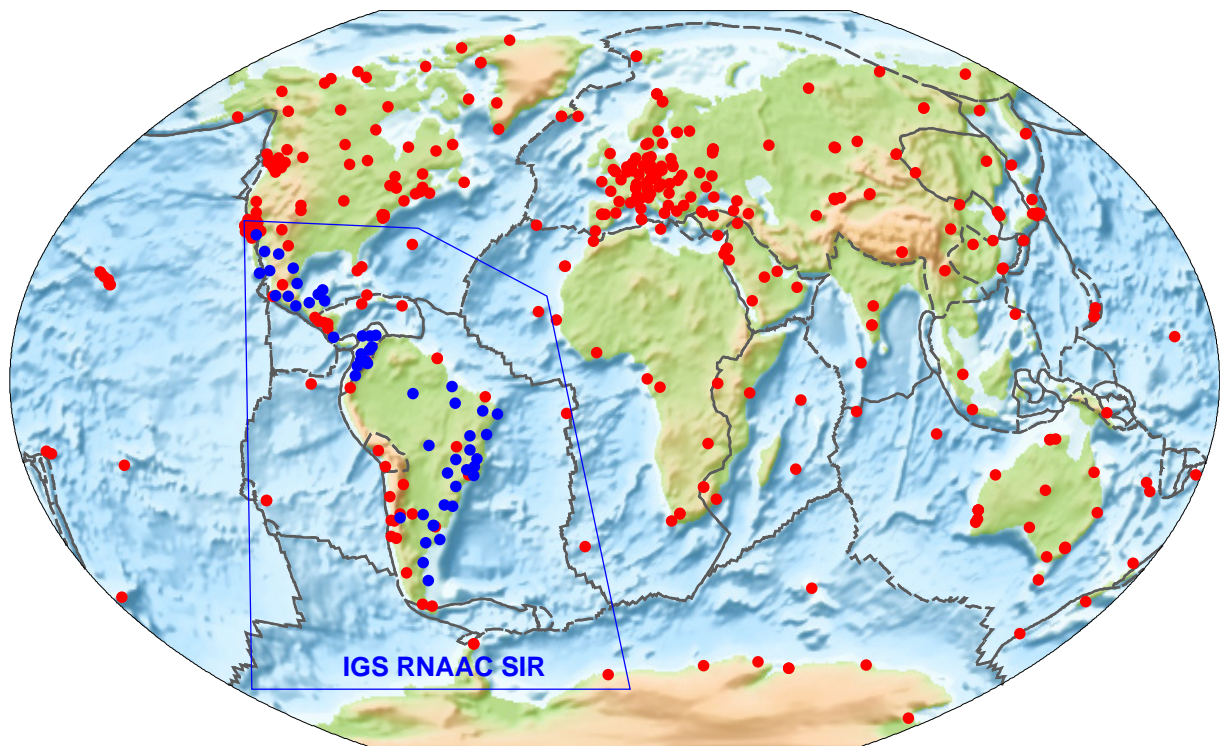


Report on New Activities of IGS Regional Associate Analysis Centre for SIRGAS (IGS RNAAC SIR)

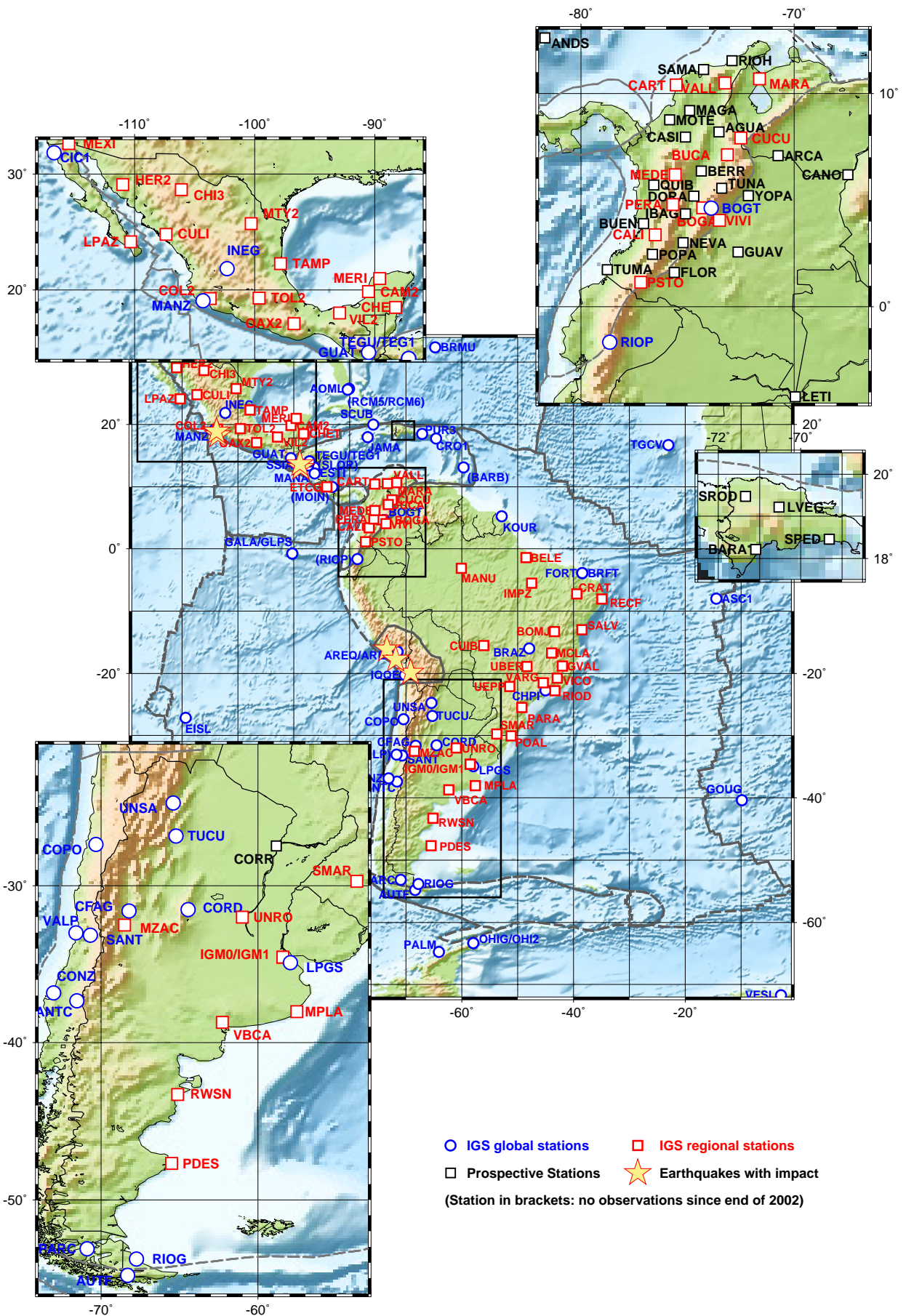
W. Seemüller
Deutsches Geodätisches Forschungsinstitut,
Marshallplatz 8, D-80539 München/Germany



CONTENT

- IGS RNAAC SIR network
- Processing strategy BPE version 4.2 and 5.0
(daily solutions, fixed weekly solution)
- Description of coordinate and velocity solution DGF05P01S
- Solution figures
- Comparison of solutions DGF04P01S and DGF05P01S
- Time series (examples)
- Conclusion

IGS RNAAC SIR Network



PROCESSING STRATEGY BPE 4.2 / 5.0

Analysis Approach (daily solutions)

	BPE Version 4.2	BPE Version 5.0
Start of processing	GPS week 0860	GPS week 1301
Elevation cutoff	10°	5°
Sampling rate	30 sec.	
Orbits/EOP	IGS final orbits referred to ITRF2000/IGb00	
Troposphere	Zenith delay estimated each 2 hours, a priori sigmas applied with respect to prediction model: - first parameter +/- 5m absolute - following parameters +/- 10cm relativ	
Ambiguities	partly resolved, remaining estimated as real values, no constraints (QIF)	
Ocean Loading	implemented since GPS week 1156	
Mapping function	Saastamoinen	Niell

PROCESSING STRATEGY BPE 4.2 / 5.0

Analysis Approach (fixed weekly solutions)

BPE Version 4.2

The coordinates and velocities are "constrained" due to the fiducial point concept to IGB00 values of ASC1, CRO1, EISL, FORT, KOUR, LPGS, OHIG/OHI2, RIOG and SANT.

Therefore the time series generated by BPE version 4.2 show nearly straight lines (will be shown later).

BPE Version 5.0

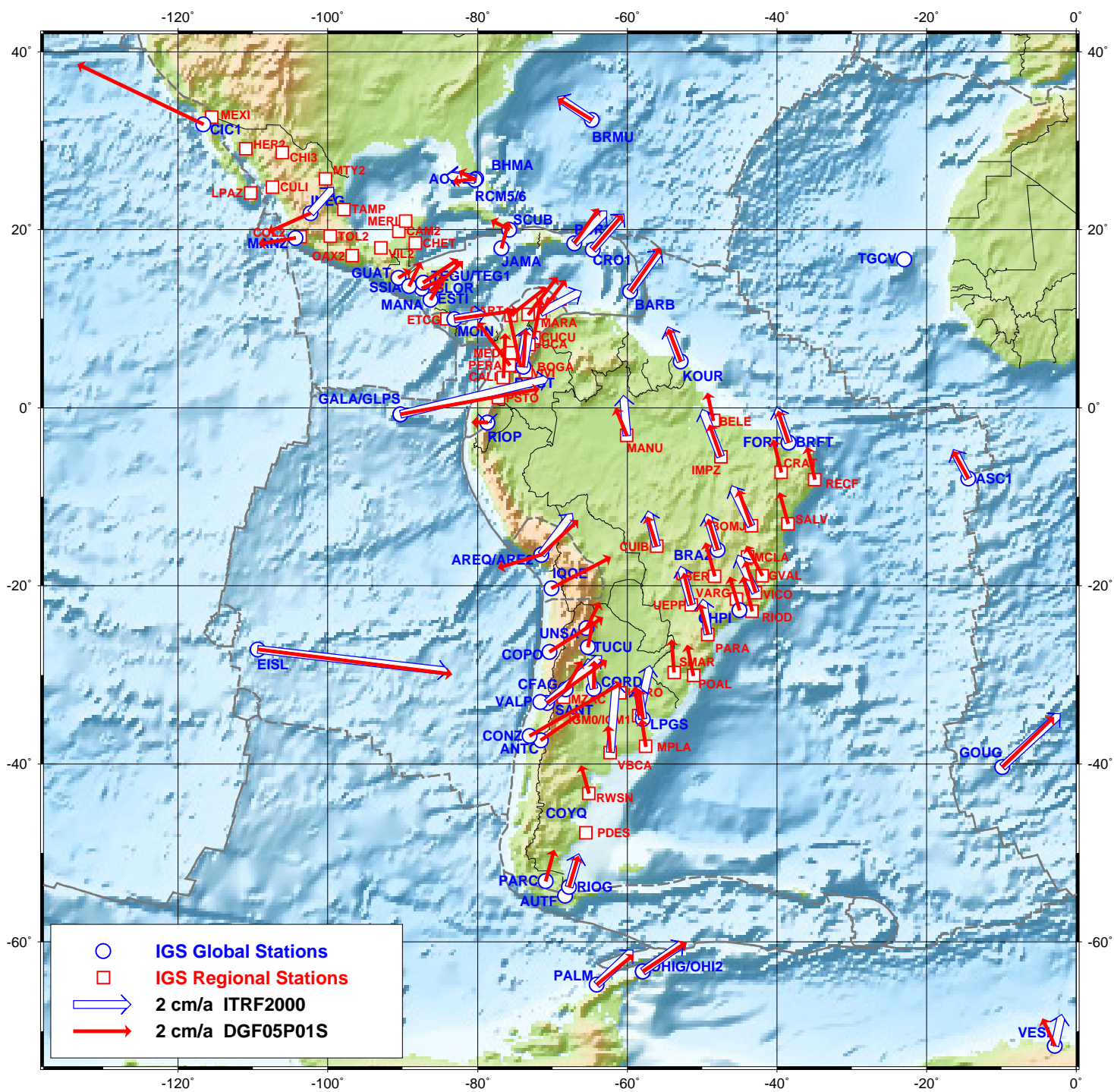
The coordinates and velocities are "constrained" by minimizing the no net rotation and the no net translation condition of the same fiducial points.

Therefore the fiducial points are allowed to vary considerably (see later).

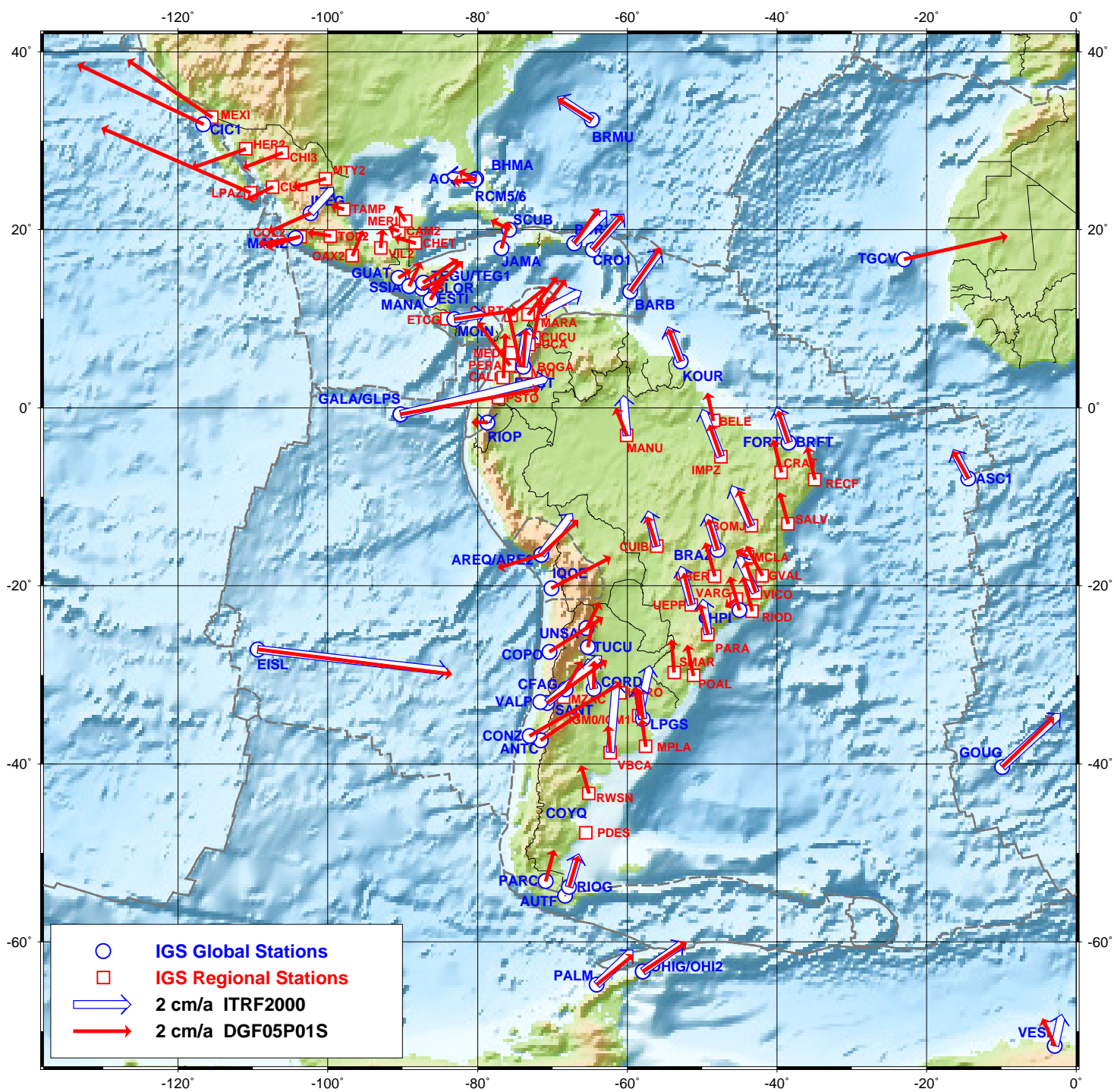
Description of Solution DGF05P01S

1. Technique:	GPS
2. Software used:	Bernese, Version 4.2
3. Data span:	June 30, 1996 - Sept. 17, 2005
4. Celestial Reference Frame:	
a - Nature:	Dynamical
b - Definition of the orientation:	By fixing EOP values at each epoch to IGSWWW7.ERP
5. Terrestrial Reference Frame:	
a - Relativity scale:	No relativistic correction applied
b - Velocity of light:	299 792 458 m/s
c - Geogravitational constant:	$GM_0=3.986004415 \cdot 10^{14} \text{ m}^3/\text{s}^2$
d - Permanent tidal correction:	No
e - Definition of the origin:	Geocenter ($C_{10} = 0, C_{11} = 0, S_{11} = 0$)
f - Definition of the orientation:	EOP values at each epoch fixed to IGSWWW7.ERP
g - Reference epoch:	2004:000
h - Tectonic plate model:	None
i - Constraints:	Coordinates and velocities are "constrained" to Igb00 values of ASC1, CRO1, EISL, FORT, KOUR, LPGS, OHIG/OHI2, RIOG, and SANT
6. Earth Orientation:	
a - A priori precession model:	IAU 1976
b - A priori nutation model:	IAU 1980
c - Short-period tidal variations in x, y, UT1:	None
7. Estimated parameters:	
a - Celestial Frame:	None
b - Terrestrial Frame:	$X_0, Y_0, Z_0, \dot{X}, \dot{Y}, \dot{Z}$ free
c - Earth Orientation:	None
d - Others:	Tropospheric zenith delay (2 hours intervals)

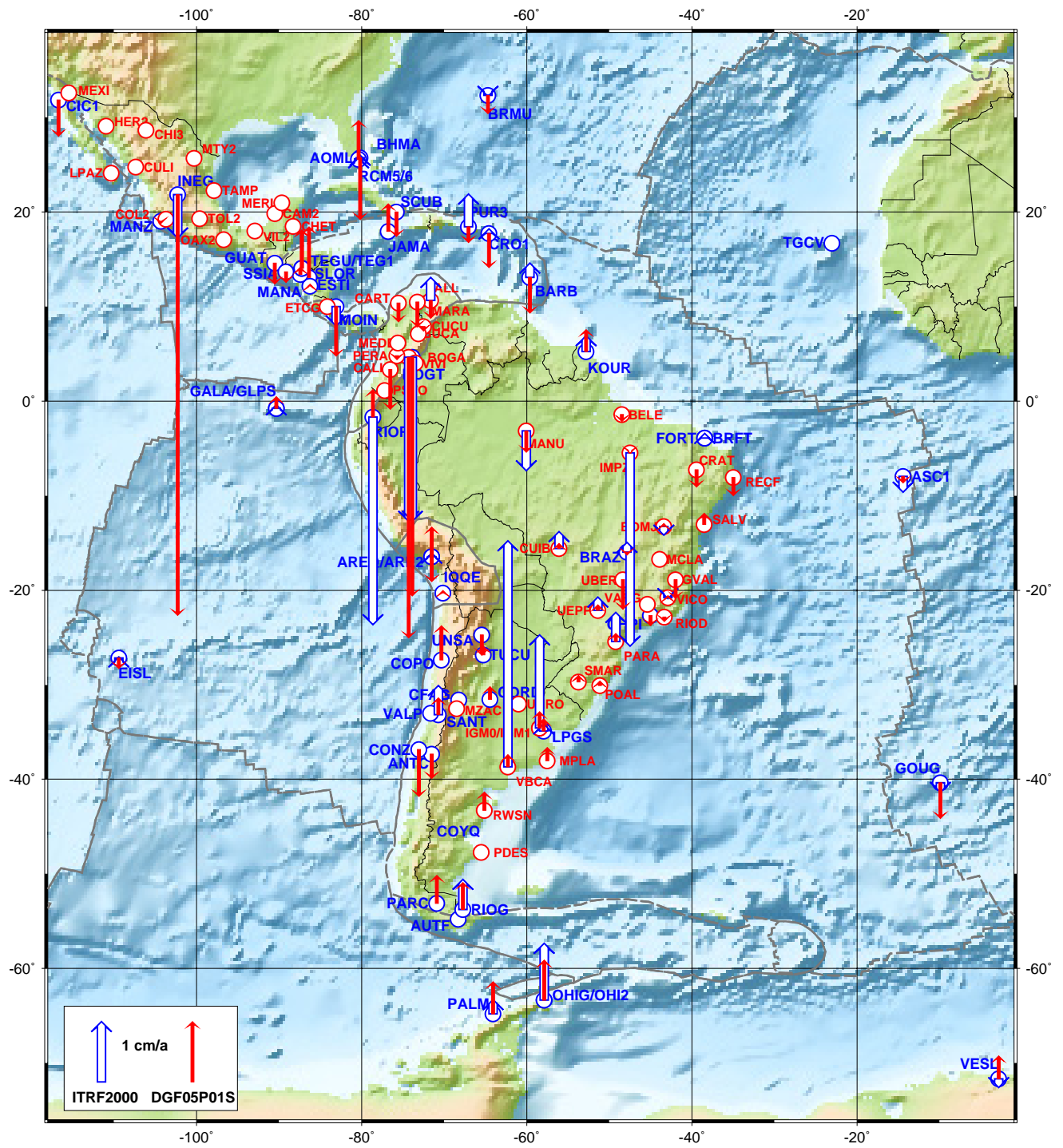
Horizontal velocities of IGS RNAAC SIR stations



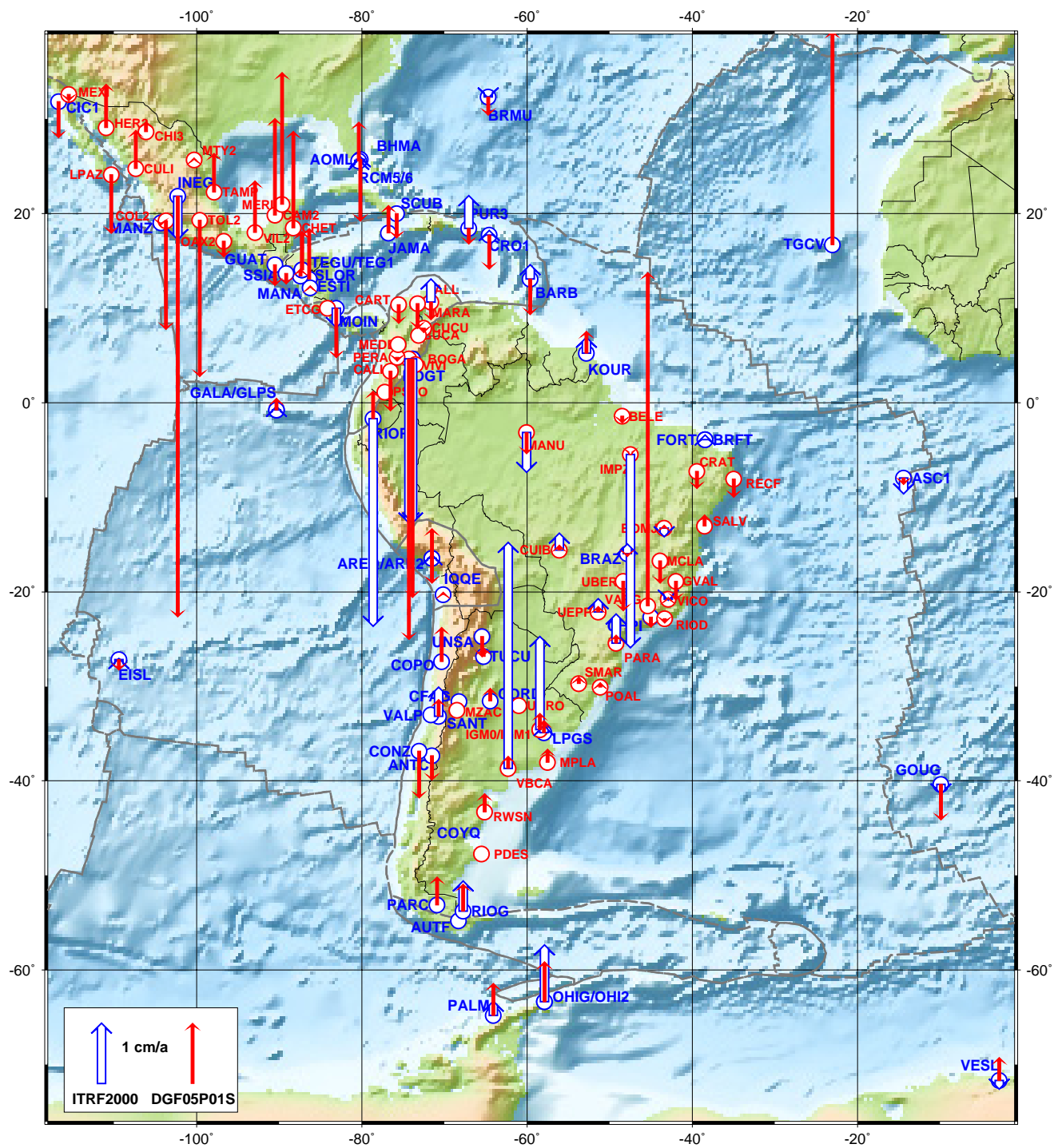
Horizontal velocities of IGS RNAAC SIR stations



Vertical velocities of IGS RNAAC SIR stations

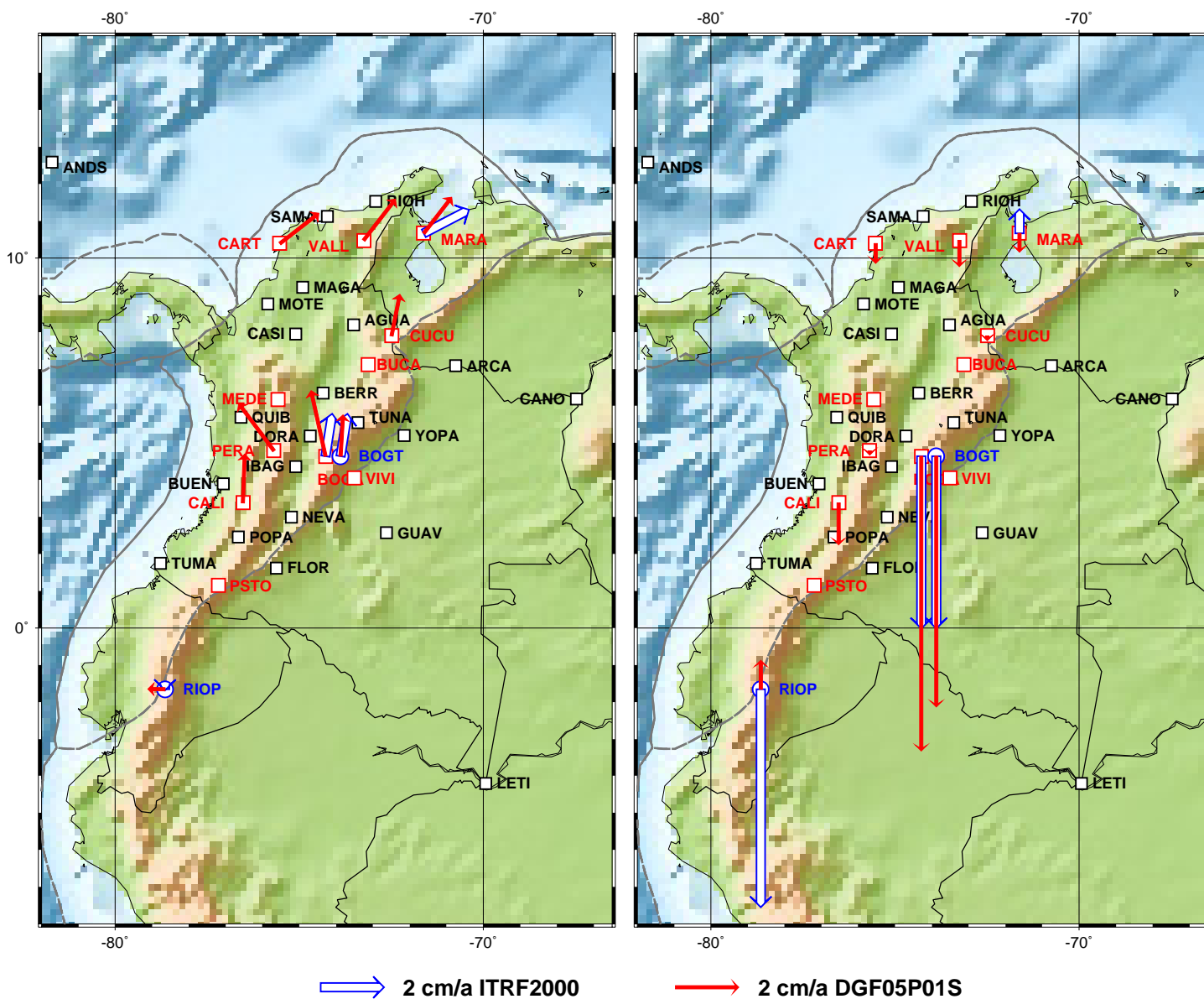


Vertical velocities of IGS RNAAC SIR stations



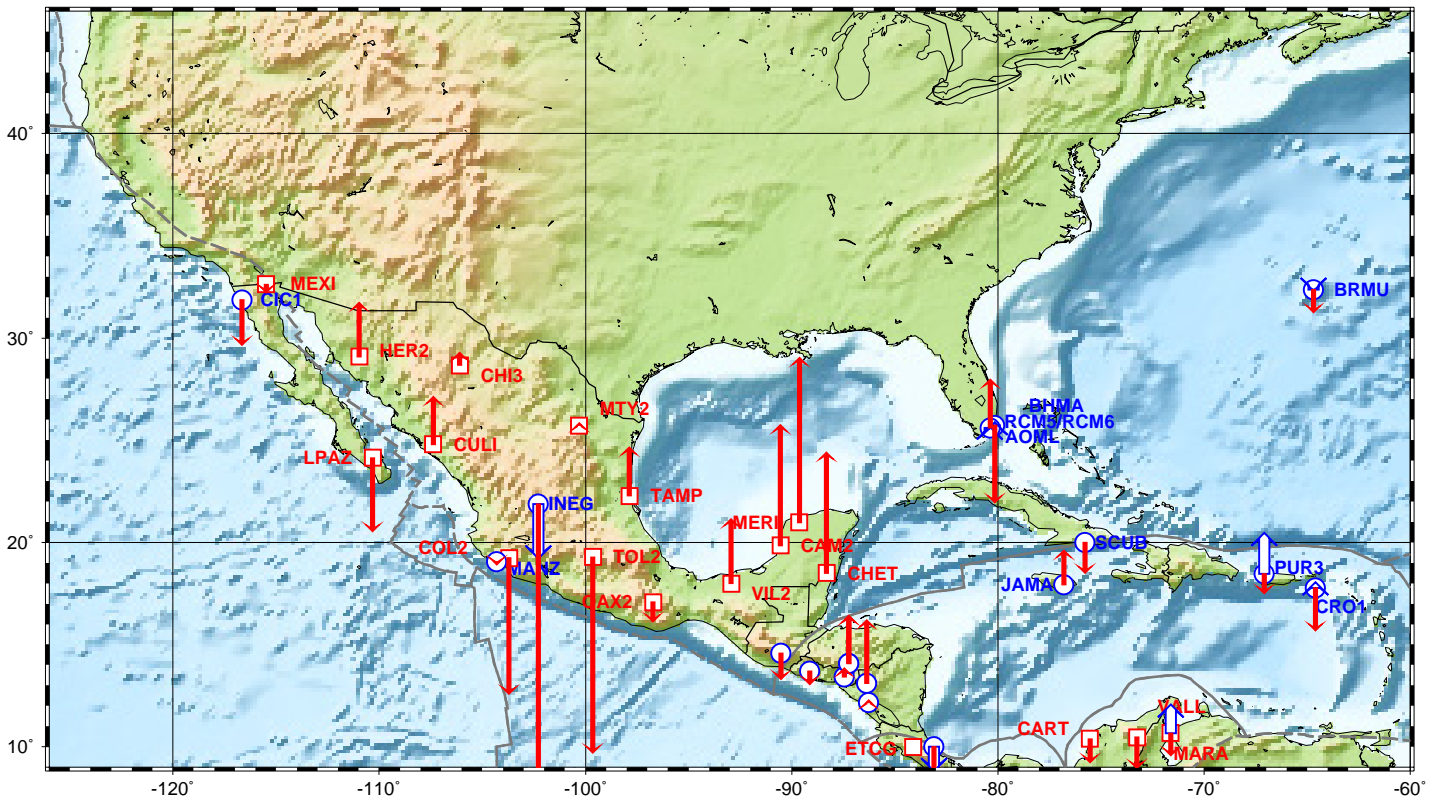
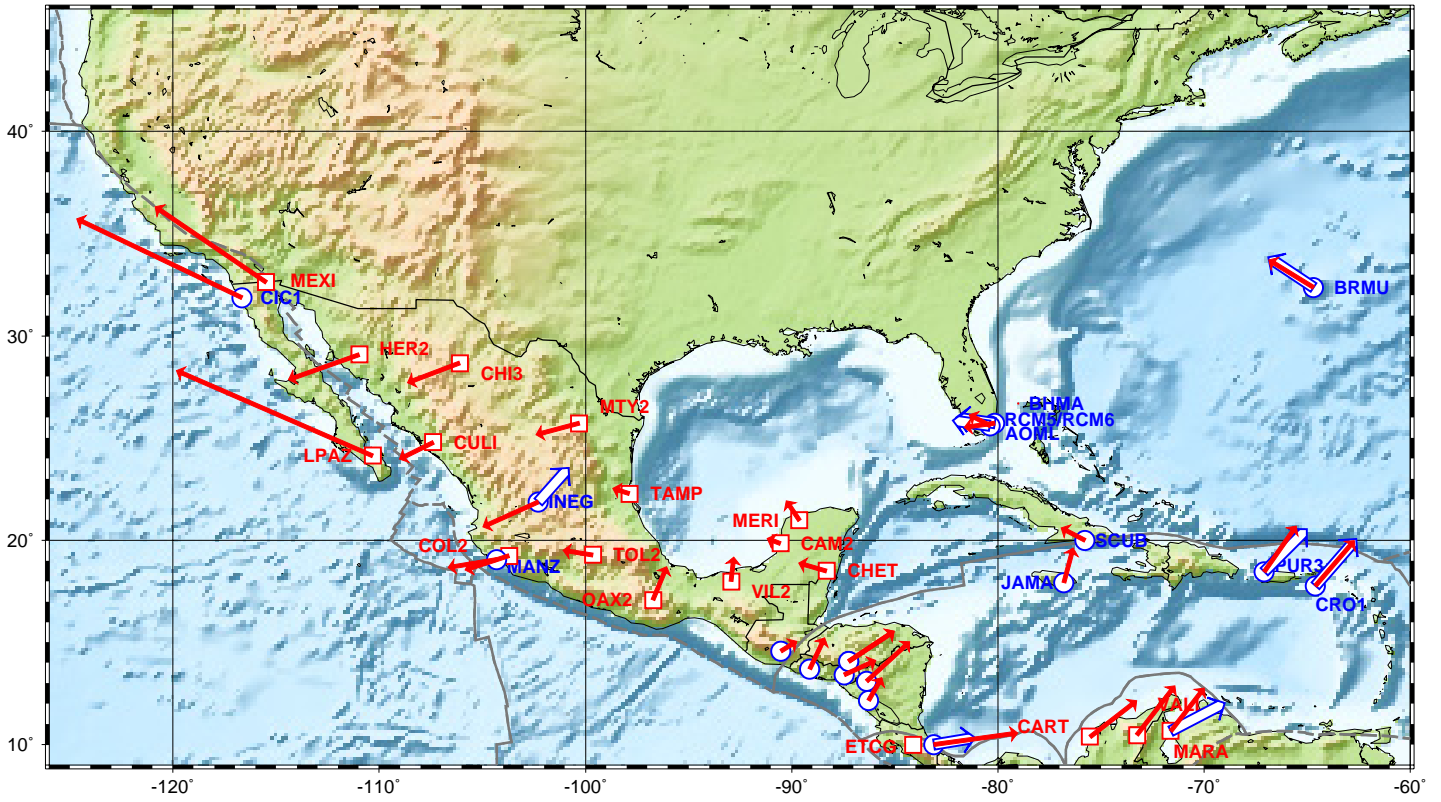
Horizontal velocities

Vertical velocities



Colombia, Ecuador, Venezuela

Mexico, Central America, Caribbean, USA



➡ 2 cm/a ITRF2000

➡ 2 cm/a DGF05P01S

COMPARISON DGF04P01S / DGF05P01S

Comparison of coordinates:

Average coordinate shifts in 80 identical stations

	X [m]	Y [m]	Z [m]
average shift	0.0016	-0.0004	0.0007
weighted r.m.s dev.	0.0025	0.0014	0.0037
shift reduced r.m.s dev.	0.0019	0.0013	0.0036

Comparison of velocities:

(RCM5/6, MOIN, VARG, CIC1, MANZ eliminated)

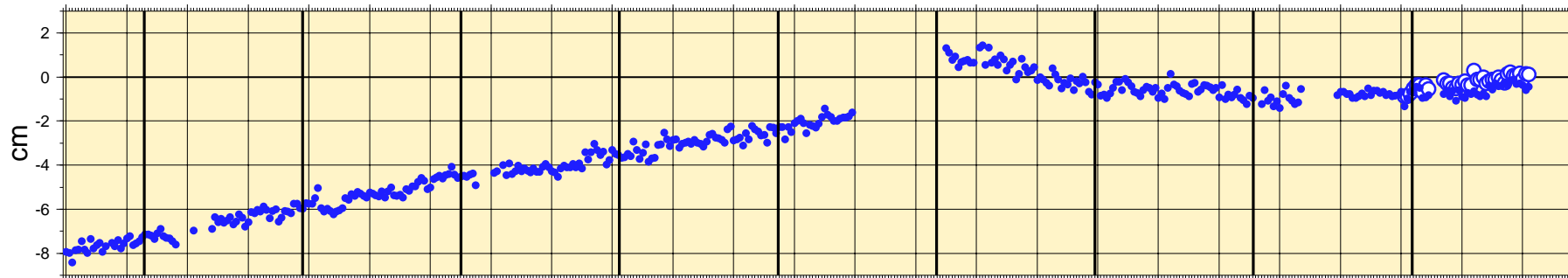
Number of stations DGF04P01S/DGF05P01S: 81/106

Number of identical stations in both solutions: 73

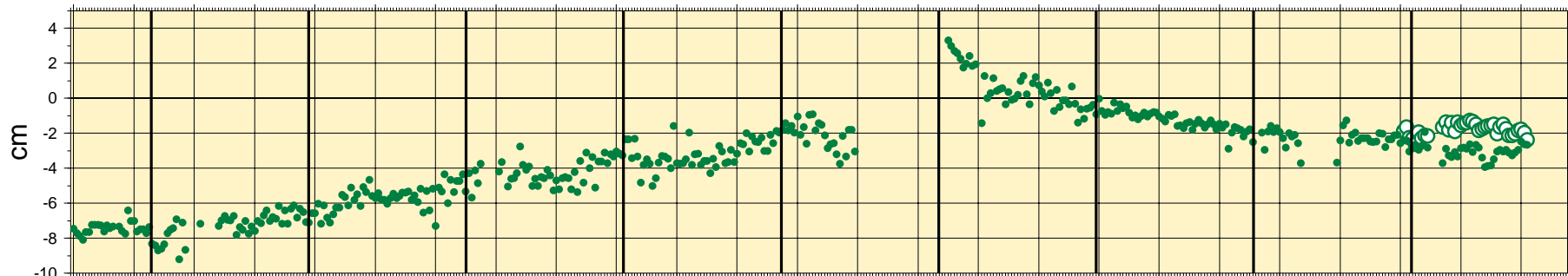
	V(X) [m]	V(Y) [m]	V(Z) [m]
max. velocity dev.	0.0028	0.0020	0.0031
min. velocity dev.	-0.0044	-0.0089	-0.0052

AREQUIPA (AREQ/ARE2)

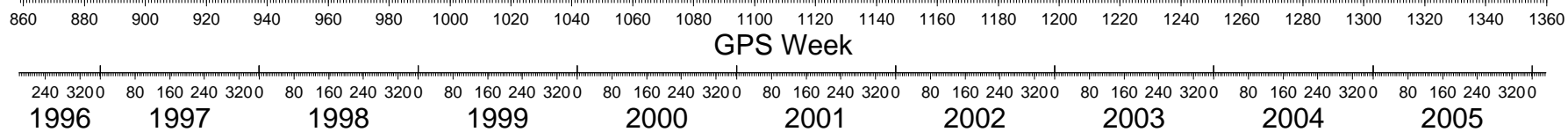
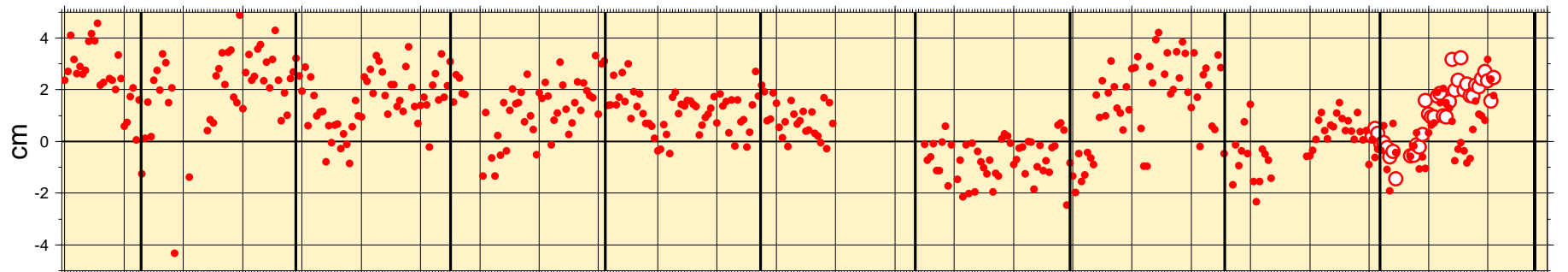
NORTH COMPONENT



EAST COMPONENT

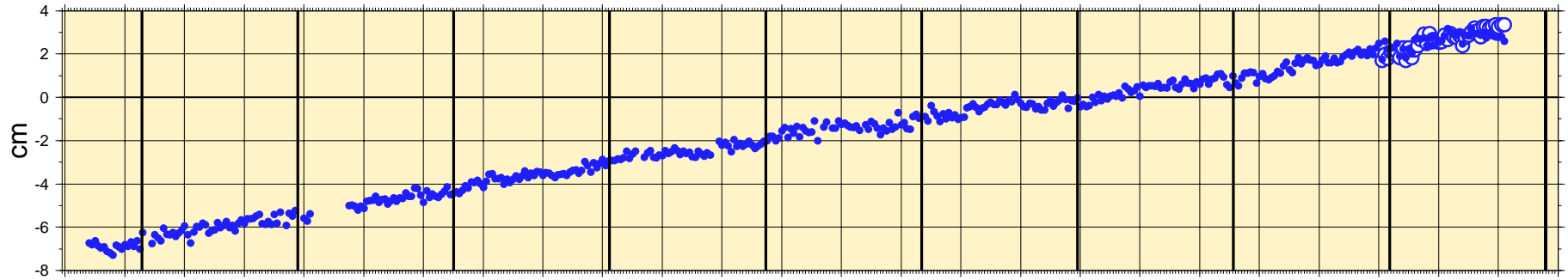


UP COMPONENT

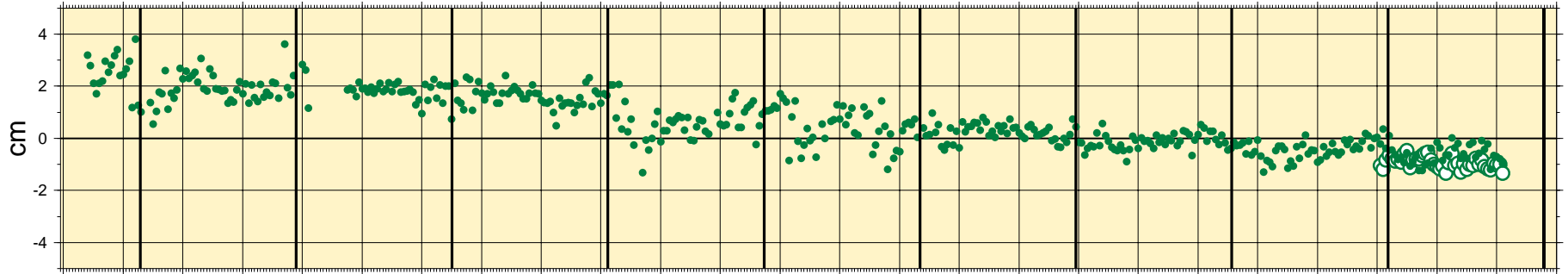


BRASILIA

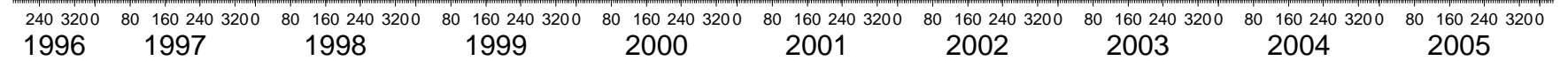
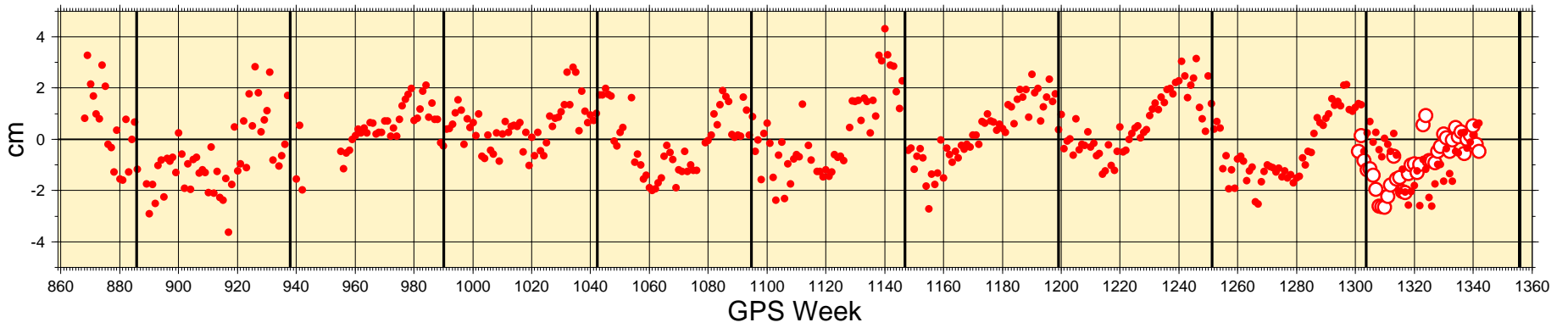
NORTH COMPONENT



EAST COMPONENT

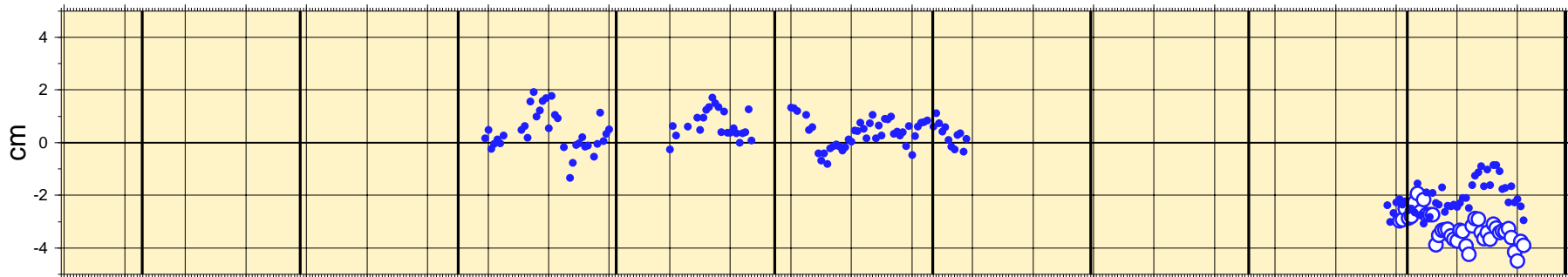


UP COMPONENT

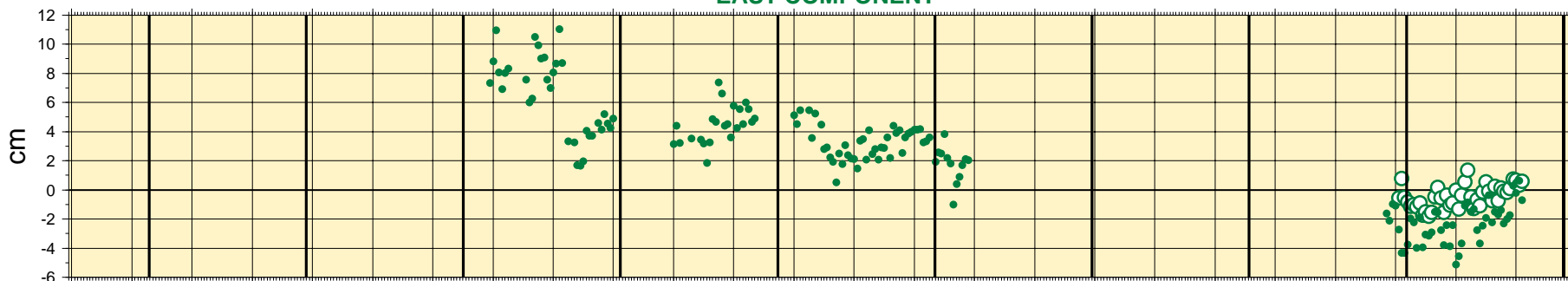


AGUASCALIENTES

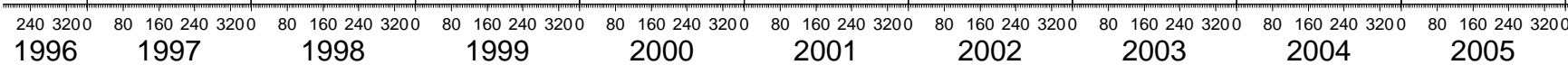
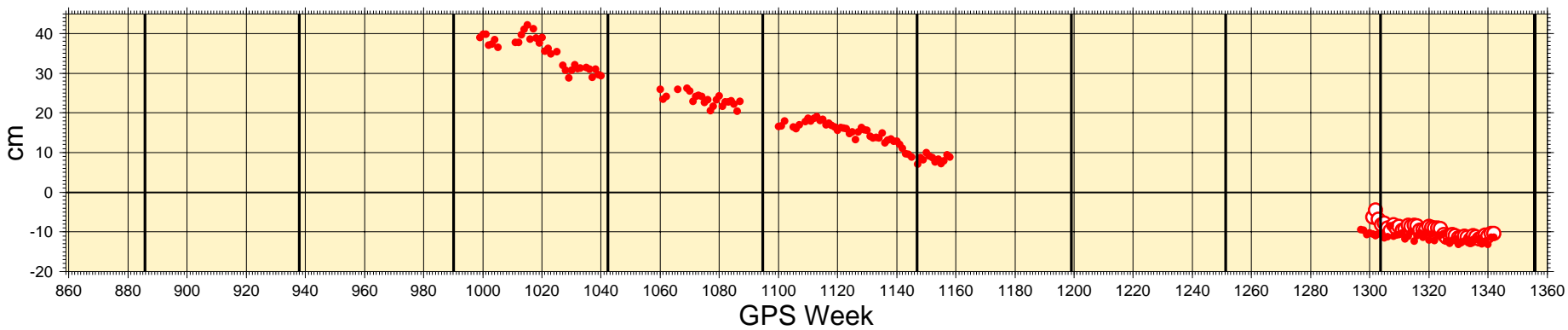
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EAST COMPONENT

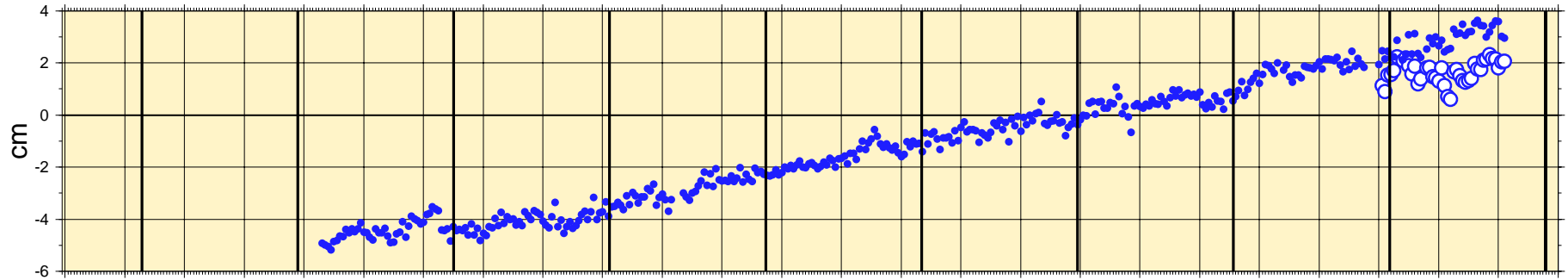


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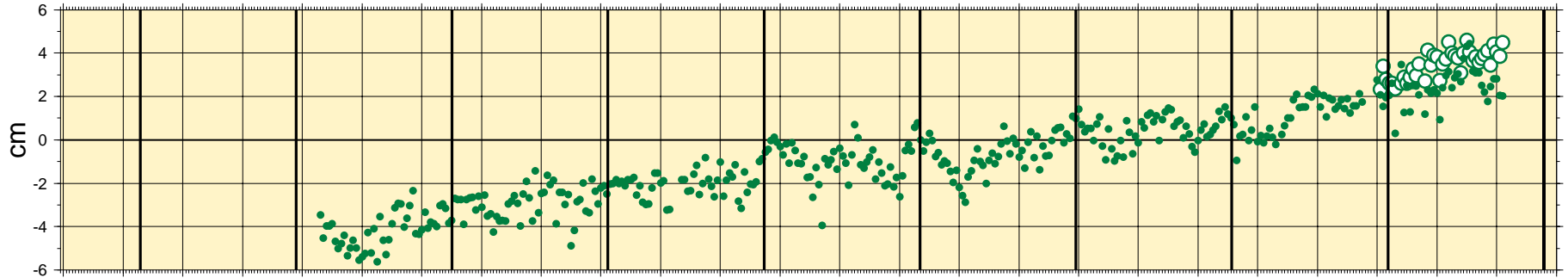


MARACAIBO

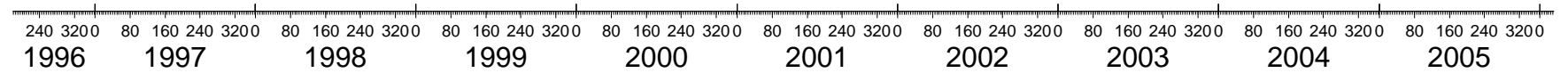
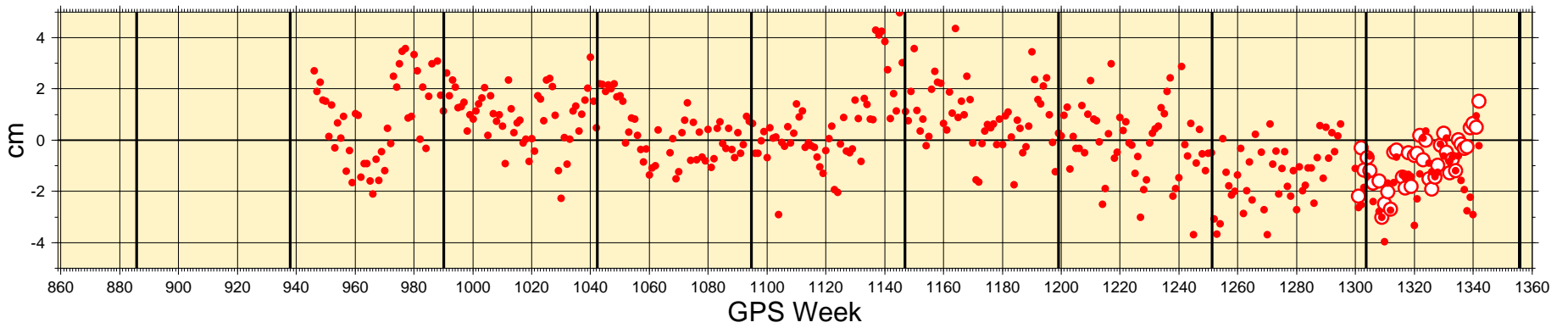
NORTH COMPONENT



EAST COMPONENT

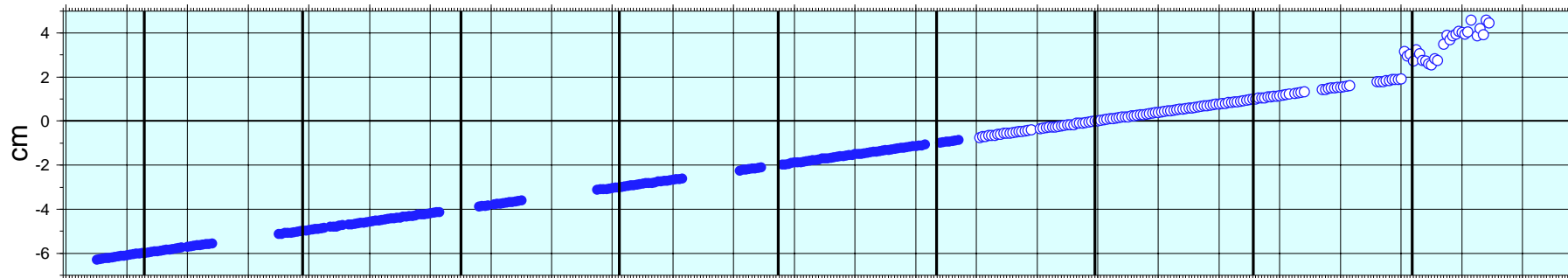


UP COMPONENT

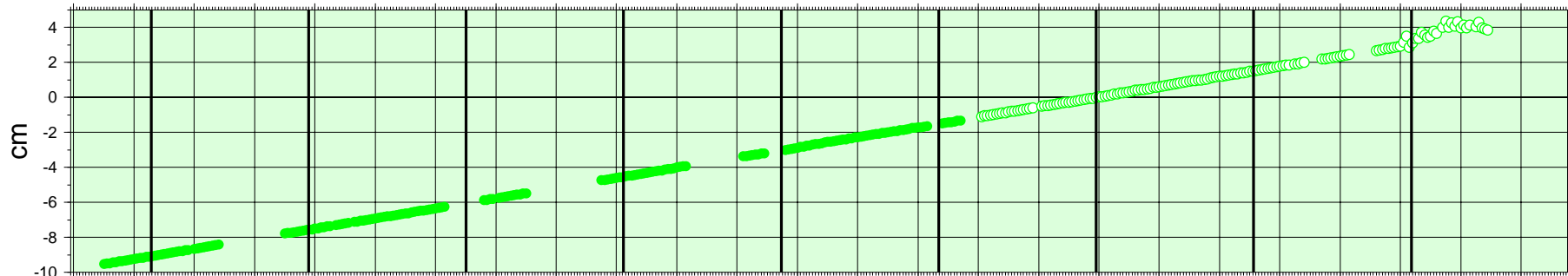


O'Higgins (OHIG/OHI2)

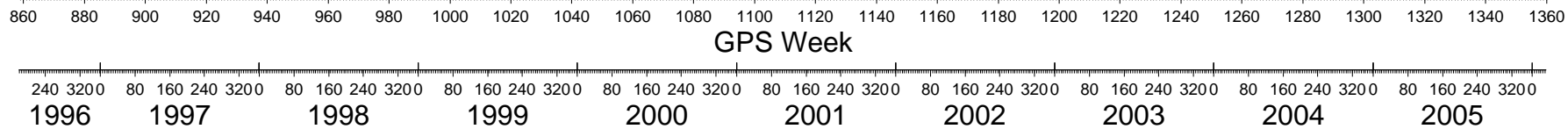
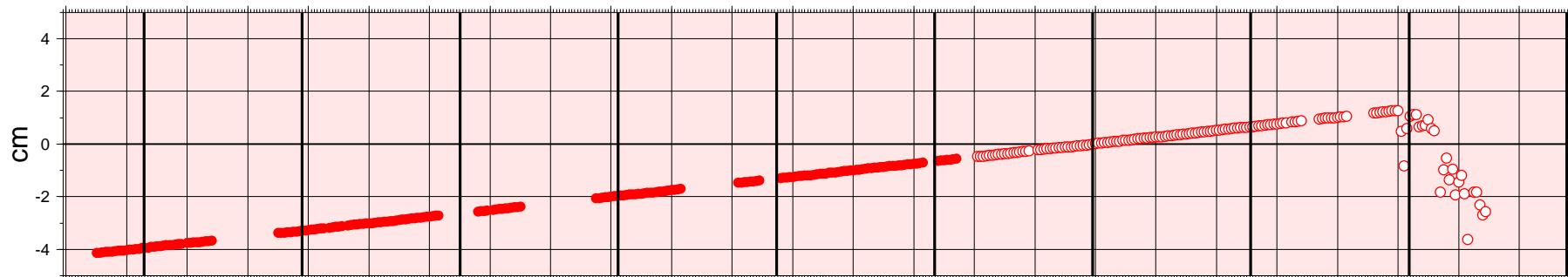
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EAST COMPONENT

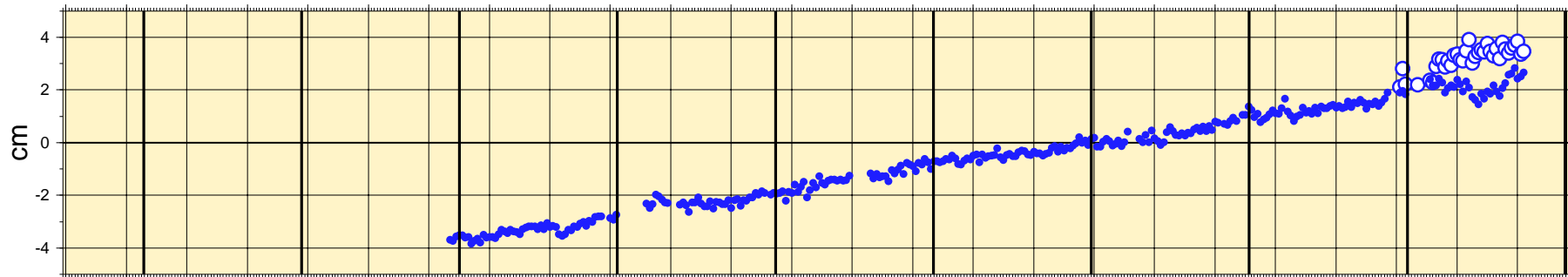


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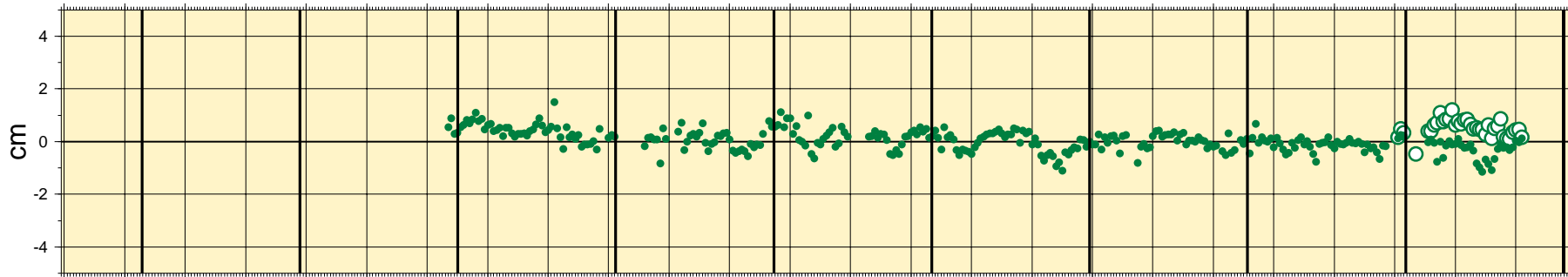


BAHIA BLANCA

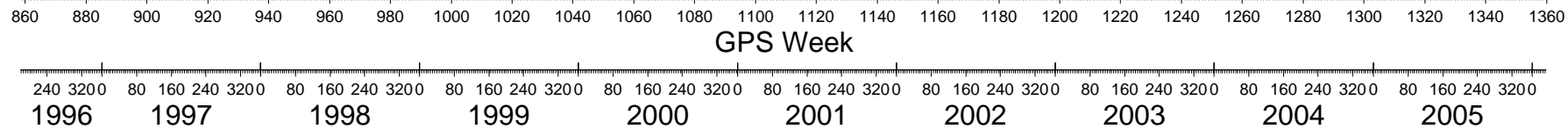
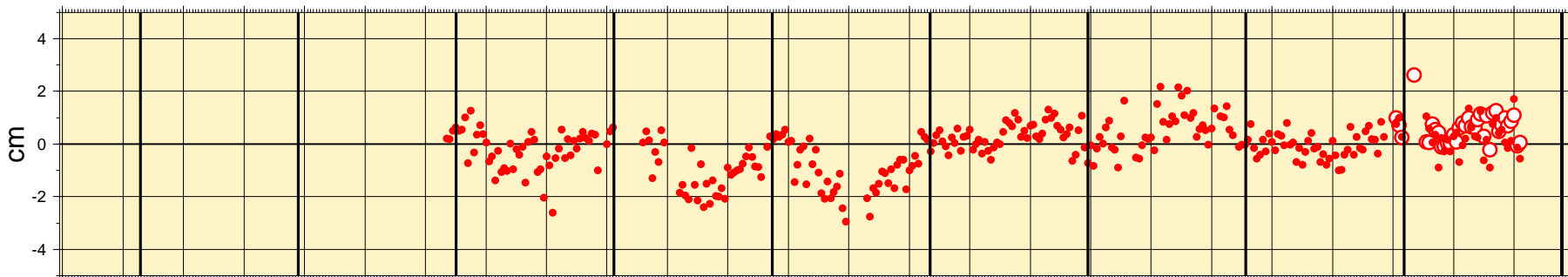
NORTH COMPONENT



EAST COMPONENT

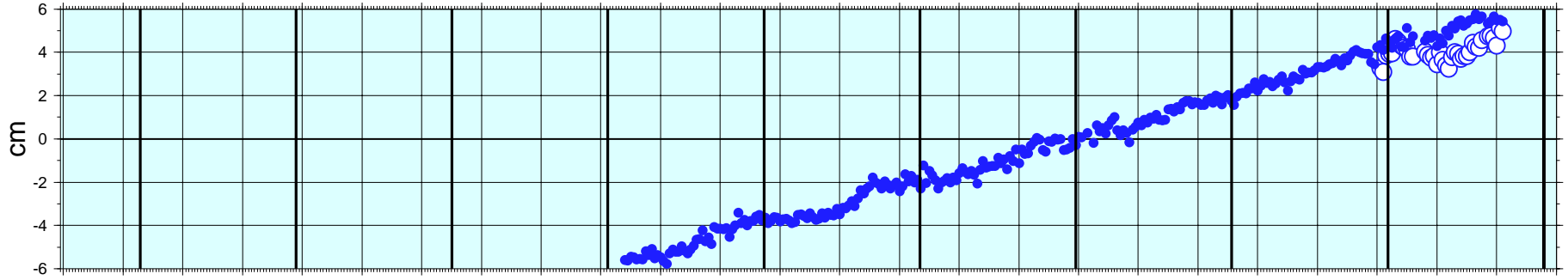


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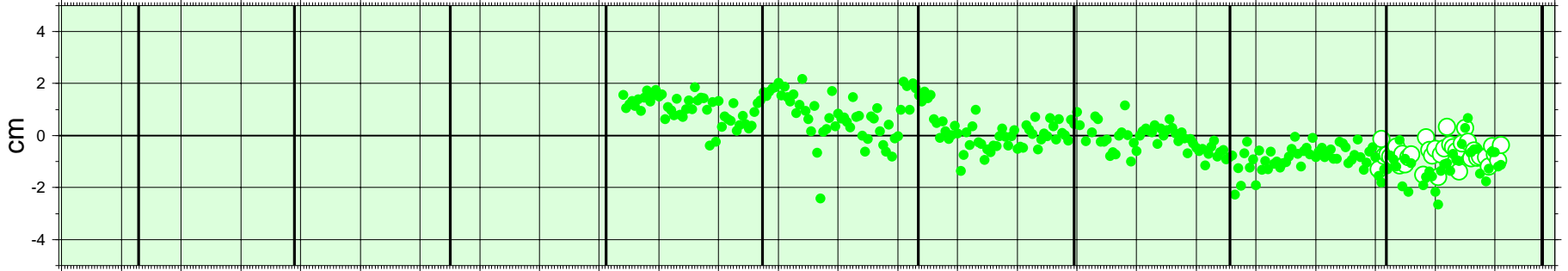


BOGOTA (BOGA)

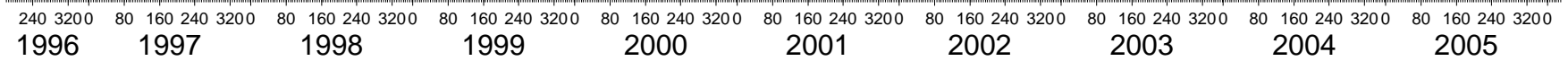
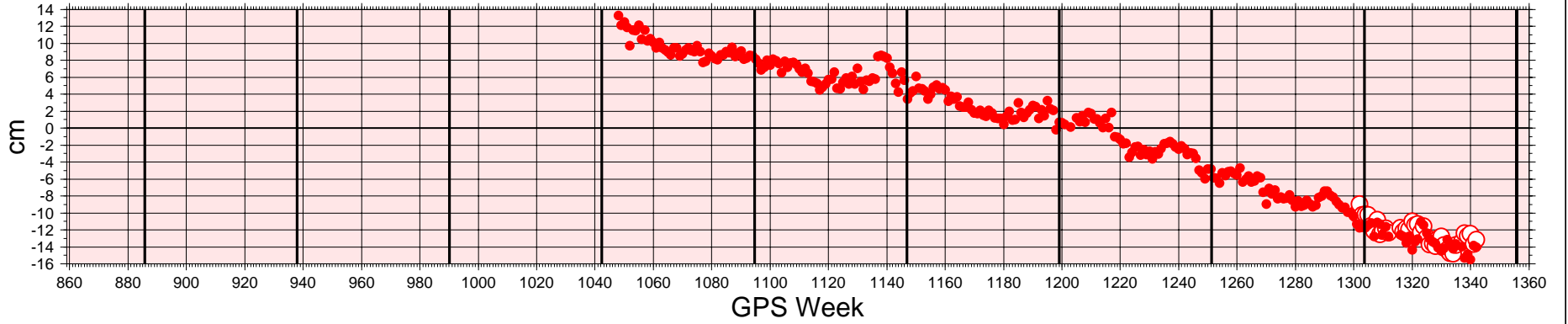
NORTH COMPONENT



EAST COMPONENT

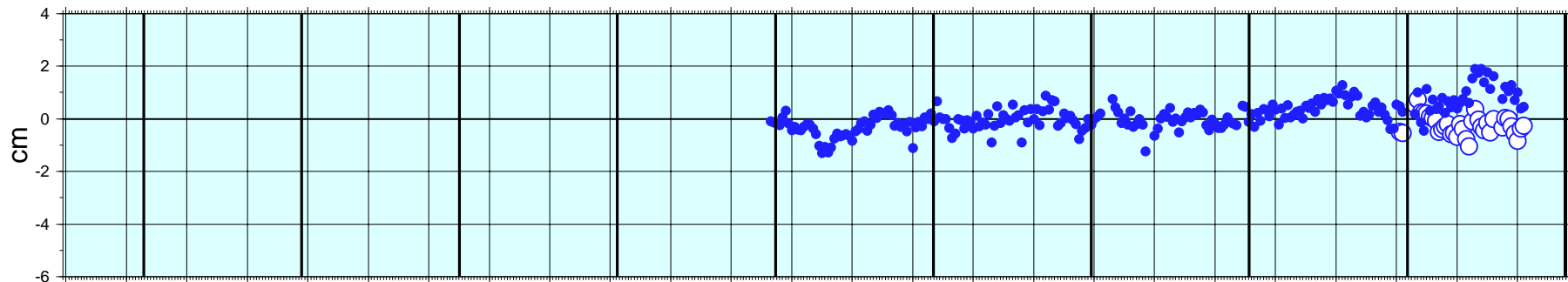


UP COMPONENT

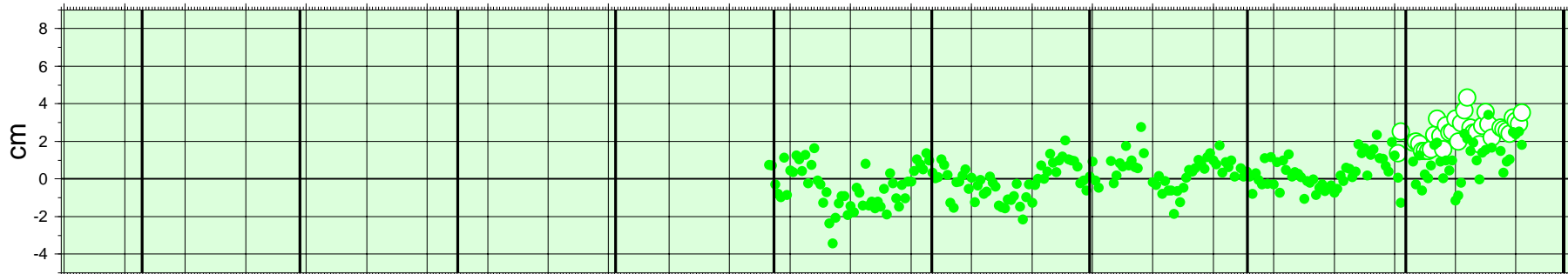


GUATEMALA

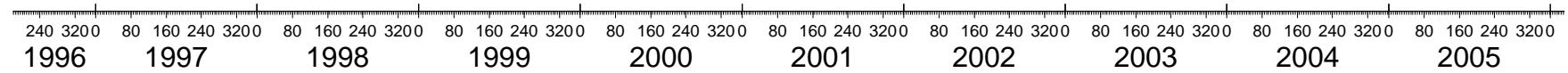
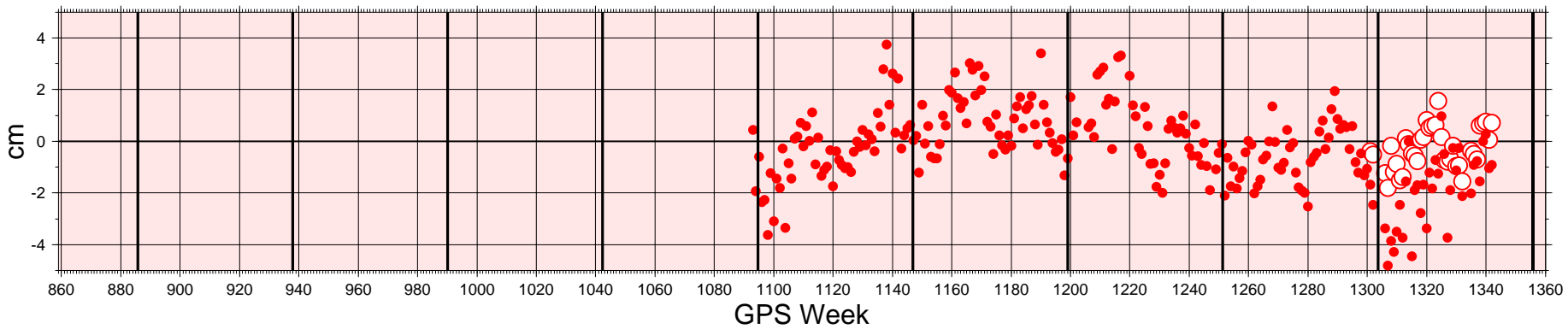
NORTH COMPONENT



EAST COMPONENT



UP COMPONENT



CONCLUSION

- The number of IGS RNAAC SIR stations increased remarkably (see IGS RNAAC SIR network)
- Nearly one more year of observations included in solution DGF05P01S
- Solution DGF05P01S still processed with BPE version 4.2
---> backward solutions with BPE version 5.0
- Installation of Sub-Analysis Centres
(Mexico, Colombia, Brasilia, Argentina, Chile, etc.)
- New demand from IGS: transition from relative to absolute phase centre variations
- The fixed weekly coordinate solutions are available at the DGFI server at `pub/gps/DFI` and `pub/gps/DGF/2005_V4.2/` respectively
- The new solution DGF05P01S and new time series will be available soon at the DGFI server `pub/gps/DGF/`