



IVS combination center at BKG

– Recent Activities –

S. Bachmann, M. Lösler

Federal Agency for Cartography and Geodesy

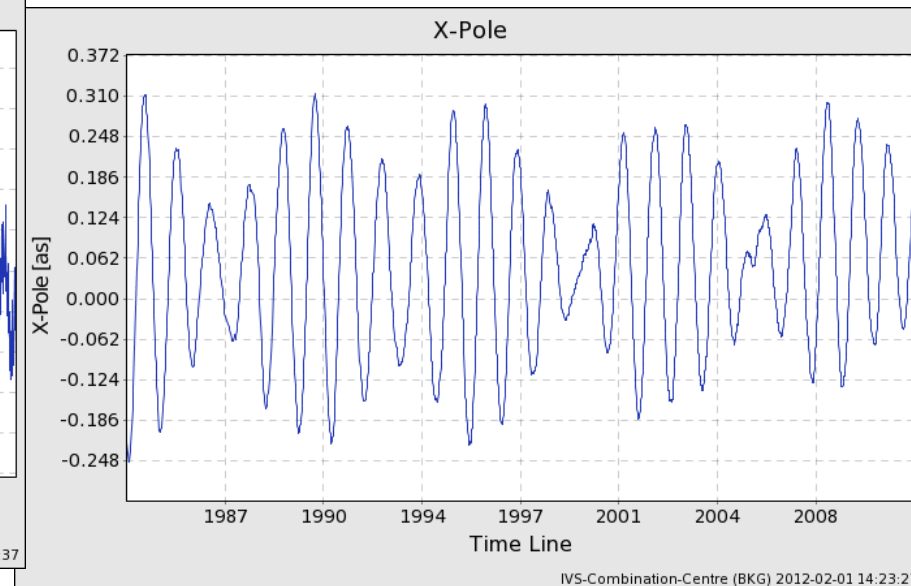
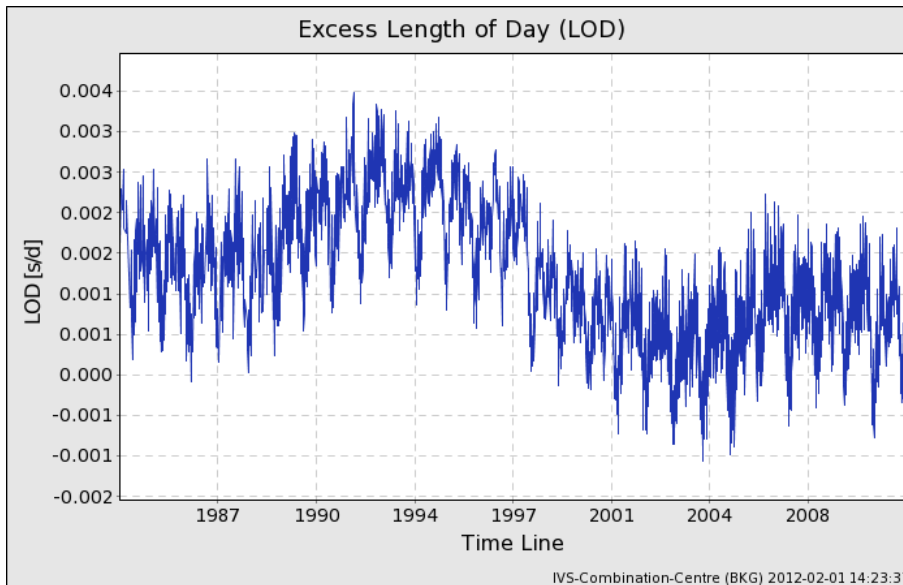


- Quarterly EOP Solution
- Combined TRF
- Station Coordinates and Velocities
- Baselines
- Outlier Detection
- Web-Based Analysis



Latest version 2011q4

- Results online (data until end 2011).
- Data files of past solutions available (drop down menu).
- Regular submission to database foreseen as soon as possible.





Combined TRF

- Generate a terrestrial reference frame with VLBI stations from VLBI observations.
- Include all daily VLBI sessions (generally all sessions listed in the master files <http://lupus.gsfc.nasa.gov/sess/>).
- Estimate station coordinates for new stations, e.g. HOBART12, YARRA12M, WARK12M, KATH12M and new station coordinates and velocities after Earthquakes, e.g. TIGOCONC, TSUKUB32.



HOBART12

Velocities

	X	Y	Z
HOBART12	-0.0397	0.0110	0.0561
HOBART26	-0.0390	0.0082	0.0411

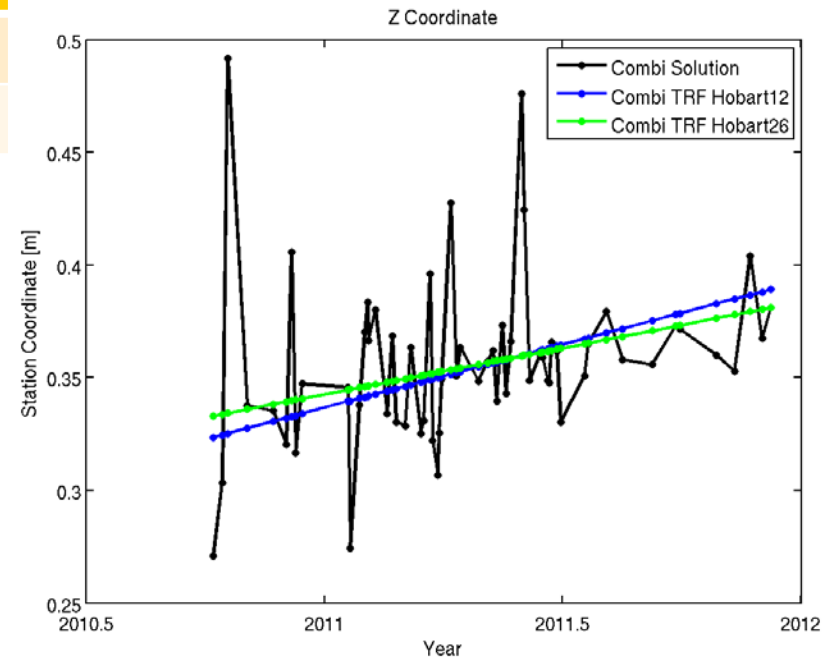
Congruence Test:

$$T = \frac{\mathbf{d}^T \mathbf{Q}_{dd}^{-1} \mathbf{d}}{3} \sim F_{3, \infty, 1-0.001} \mid H_0$$

with

$$\mathbf{d} = \mathbf{v}_2 - \mathbf{v}_1 \quad \text{and} \quad \mathbf{Q}_{dd} = \mathbf{Q}_{v_1 v_1} + \mathbf{Q}_{v_2 v_2}$$

$$T = 17.4 > F_{3, \infty, 1-0.001} = 5.4 \rightarrow H_0 \text{ rejected}$$

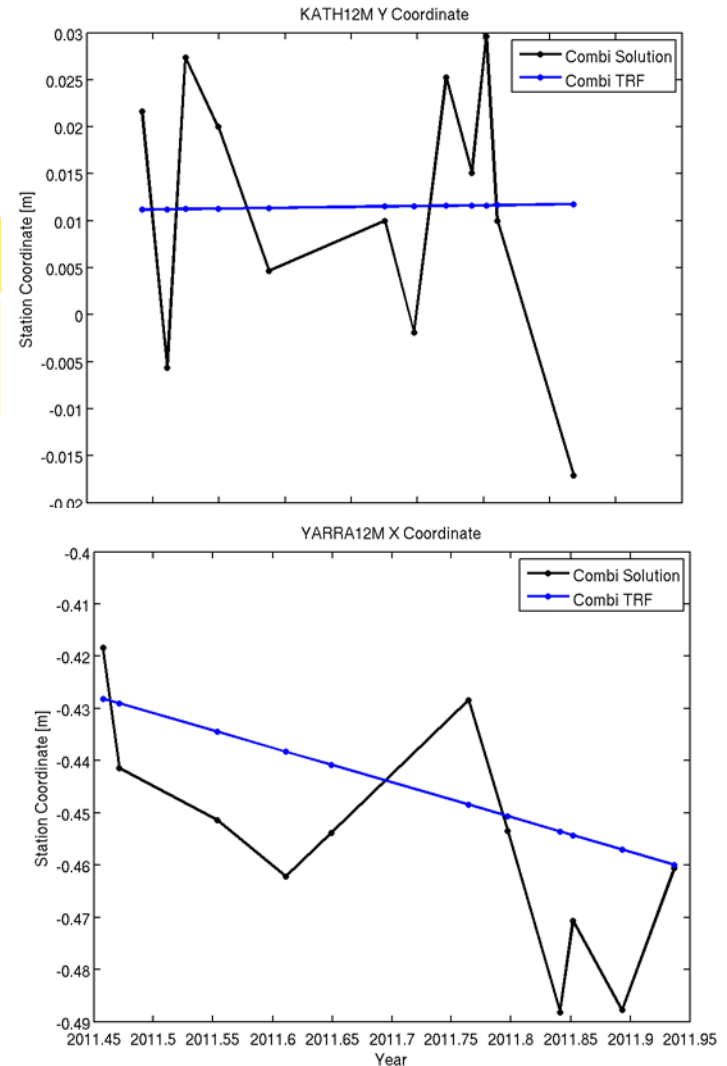




Australia/ New Zealand Stations (YARRA12M, WARK12M, KATH12M)

Station	YARRA12M	WARK12M	KATH12M
Nb. sessions	11	3	12

- Too few sessions to calculate reliable station positions and velocities.
- Not all ACs analyze new stations.

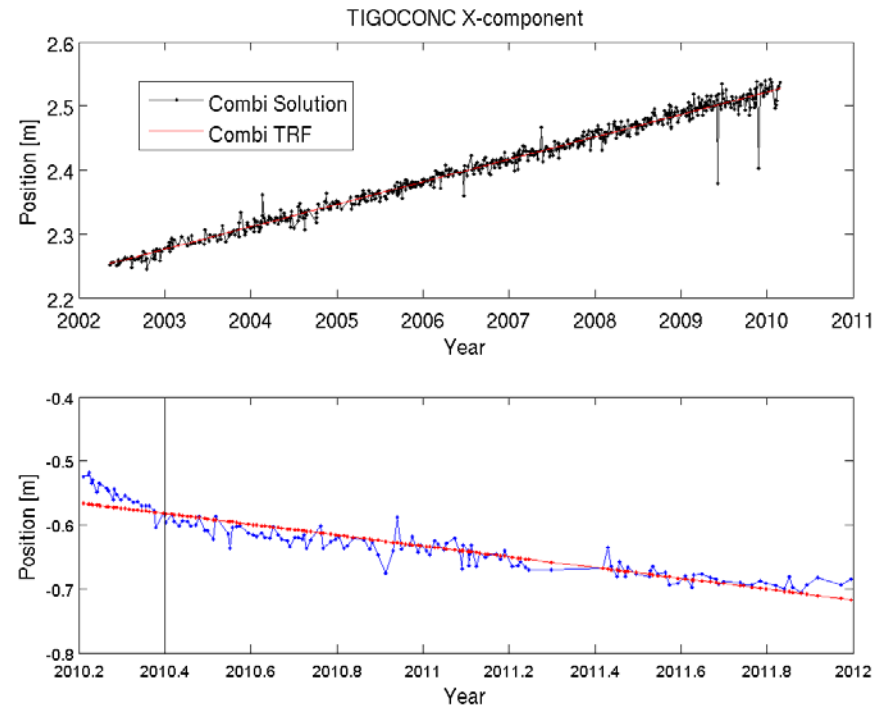




TIGOCONC

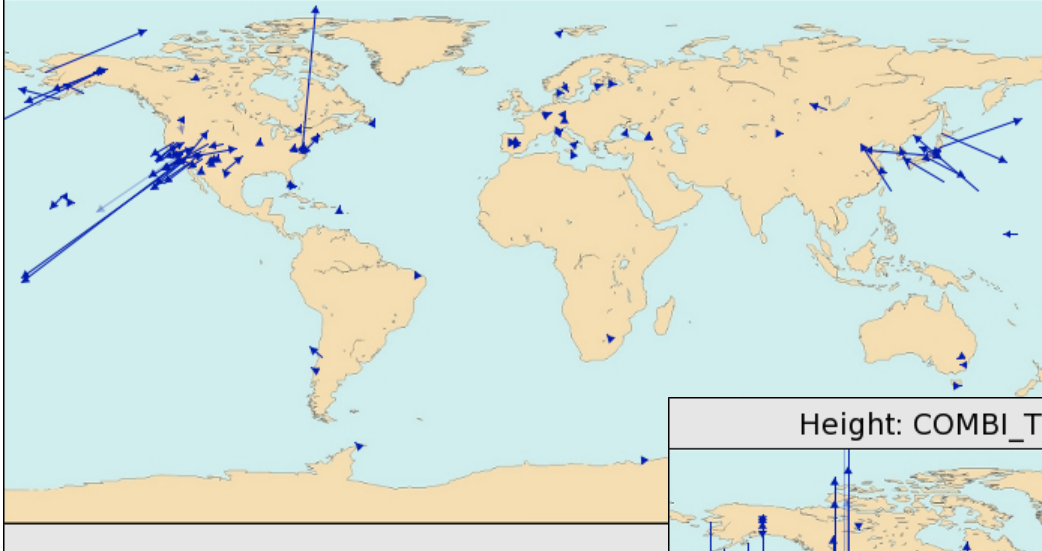
Earthquake February 2010

- Velocity in x-component changed significantly.
 - 3 Epochs:
 1. 2010.1597
 2. 2010.4 (~90 days after EQ)
- Careful modeling of station velocities (non-linear modeling).
- No strict modeling rule applicable (e.g. keeping velocities).



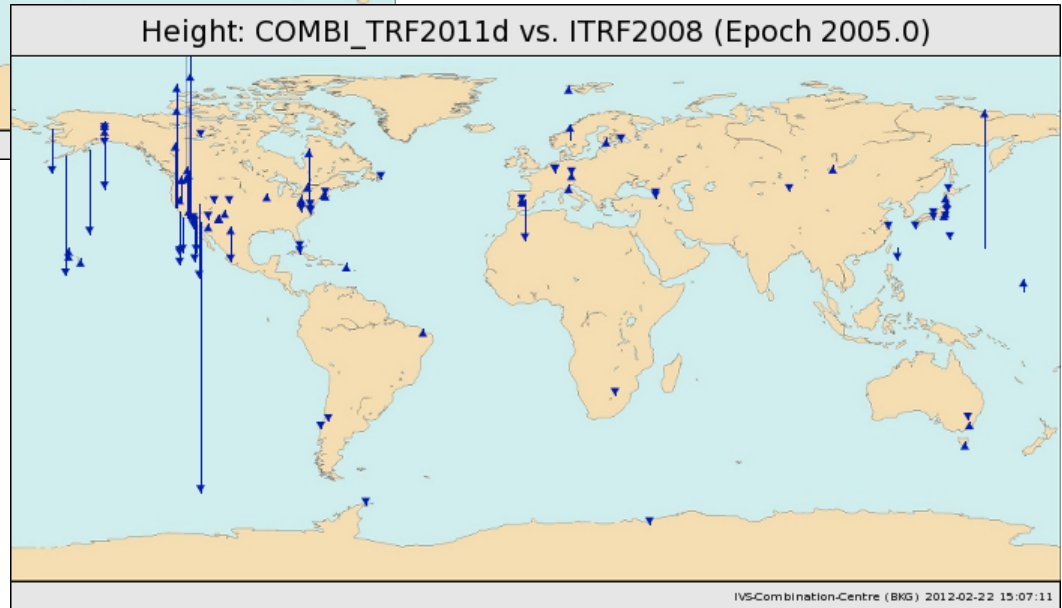


2D-Position: COMBI_TRF2011d vs. ITRF2008 (Epoch 2005.0)



2D-Position

Height: COMBI_TRF2011d vs. ITRF2008 (Epoch 2005.0)



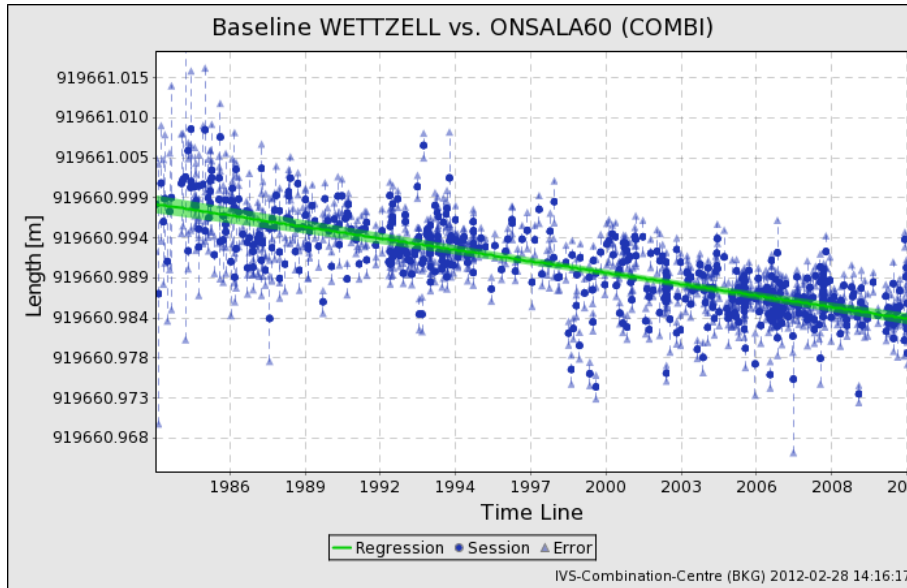
Height

IVSCombination-Centre (BKG) 2012-02-22 15:07:11



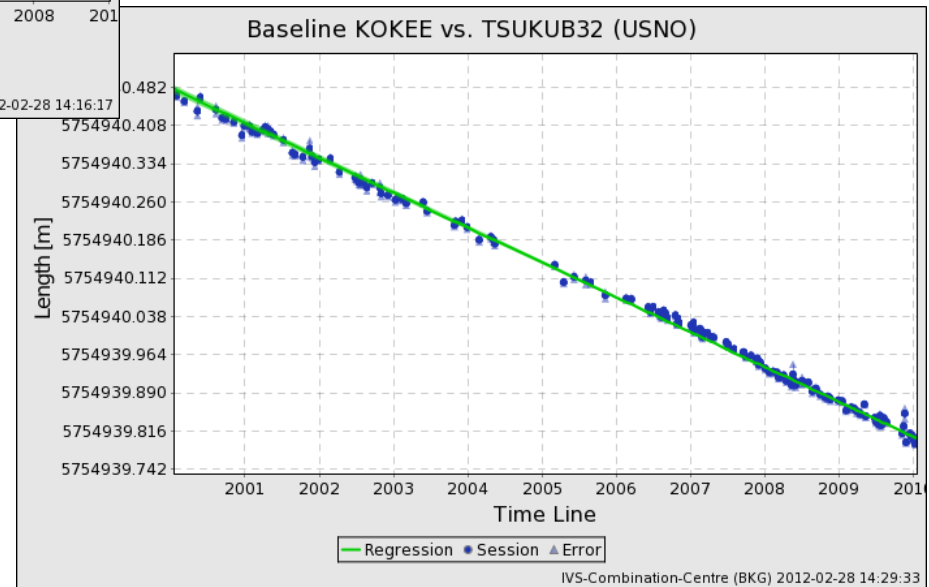
Baselines

- Project established end 2011/beginning 2012.
- Station coordinates result from quarterly combination of station coordinates (long term series from 1984 until now).
- Data stored in a database (speed up graphic generation).
- Baseline plot for individual ACs or combined solution.
- Results available on IVS combination center web site:
<http://ida.bkg.bund.de/IVS/baseline>



Combined

Individual AC





Least Median Squares (LMS)

- Robust outlier detection for station coordinates and EOP
 - Suitable for a small number of input parameters (IVS combination)
 - Highly resistant to leverage points (theoretical breakdown point of 50%)
- Poster 3.24 “Robust outlier detection and weighting strategies”



Products and results available at
IVS combination center web site:

<http://ida.bkg.bund.de/IVS/>