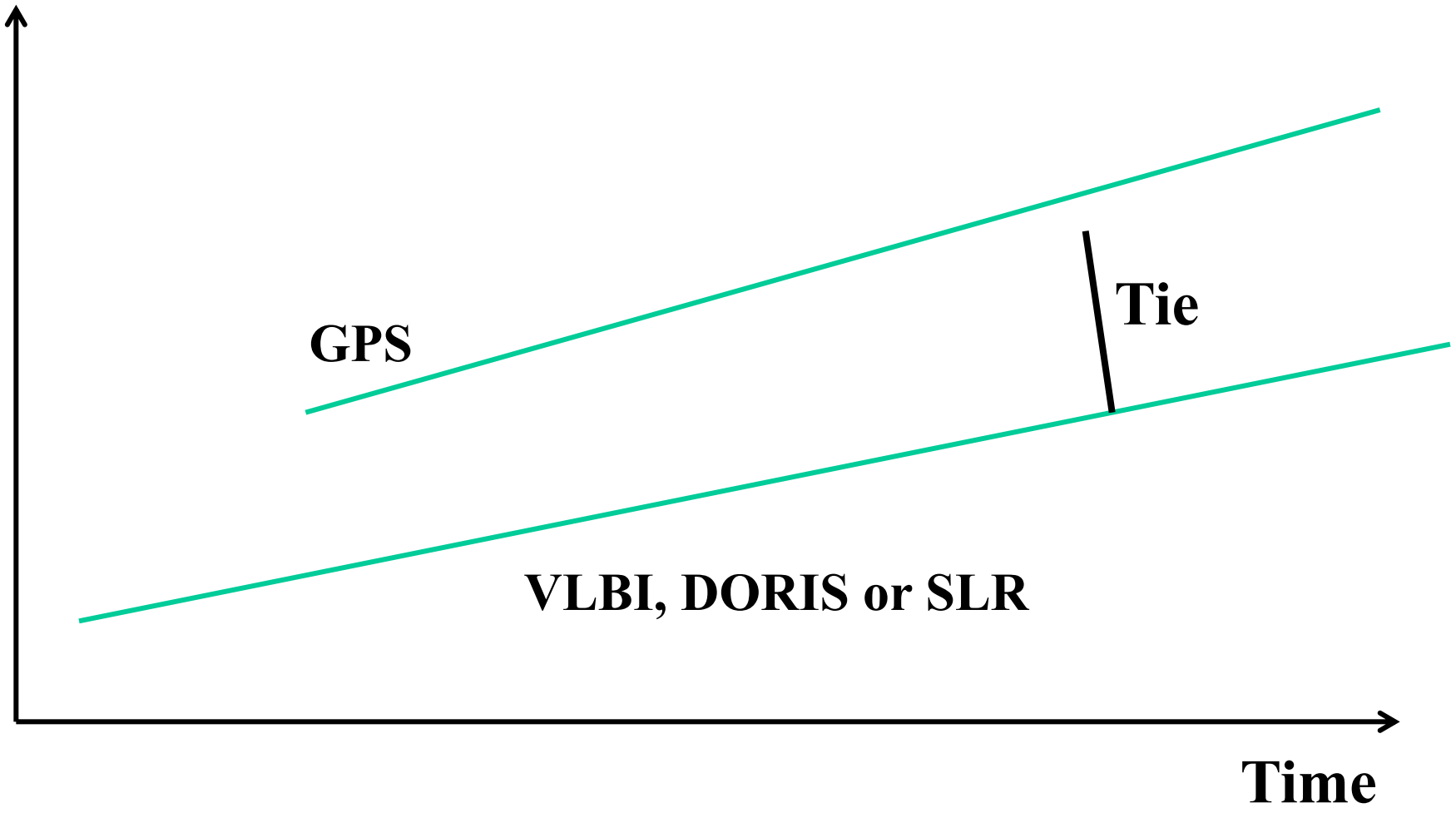

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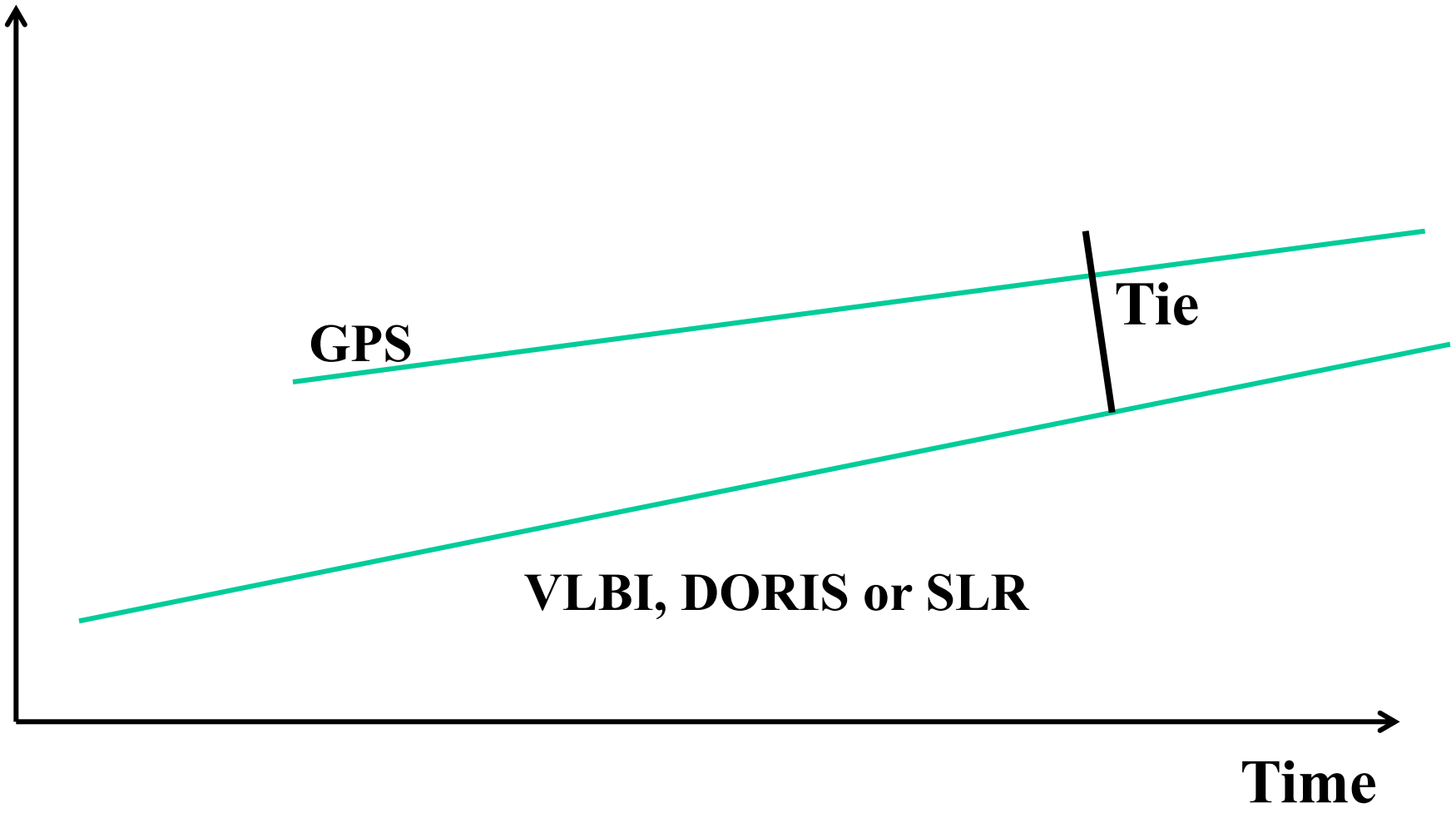

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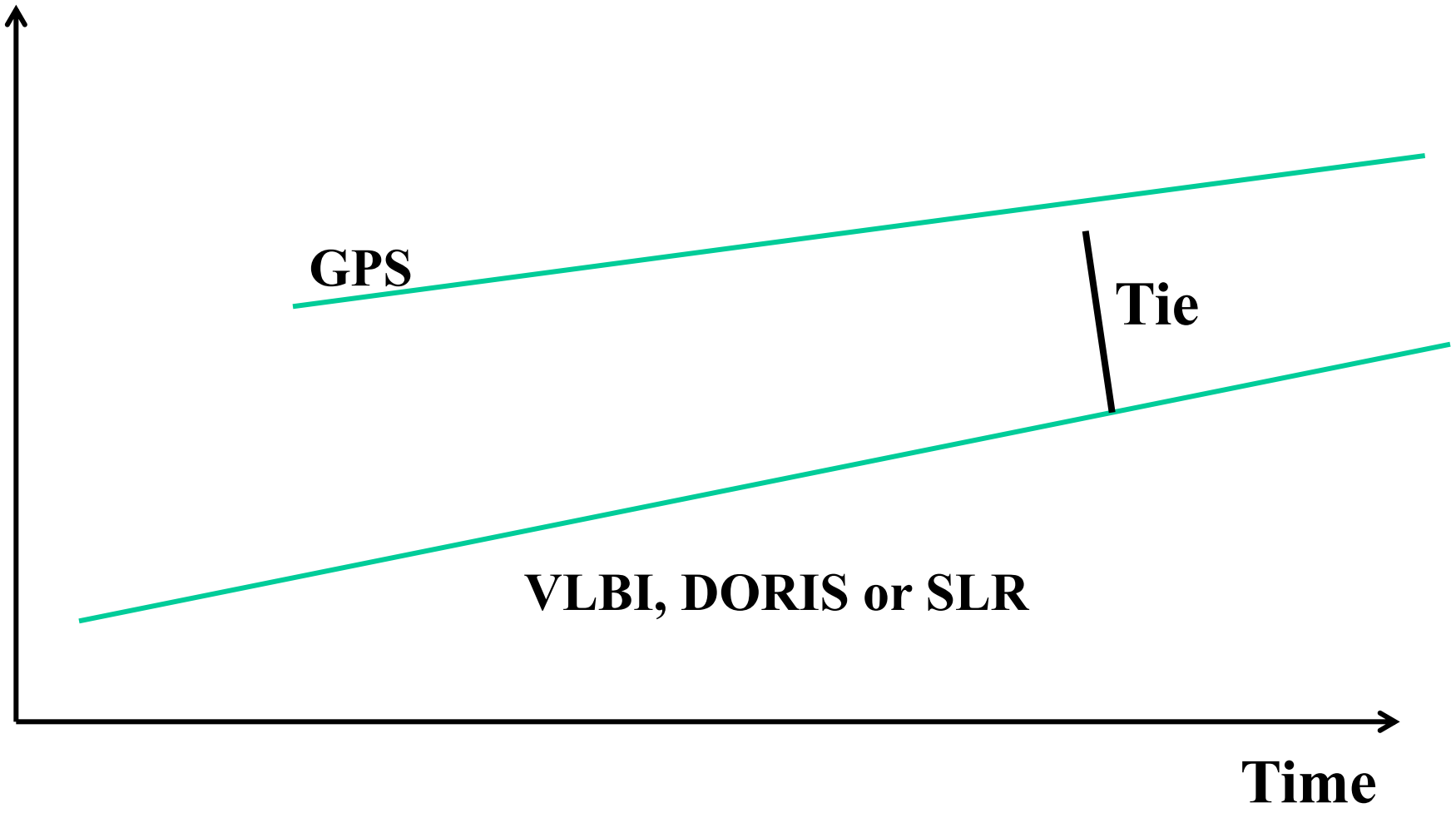

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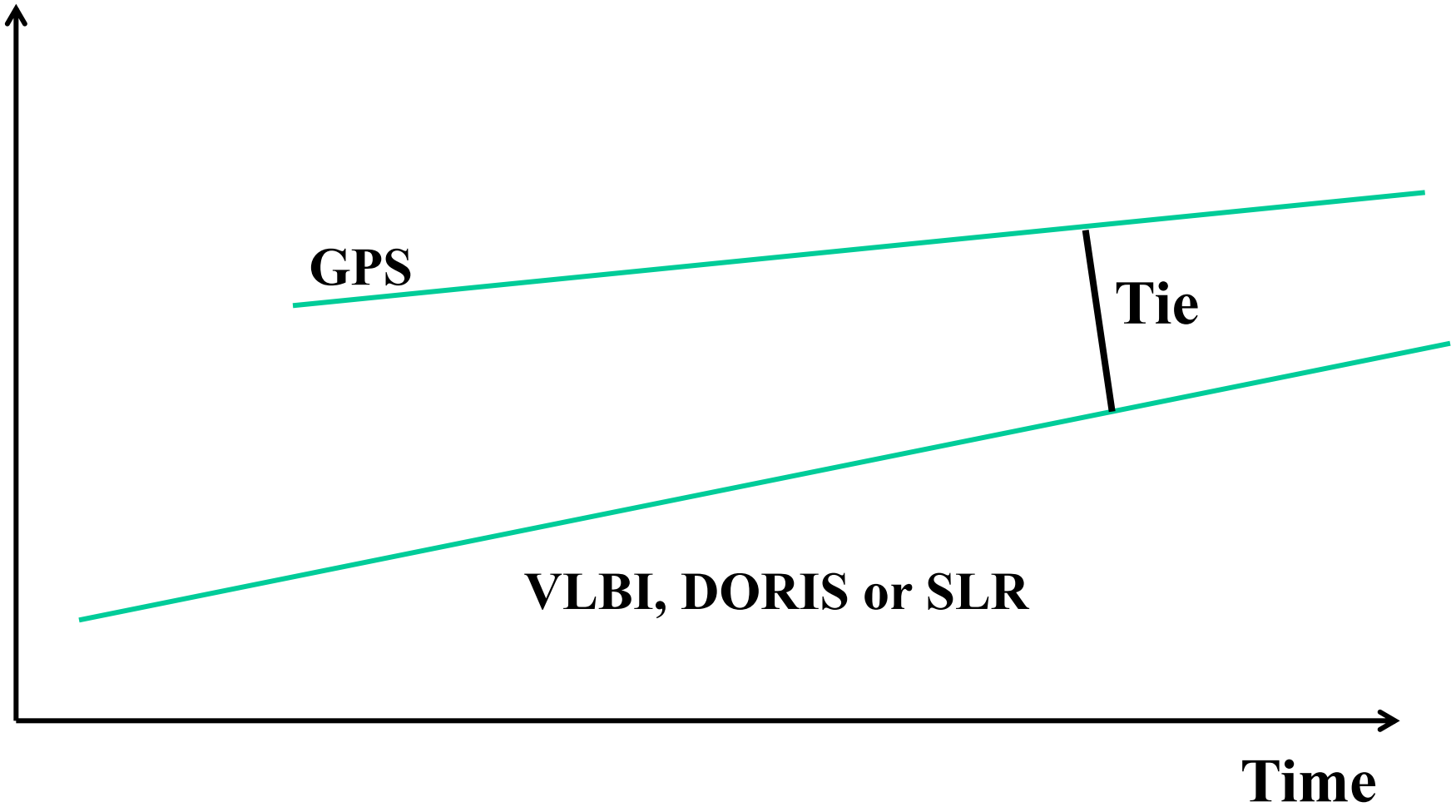


Data used for this presentation in preparation for ITRF2013

- **Space Geodesy:**

  SLR: ILRS contribution to ITRF2008, extended up to 2013.96 by ILRS operational weekly SNX solutions

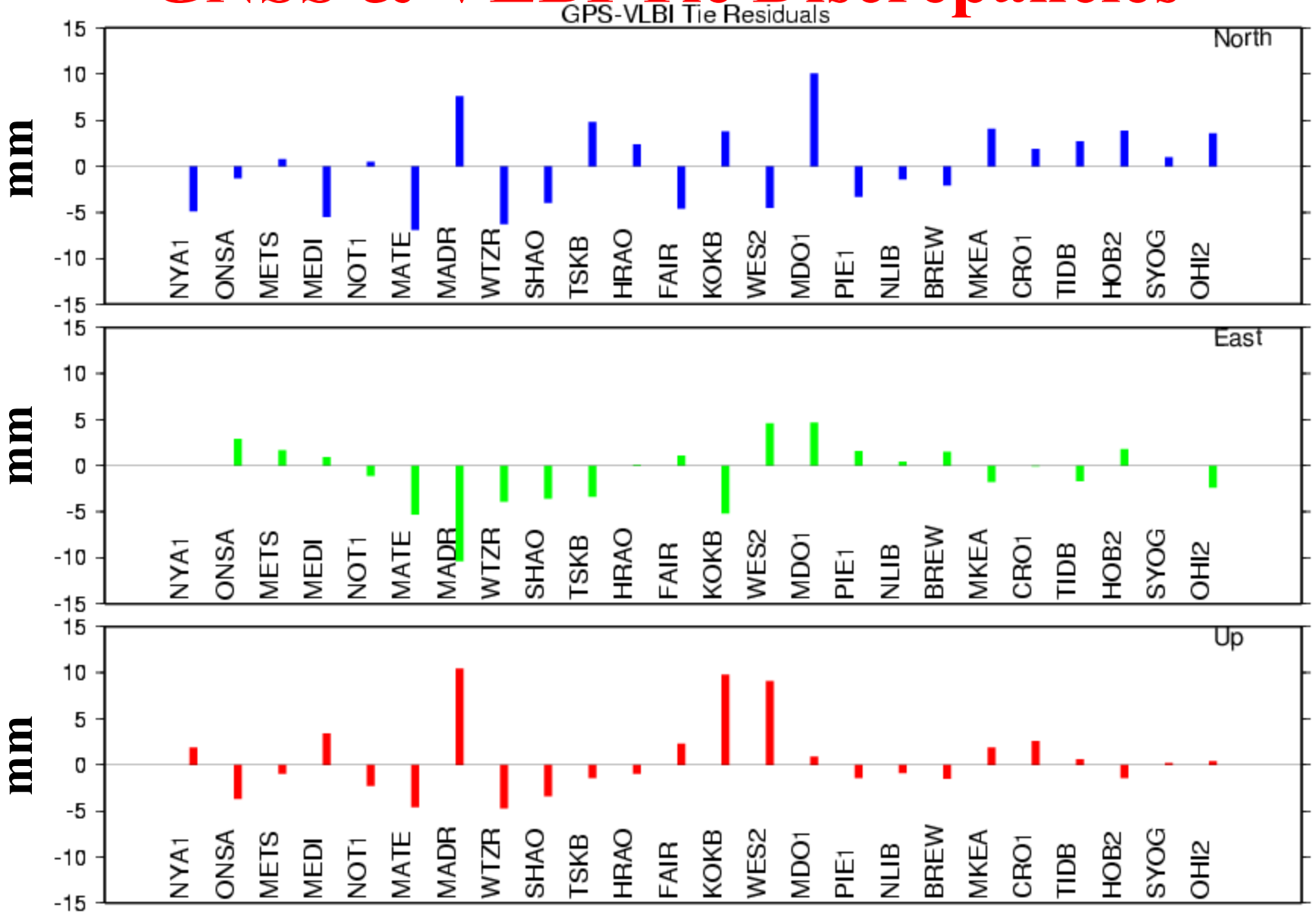
  VLBI: GSFC 2011b session-wise solutions: 1983-2013.9

  GNSS: IGS operational weekly solutions: 1994-2013.9

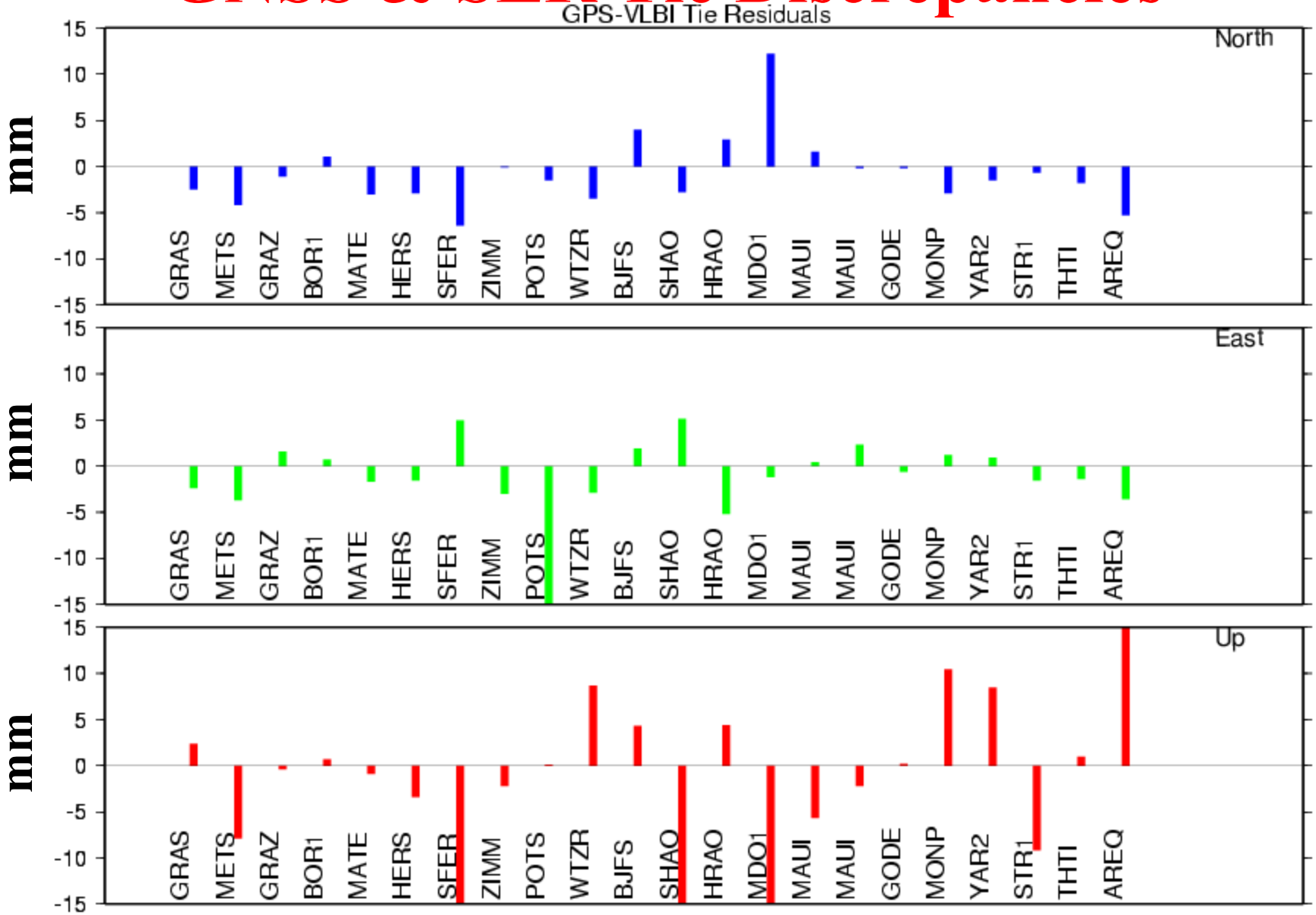
  DORIS: Not used here

- **Local ties:**
  - **ITRF2008 local ties**
  - **New ties…**

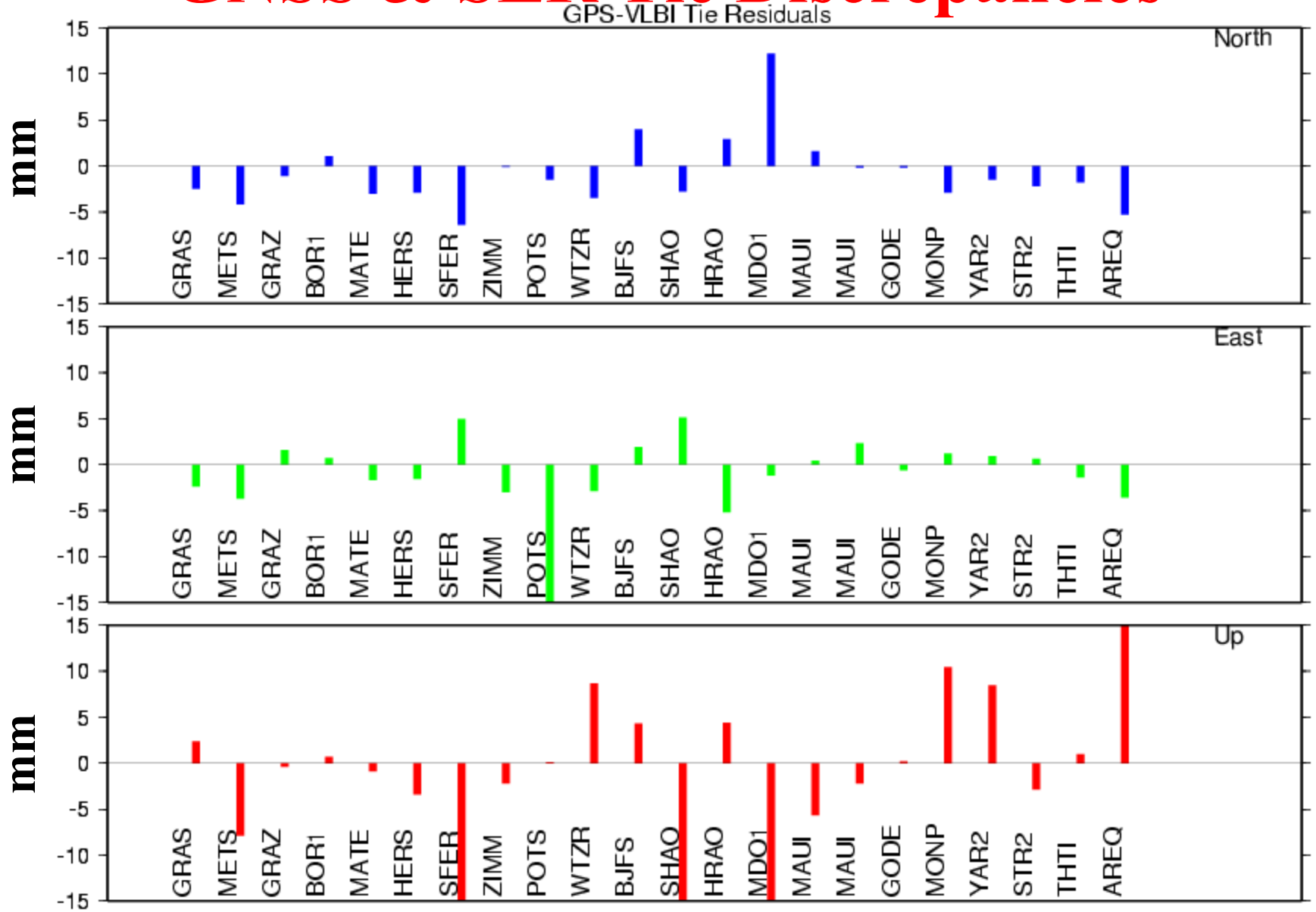
GNSS & VLBI Tie Discrepancies



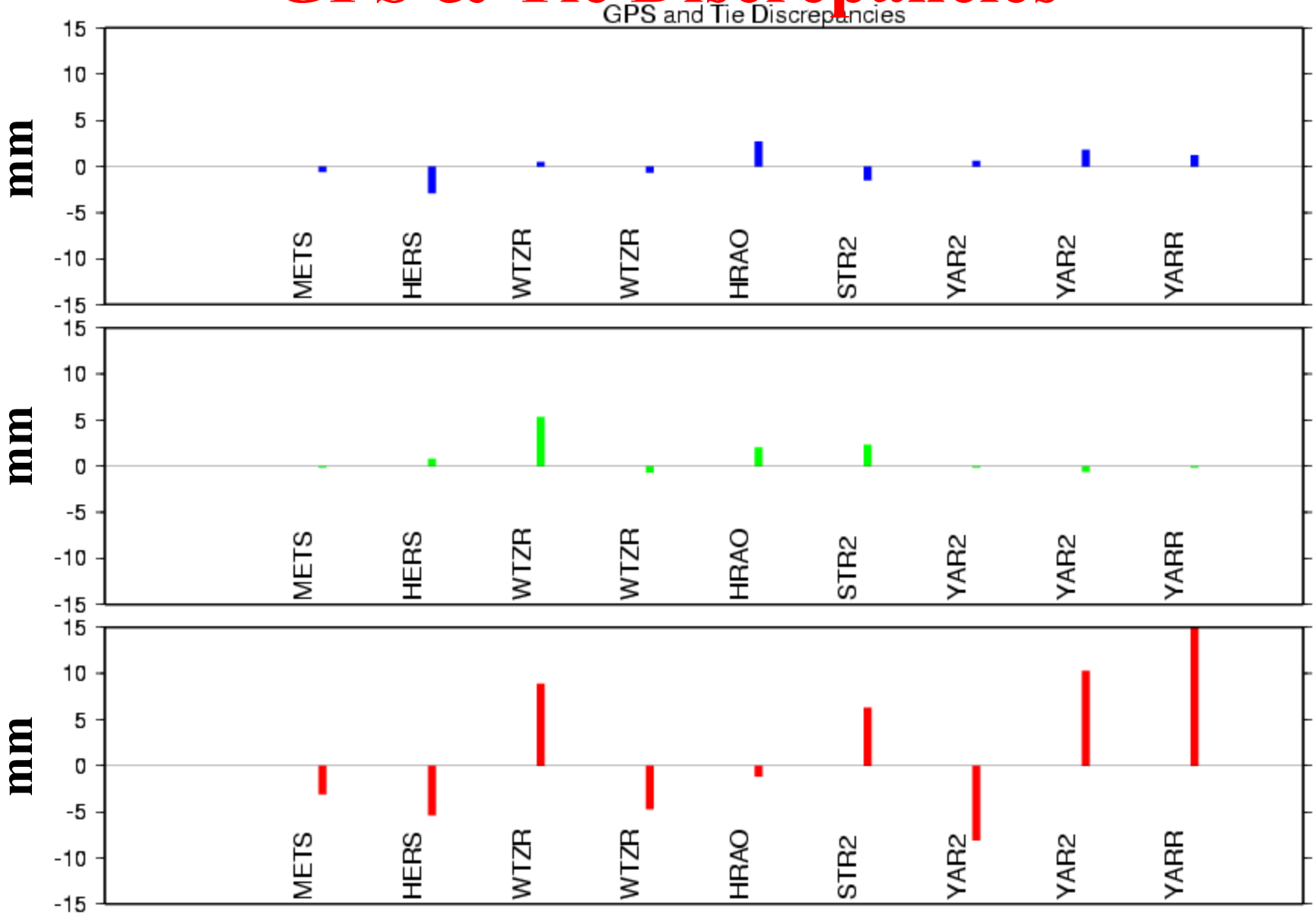
GNSS & SLR Tie Discrepancies



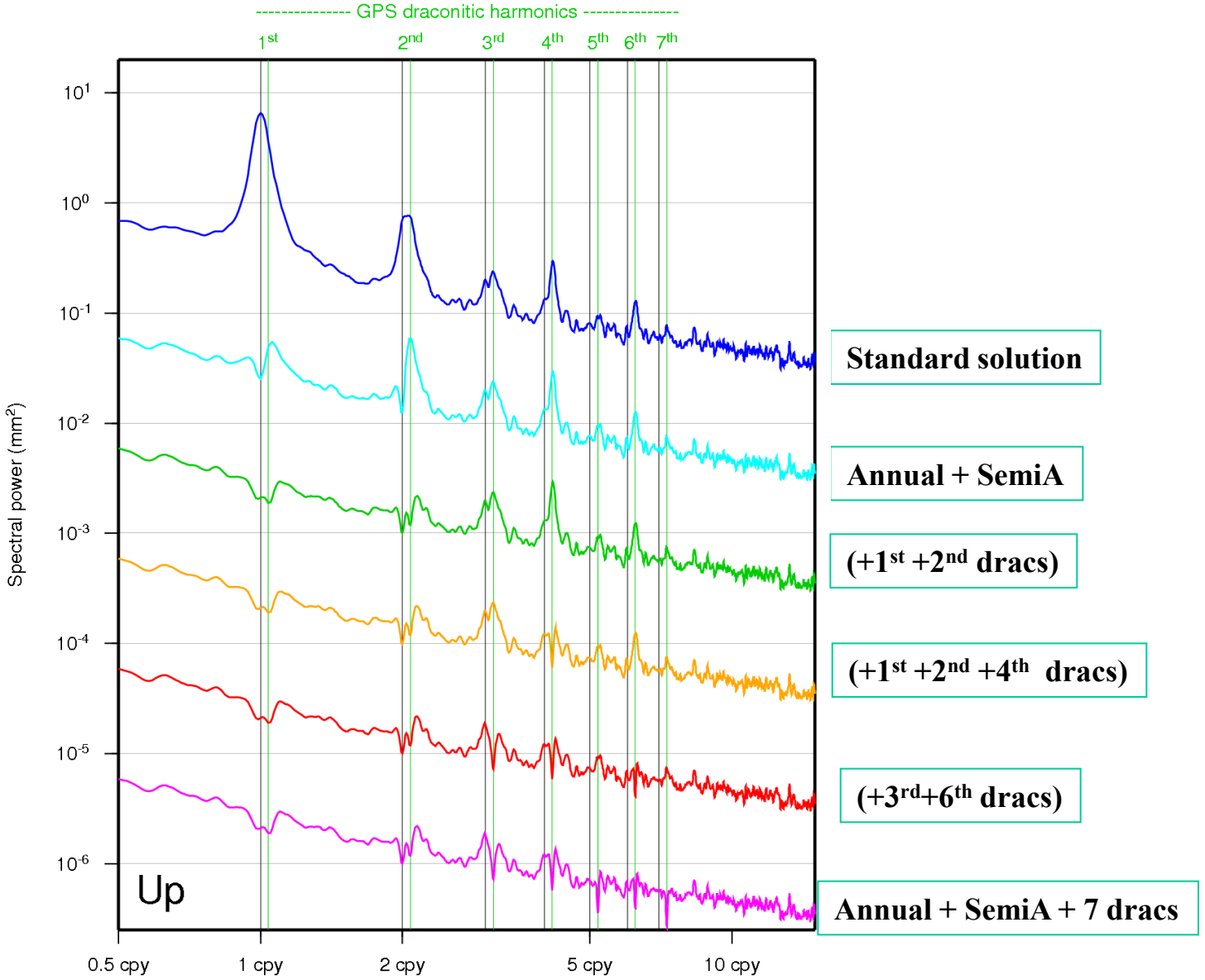
GNSS & SLR Tie Discrepancies



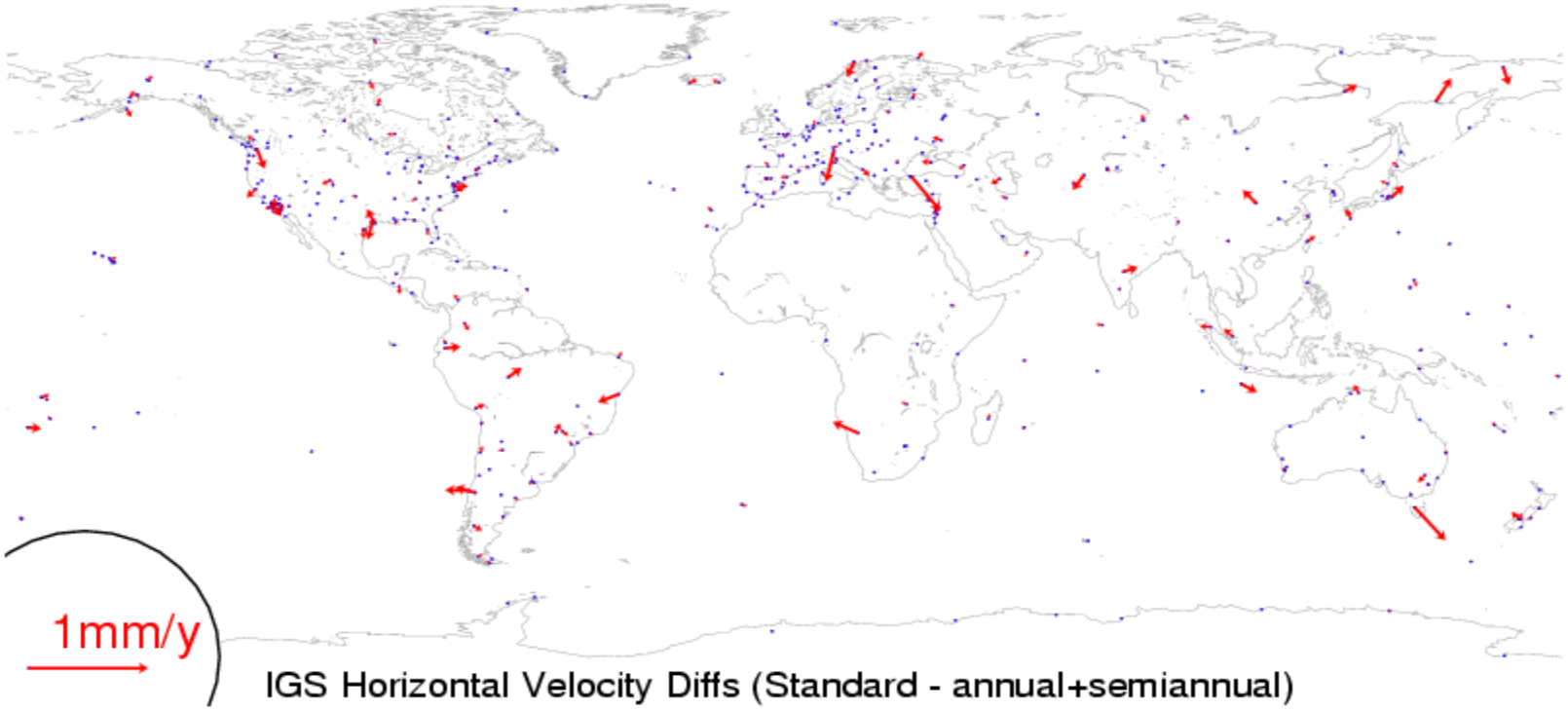
GPS & Tie Discrepancies



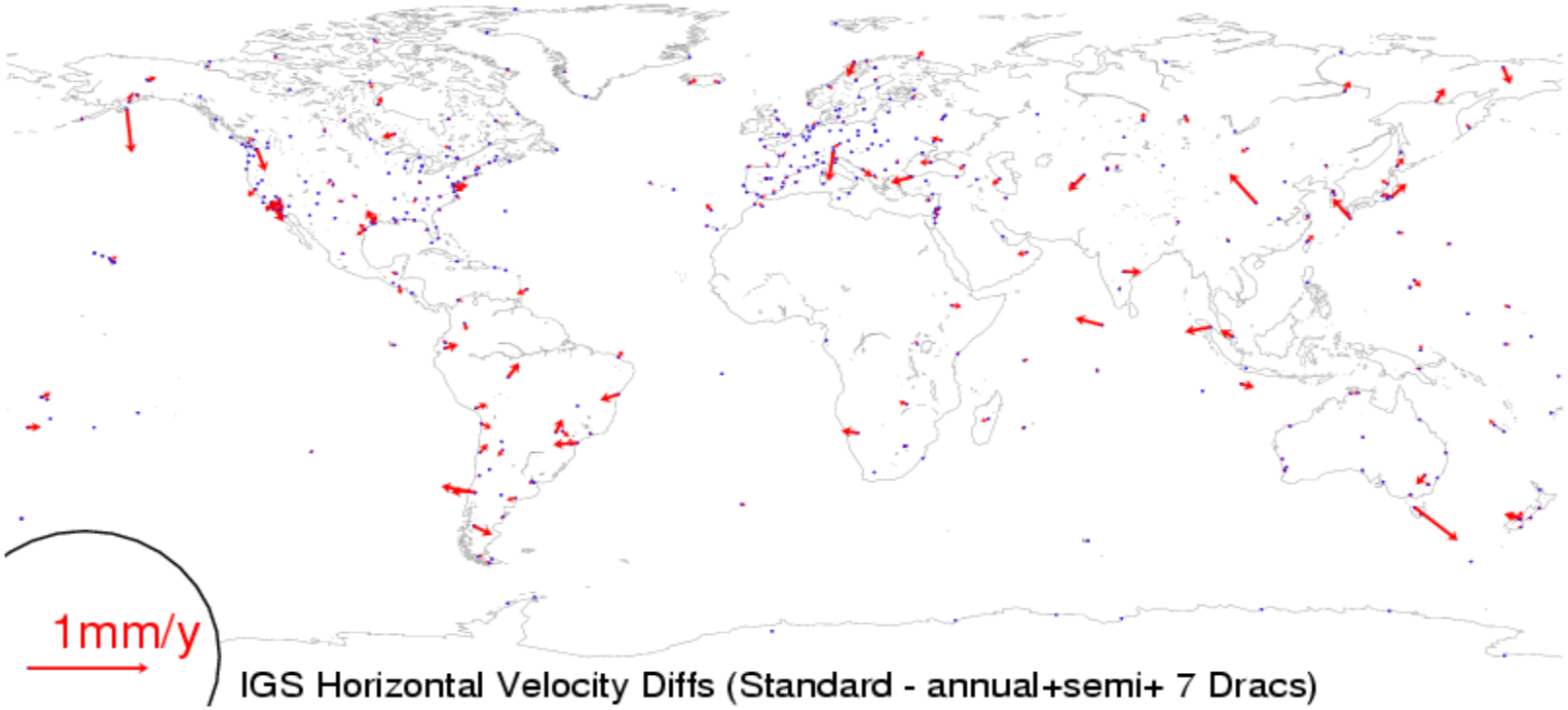
IGS station position Up residuals: stacked periodogram



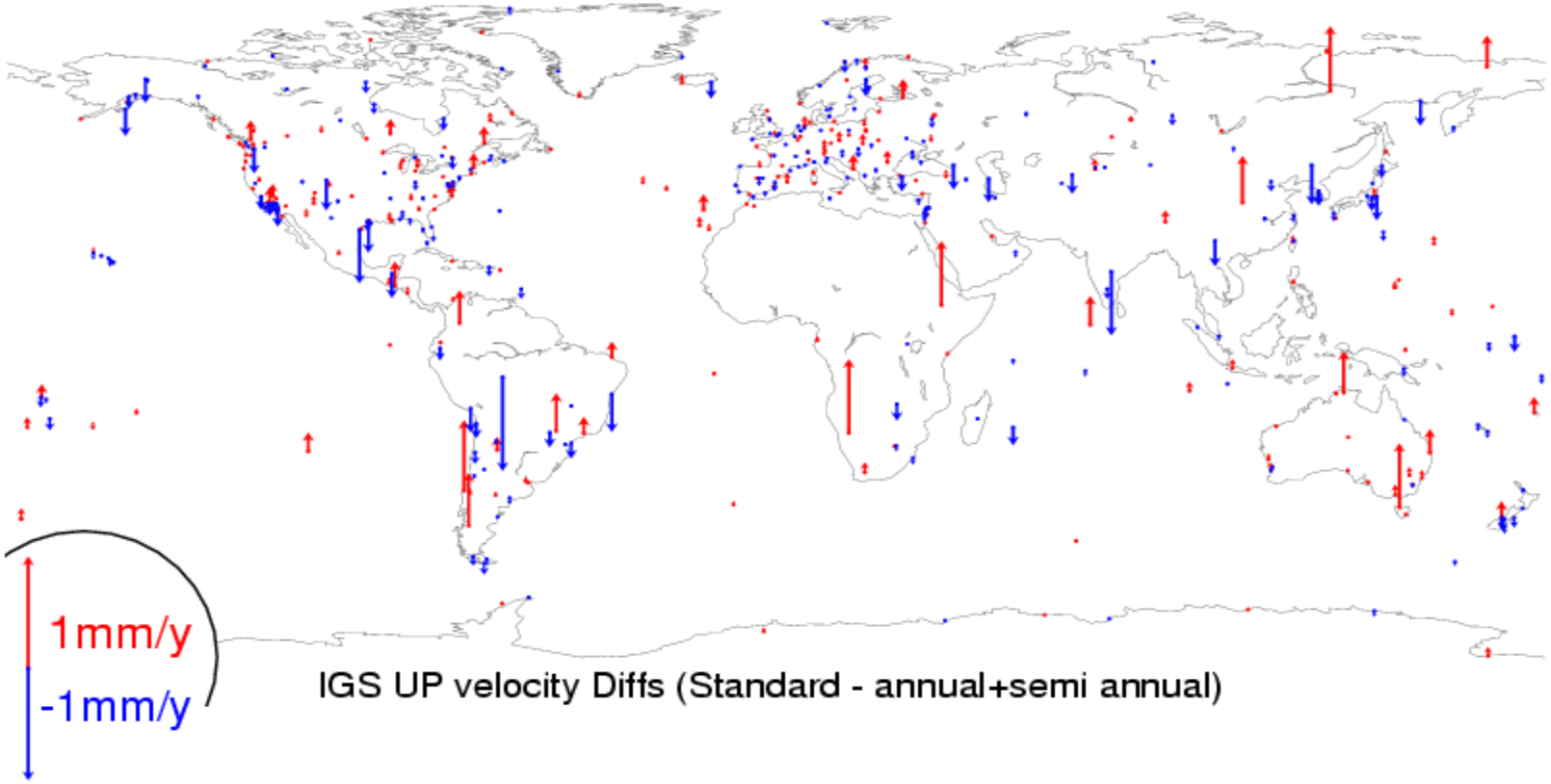
IGS Horizontal velocity differences (Standard – Annual+Semi-Annual)



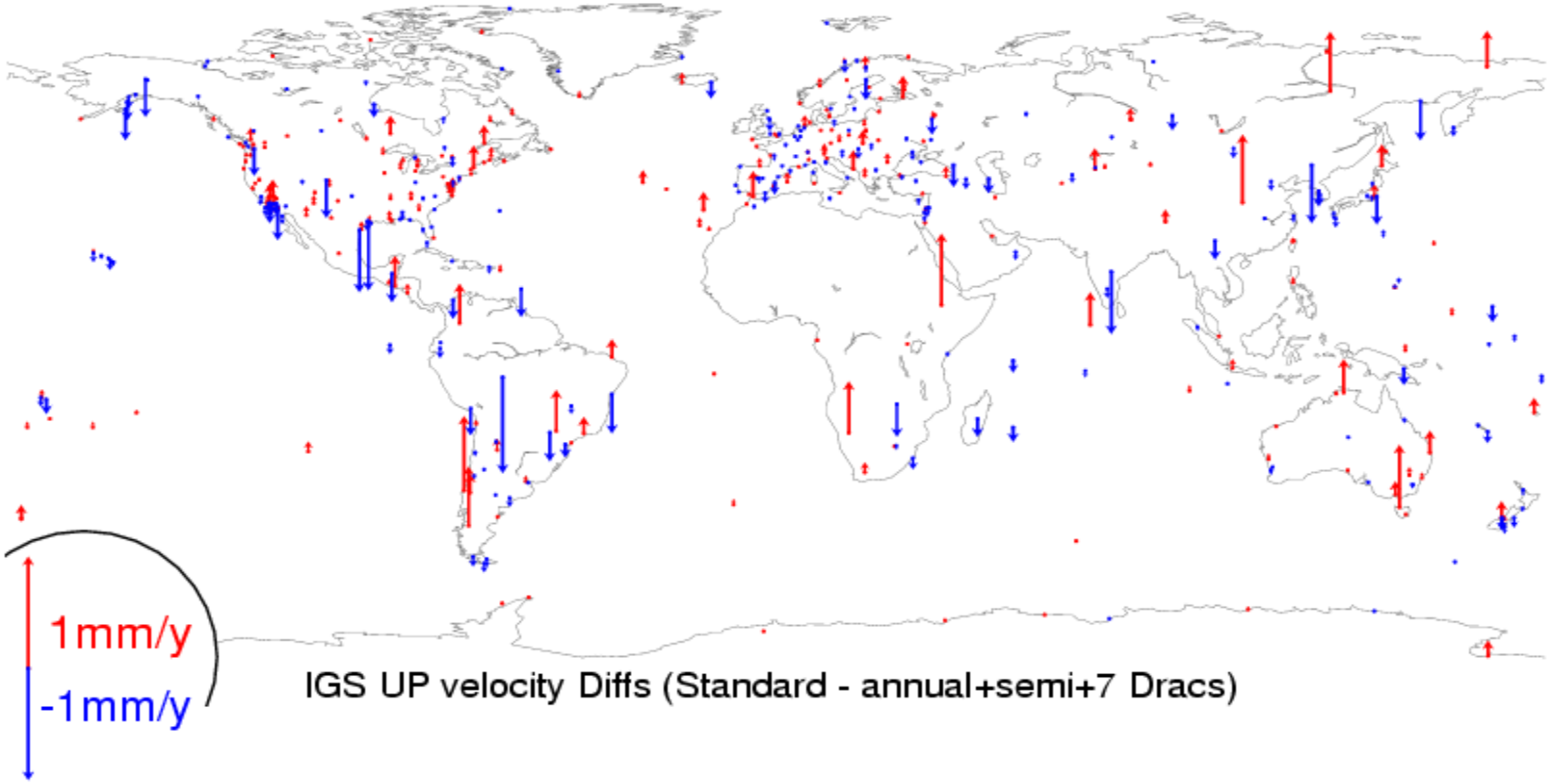
IGS Horizontal velocity differences (Standard – Annual+Semi-A+7 dracs)



IGS Vertical velocity differences (Standard – Annual+Semi-Annual)



IGS Vertical velocity differences
(Standard – Annual+Semi-A+ 7 dracs)



Parametric post seismic models

Parametric models for postseismic displacements :

$$\forall i \in \{E, N, U\}, X_i(t) =$$

$$\begin{cases} X_1(t_0) + V_1 \times (t - t_0) & , \quad t < t_{eq} \\ X_2(t_{eq}) + V_2 \times (t - t_{eq}) + D(t - t_{eq}), & t > t_{eq} \end{cases}$$

Parametric postseismic models use logarithmic or exponential functions :

$D(t - t_{eqk})$ with

$$D(t - t_{eqk}) = A \; log(1 + \frac{t - t_{eqk}}{\tau}) \tag{1}$$

or

$$D(t - t_{eqk}) = A \; (1 - e^{-\frac{t - t_{eqk}}{\tau}}) \tag{2}$$

[e.g. : Kreemer et al., 2006]

or

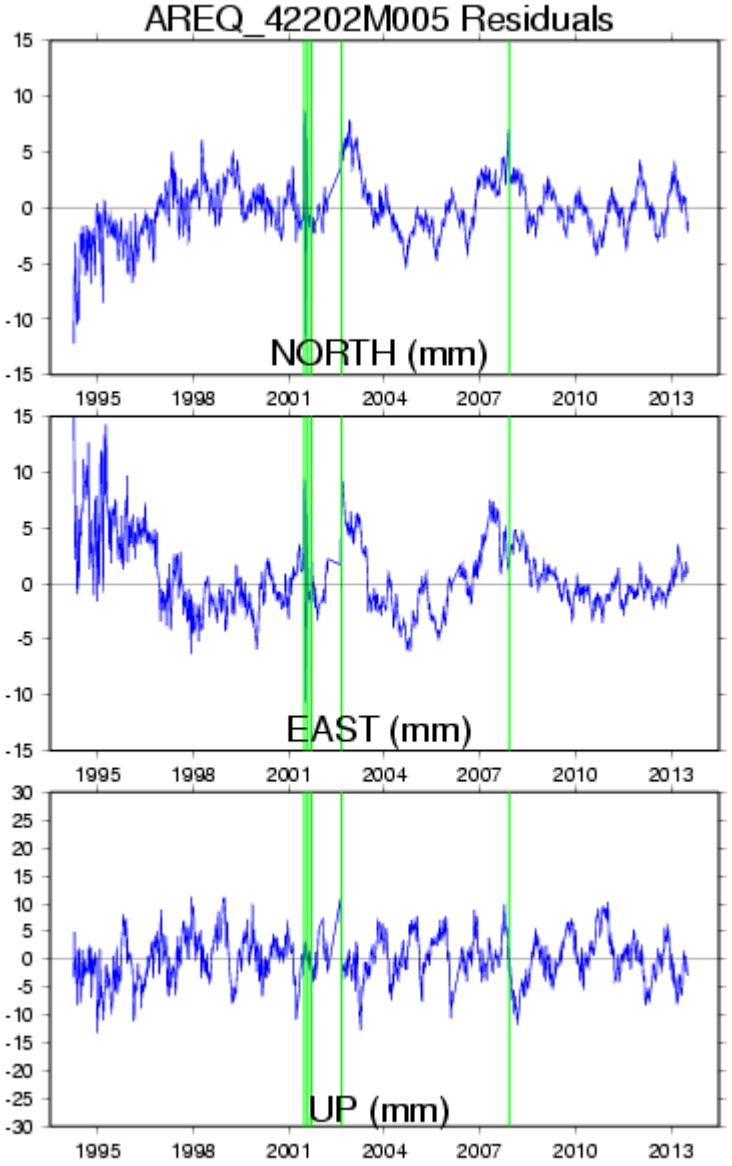
$$D(t - t_{eqk}) = A_1 \; log(1 + \frac{t - t_{eqk}}{\tau_1}) + A_2 \; (1 - e^{-\frac{t - t_{eqk}}{\tau_2}}) \tag{3}$$

or

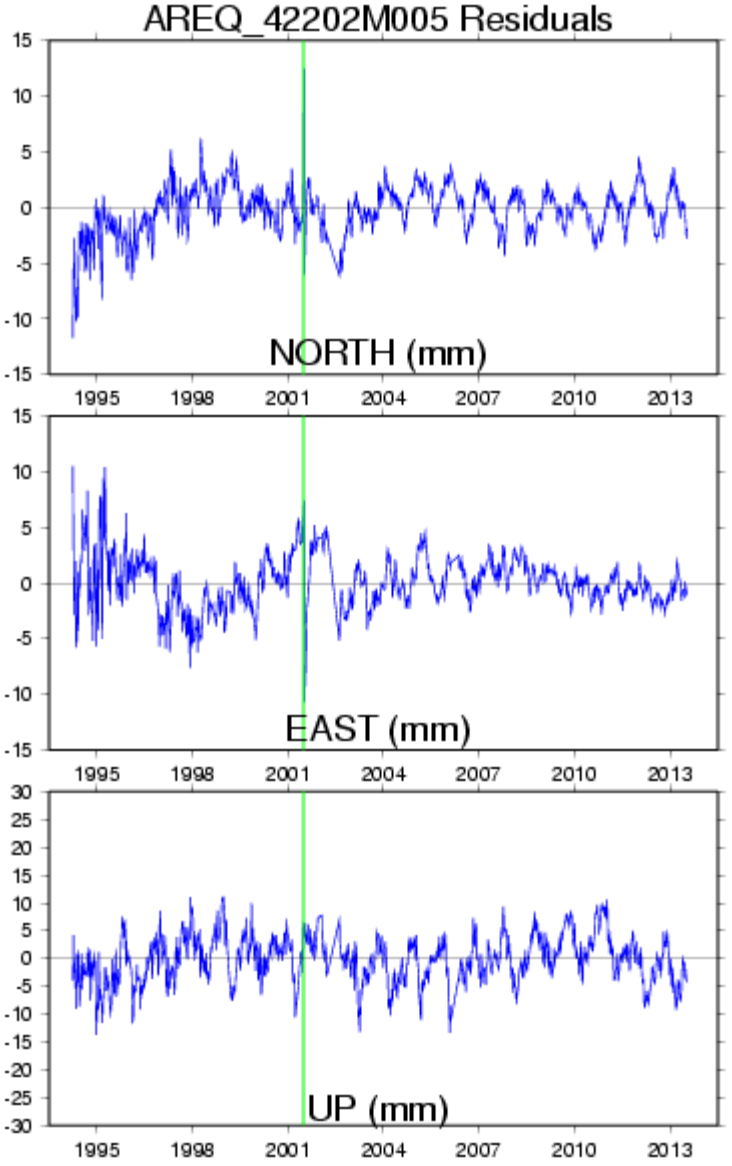
$$D(t - t_{eqk}) = A_1 \; (1 - e^{-\frac{t - t_{eqk}}{\tau_1}}) + A_2 \; (1 - e^{-\frac{t - t_{eqk}}{\tau_2}}) \tag{4}$$

Arequipa

Linear Function



Parametric Model



ITRF2013: Schedule

• Feb 10, 2014	Deadline for solution submissions by Technique.
• End of April	First results and discussions at the EGU2014
• End of May	Inter comparisons of the ITRF CCs solutions
• June	Preliminary ITRF2013 solutions available for evaluation by the Technique/Analysis Centers (One ITRF2013P solution provided by the ITRS Center)
• July-Aug, 2014	Final ITRF2013 solution released by the ITRS Center.

Status of submissions

- No official solution was submitted so far
- IDS: ???
- IGS:
  - Some ACs are ready: ESA, GFZ, CODE
  - Others need about one month ==> Mid April
  -
- ILRS: Promised to deliver a first solution by end of March
- IVS: by end of March