

# IDS contribution to global monitoring of planet Earth

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- Earth and space colocations
- Current performance

Acknowledgements to:

Z. Altamimi, J.-P. Berthias, J.-F. Crétaux, P. Exertier,  
R. Ferland, F. Lemoine, J.-M. Lemoine, J. Ries,  
L. Soudarin , J.-J. Valette, P. Willis, P. Yaya

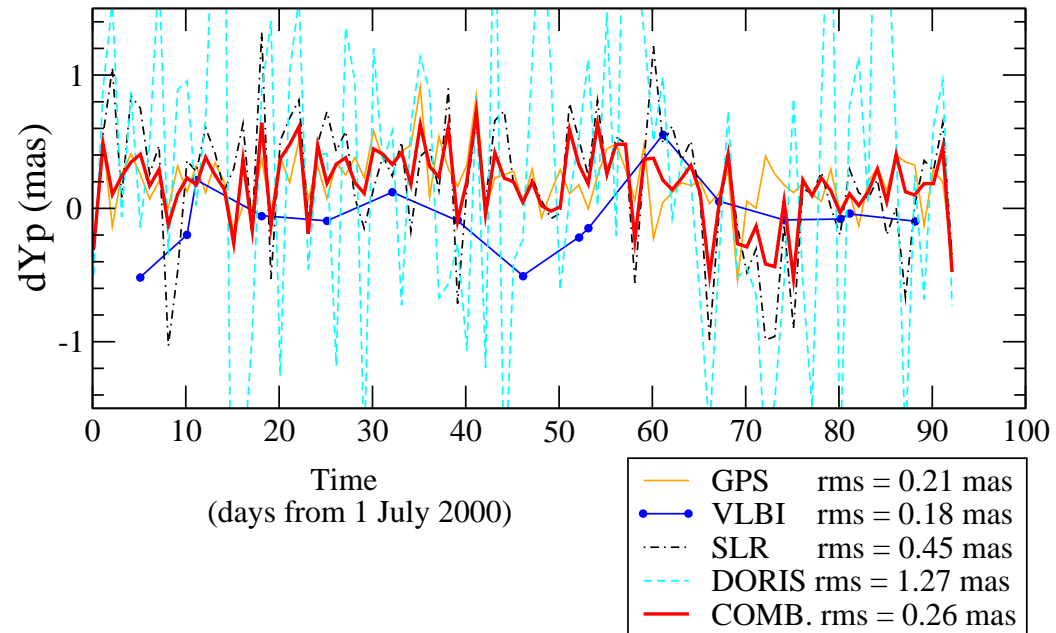
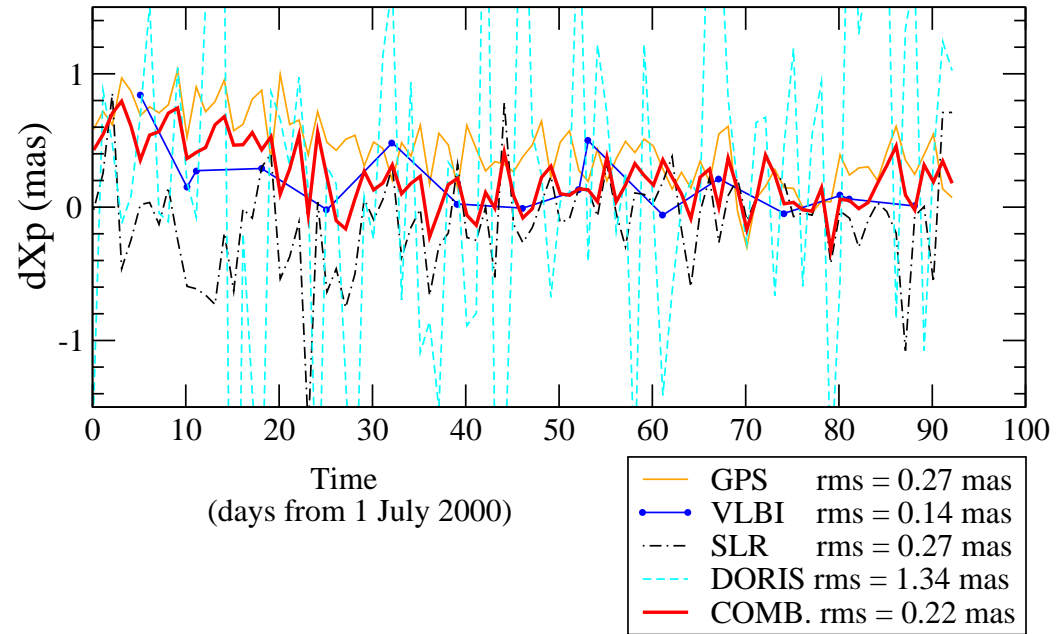
# The DORIS-equipped fleet

## Orbital colocations

- (Image taken from the IDS web site)
- **Doris - SLR - GPS:**  
*Topex/Poseidon*
- **Doris - SLR - GPS:**  
*Jason 1*
- **Doris - SLR:**  
*Envisat*

# Polar motion

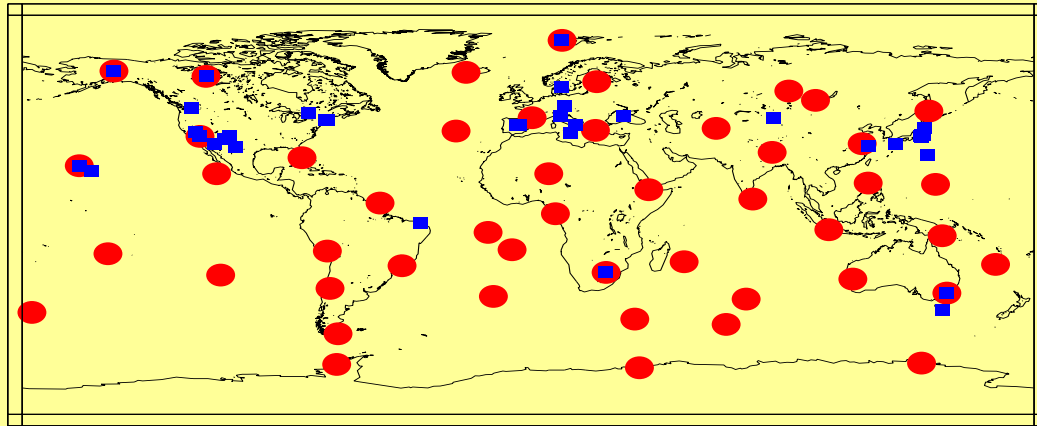
## RESULT OF THE COMBINATION (24h concatenation from 6h resolution)



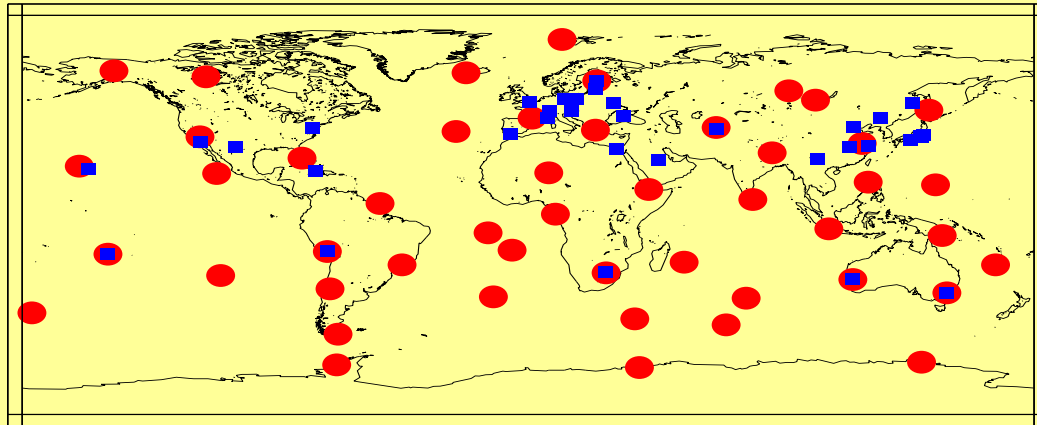
- source: Philippe Yaya, Obs. Paris - GRGS

# The DORIS terrestrial network and the ITRF

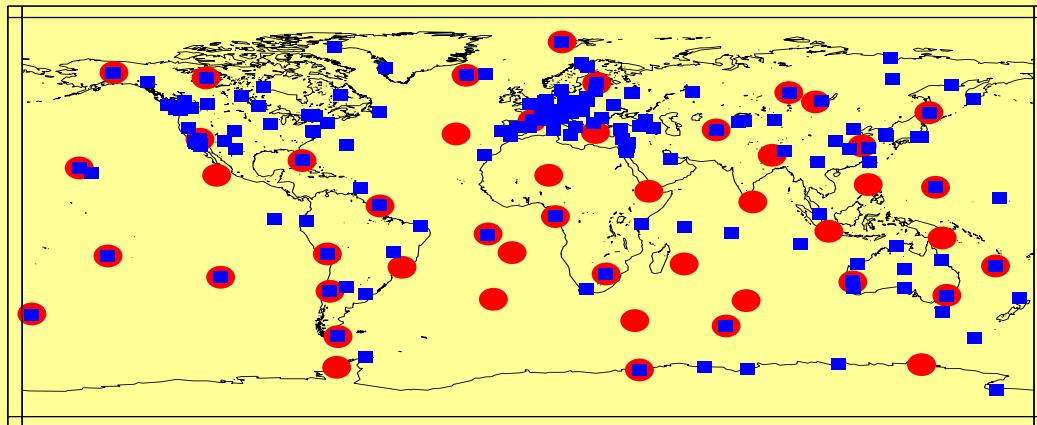
DORIS-VLBI Collocations



DORIS-SLR Collocations



DORIS-GPS Collocations



source:  
Zuheir Altamimi, IGN

# Geometry of ITRF colocations

## Helmert transformation: correlation coefficients of Translations (Tx,Ty,Tz) with Scale and Rotations (Rx,Ry,Rz)

### VLBI & other 3 tech. (41 sites)

	Scale	Rx	Ry	Rz
Tx	.03	-.07	-.52	-.32
Ty	.30	.56	.04	.08
Tz	-.45	.39	-.01	.03

### SLR & other 3 tech. (37 sites)

	Scale	Rx	Ry	Rz
Tx	-.24	-.13	-.52	-.28
Ty	.18	.44	.05	-.24
Tz	-.39	.28	.37	.08

### GPS & other 3 tech. (63 sites)

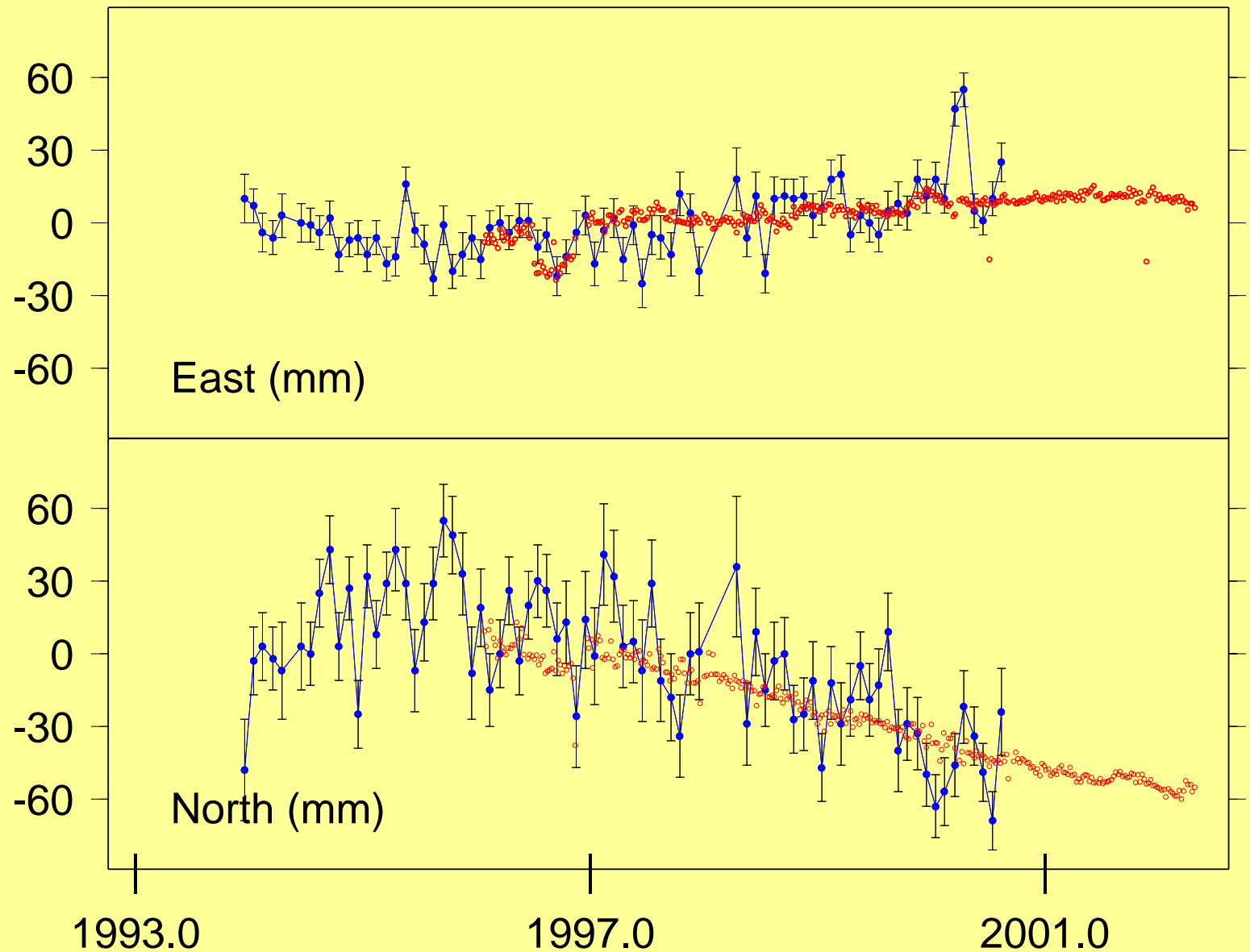
	Scale	Rx	Ry	Rz
Tx	-.10	-.04	-.31	-.11
Ty	.10	.32	.03	-.09
Tz	-.27	.14	.13	.01

### DORIS & other 3 tech. (24 sites)

	Scale	Rx	Ry	Rz
Tx	-.06	-.01	.04	-.09
Ty	.07	-.05	.00	-.08
Tz	.03	.08	.08	.01

# Horizontal motion: GUAM

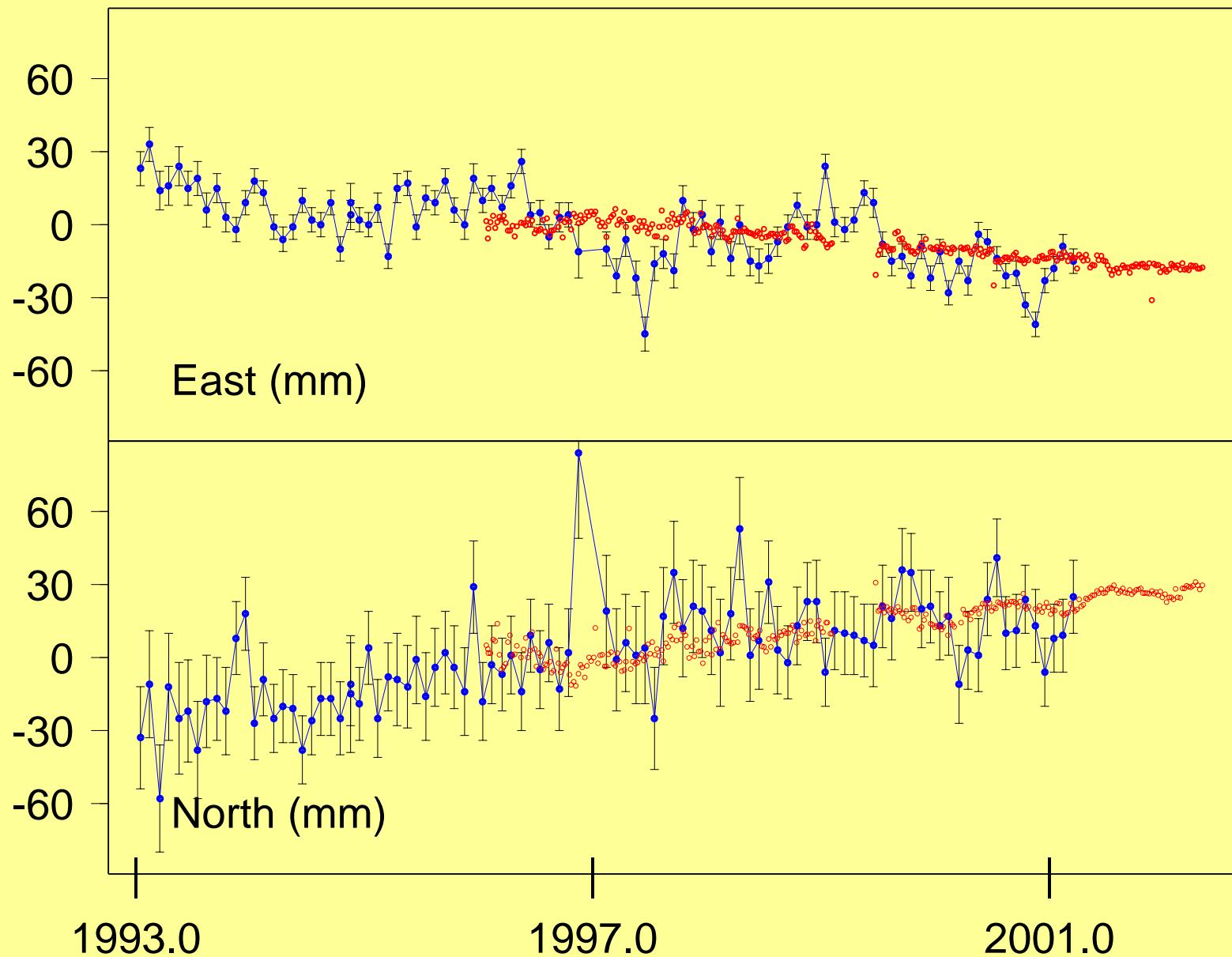
GUAM: DORIS (blue with error bars) and GPS (red) coordinates



Sources:  
LEGOS-CLS (DORIS)  
IGS/R. Ferland (GPS)

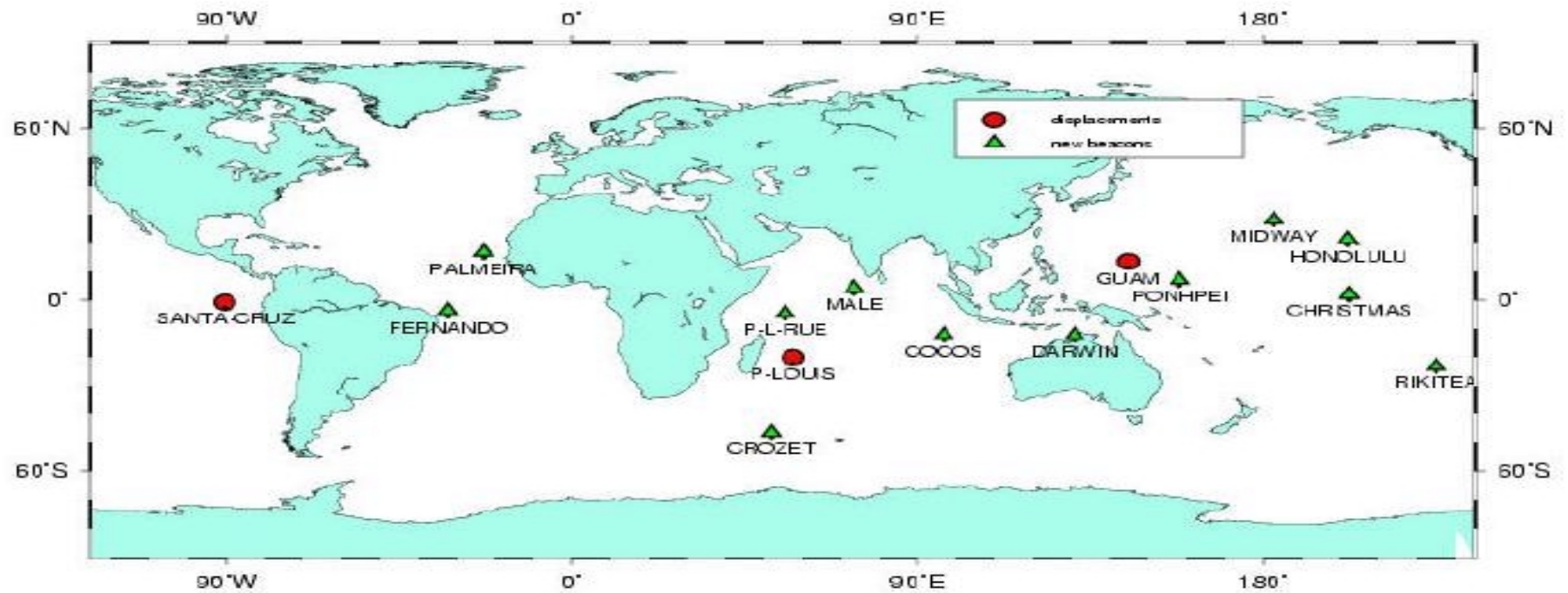
# Horizontal motion: KERGUELEN

KERG: DORIS (blue with error bars) and GPS (red) coordinates



Sources:  
LEGOS-CLS (DORIS)  
IGS/R. Ferland (GPS)

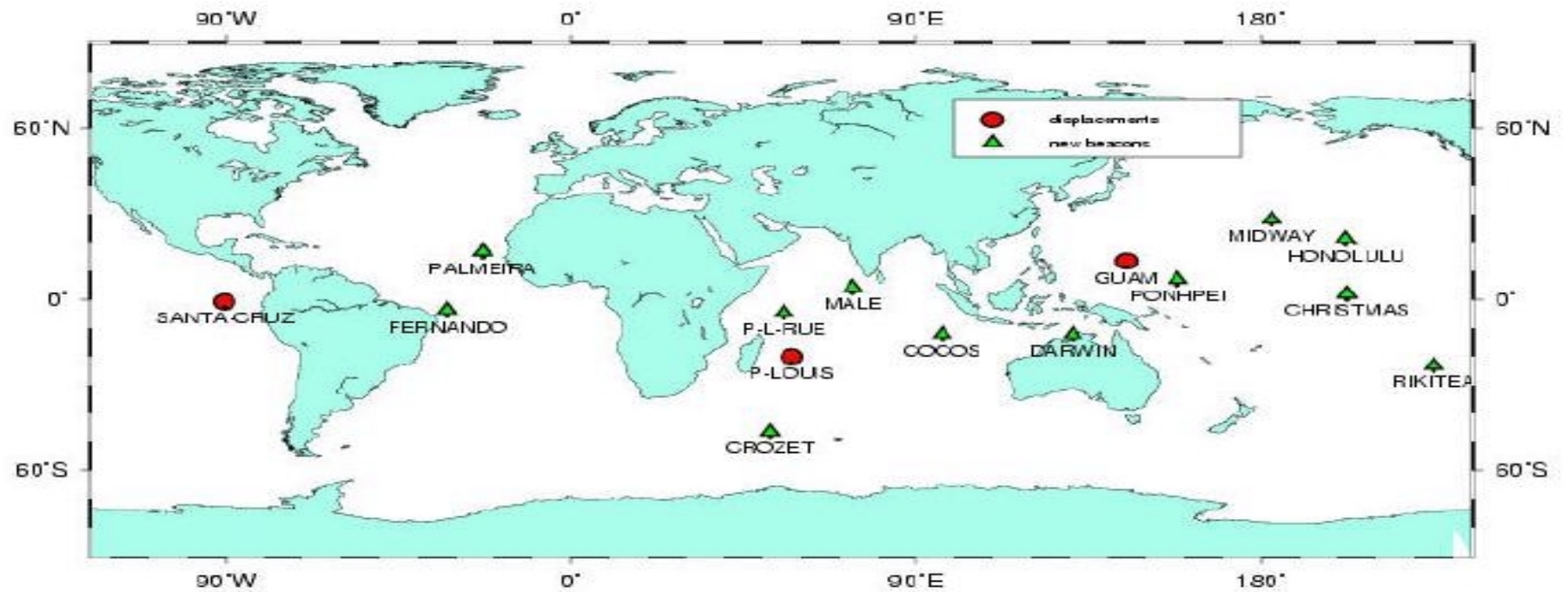
# DORIS and tide gauges



DORIS network densification



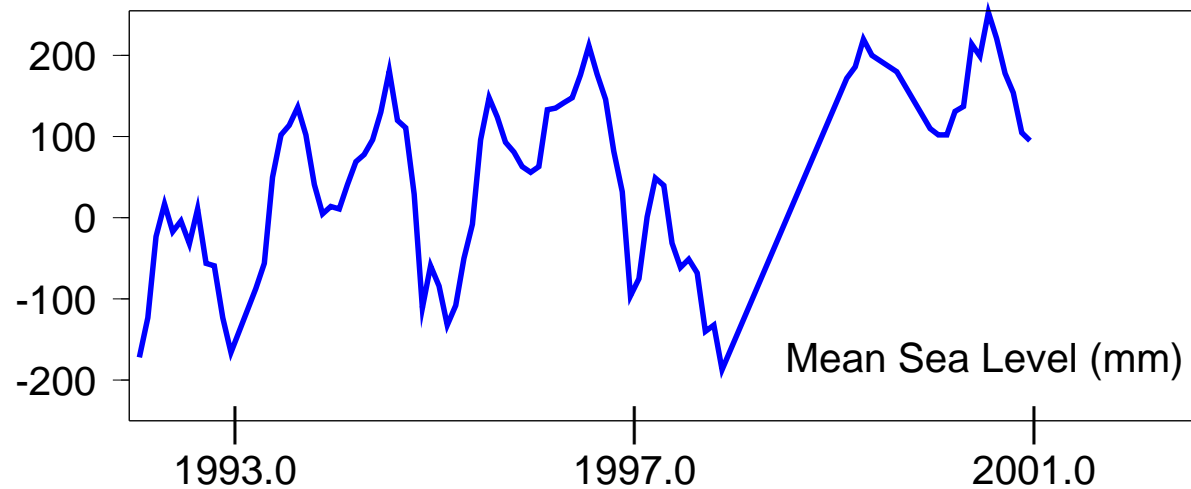
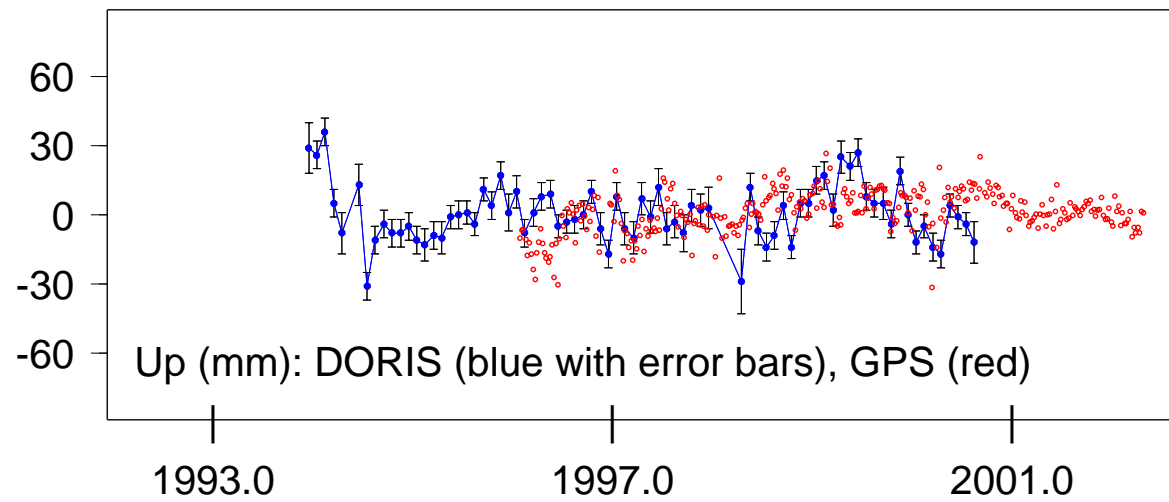
# DORIS and tide gauges



DORIS network densification

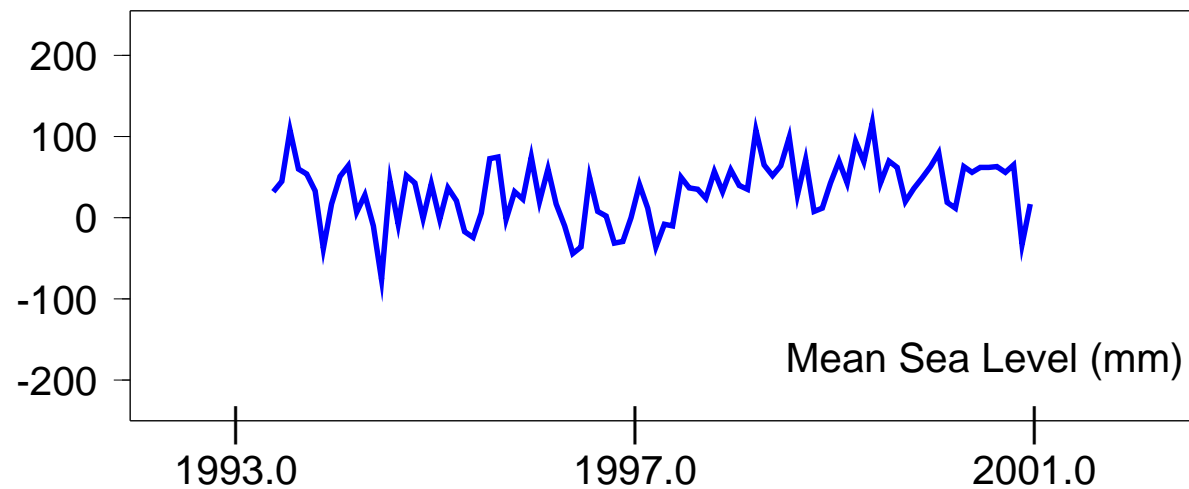
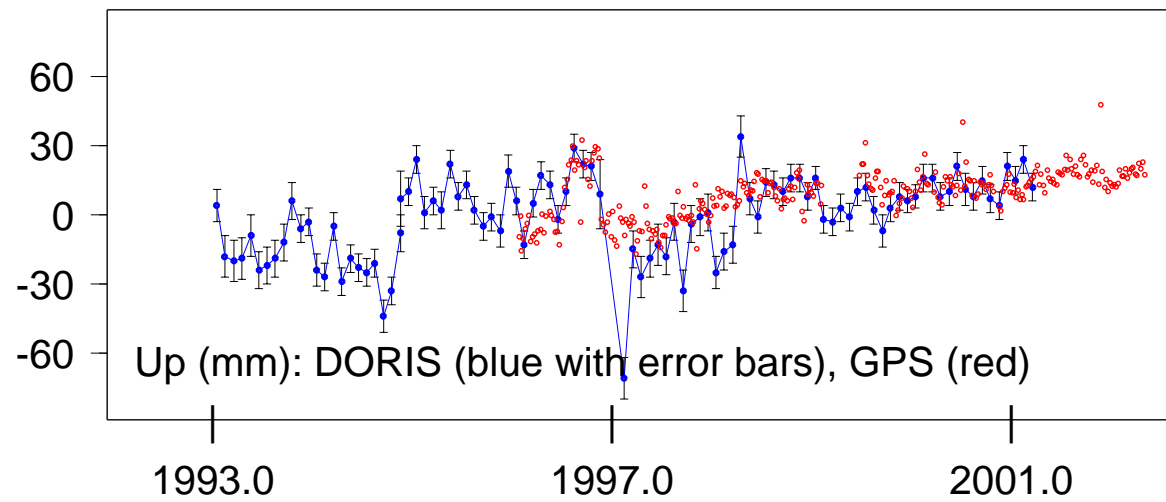
# Vertical motion and mean sea level change

GUAM: Vertical land motion and Mean Sea Level (PSMSL)



# Vertical motion and mean sea level change

KERG: Vertical land motion and Mean Sea Level (PSMSL)



# **New colocation and altimeter calibration sites**

- **VLBI, SLR, GPS (TIGO):  
Concepcion, Chile**
- **Altimeter calibration sites:**
  - **Burnie, Tasmania**
  - **Gavdos, Greece**
  - **Grasse-Corsica, France**

# The Grasse - Corsica multitechnique CALVAL complex

- Objectives

- Long term monitoring of space altimeter calibration: Topex/Poseidon, Jason 1, ...

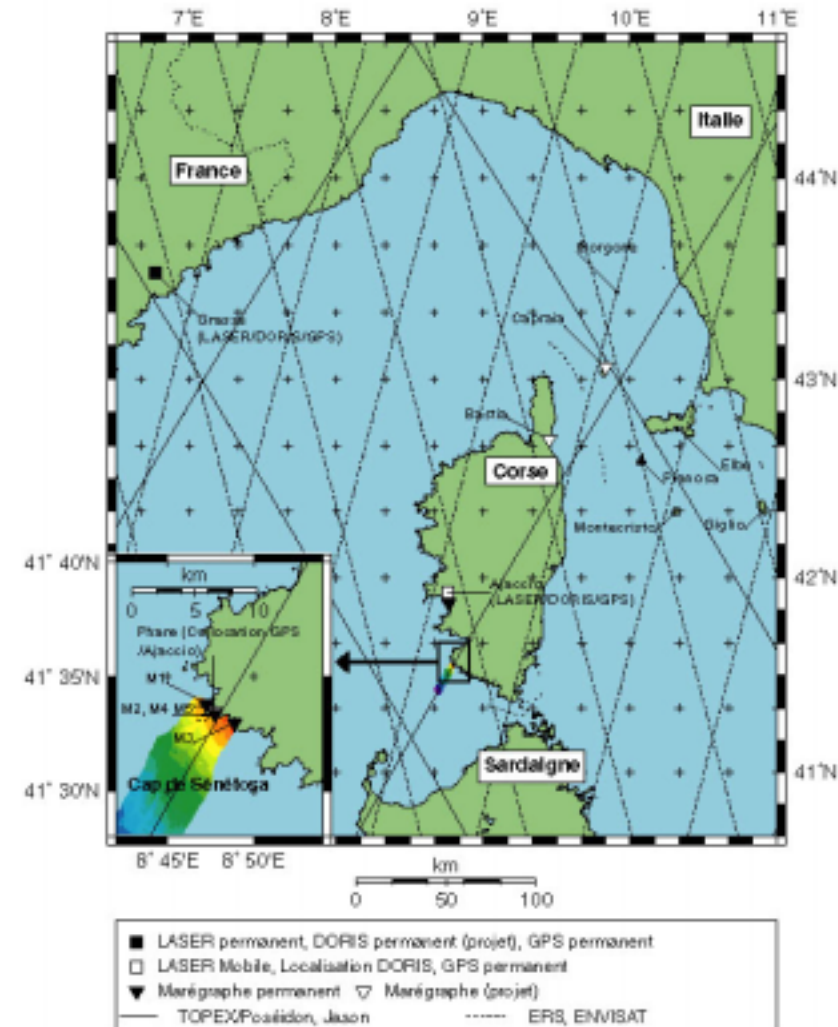
- Multi-technique DORIS-GPS-SLR orbital collocation

- Grasse ITRF collocated site
- French transportable laser station (300 kg, 5 mm ranging precision)



- DORIS beacon
- Three sea-bottom tide gauges
- GPS buoys
- GPS-positioned reference point

• source: OCA/CERGA

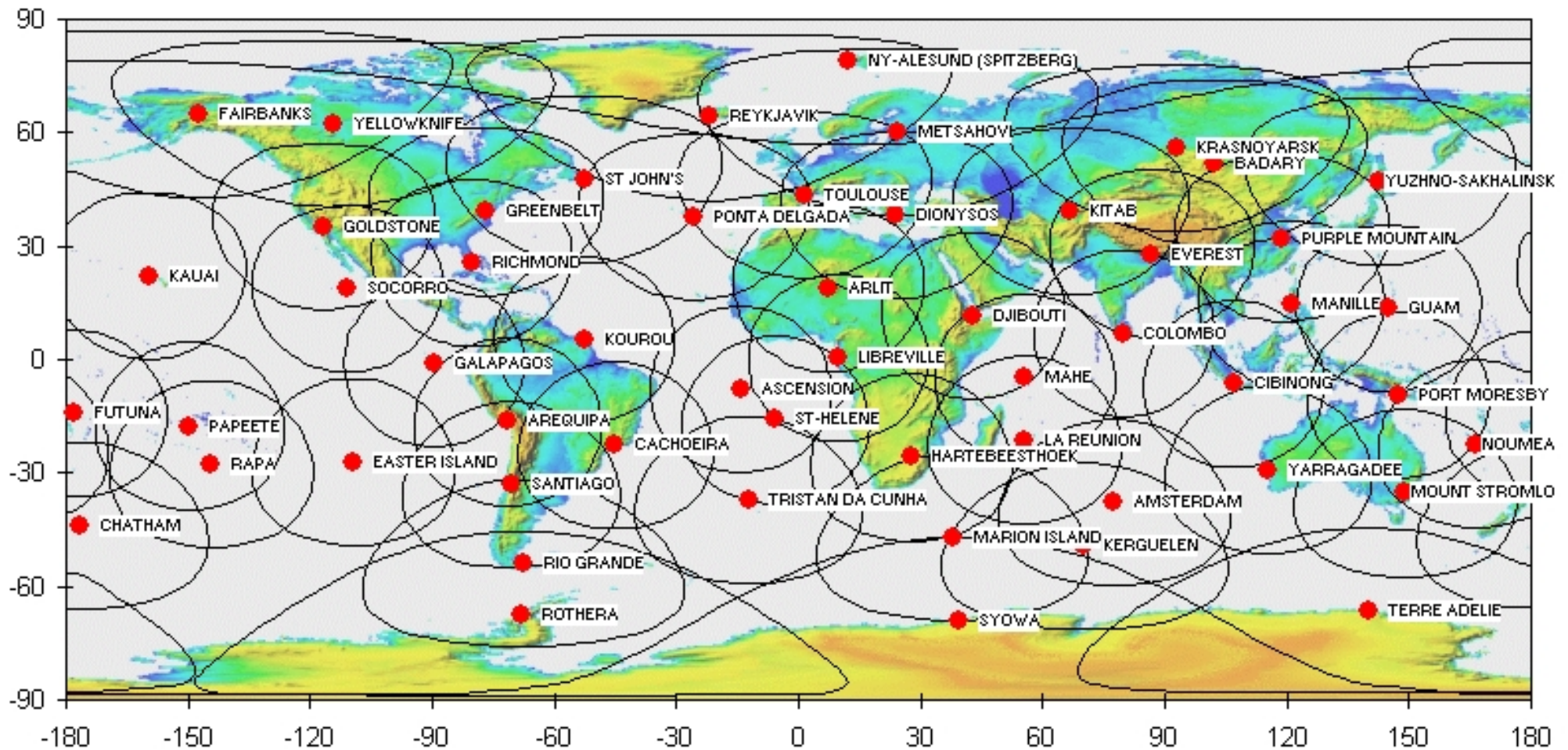




# DORIS and

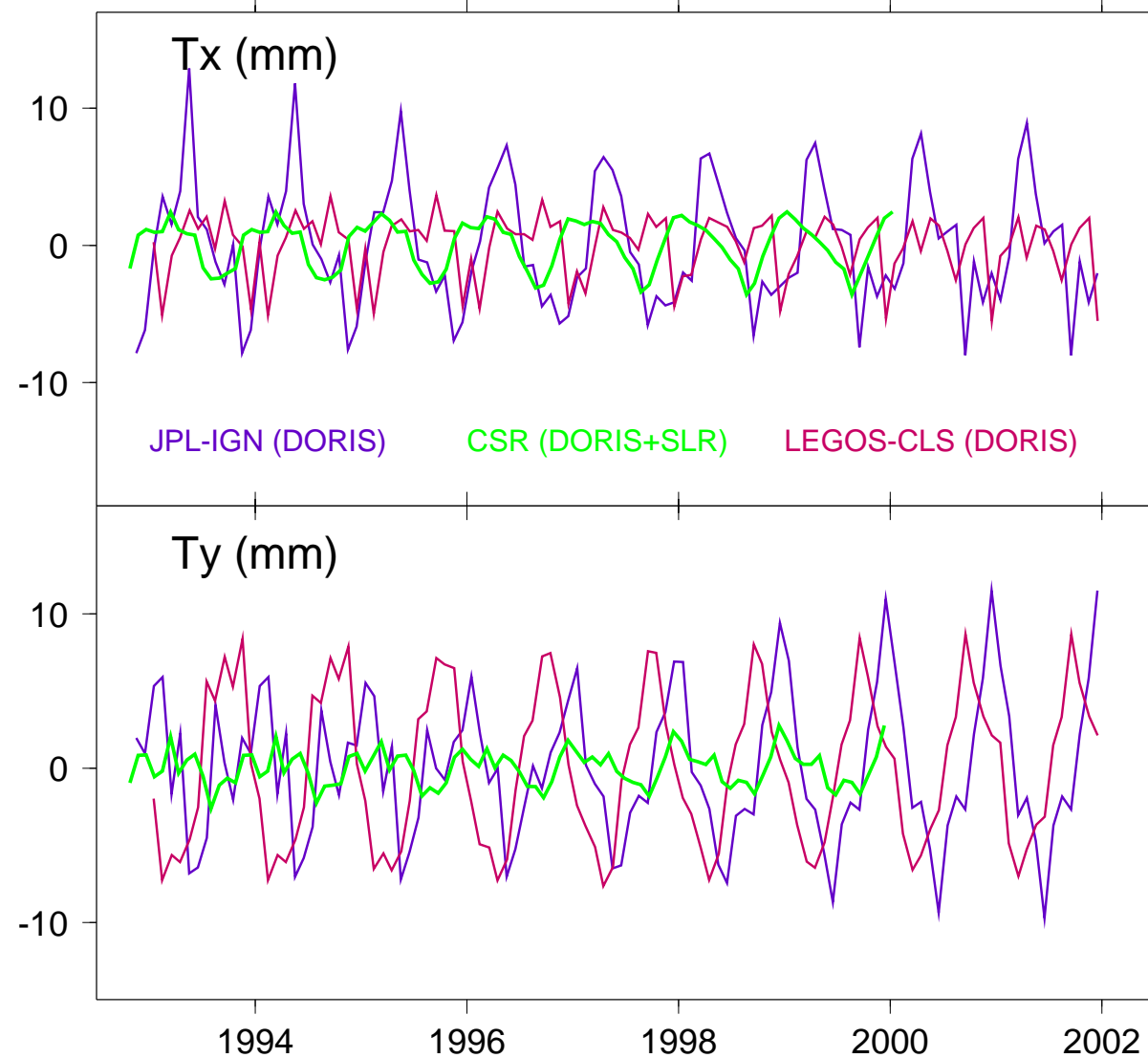
- gravimeters
- superconducting gravimeters

Visibility JASON/DORIS  
Altitude 1343 km Elevation 15°



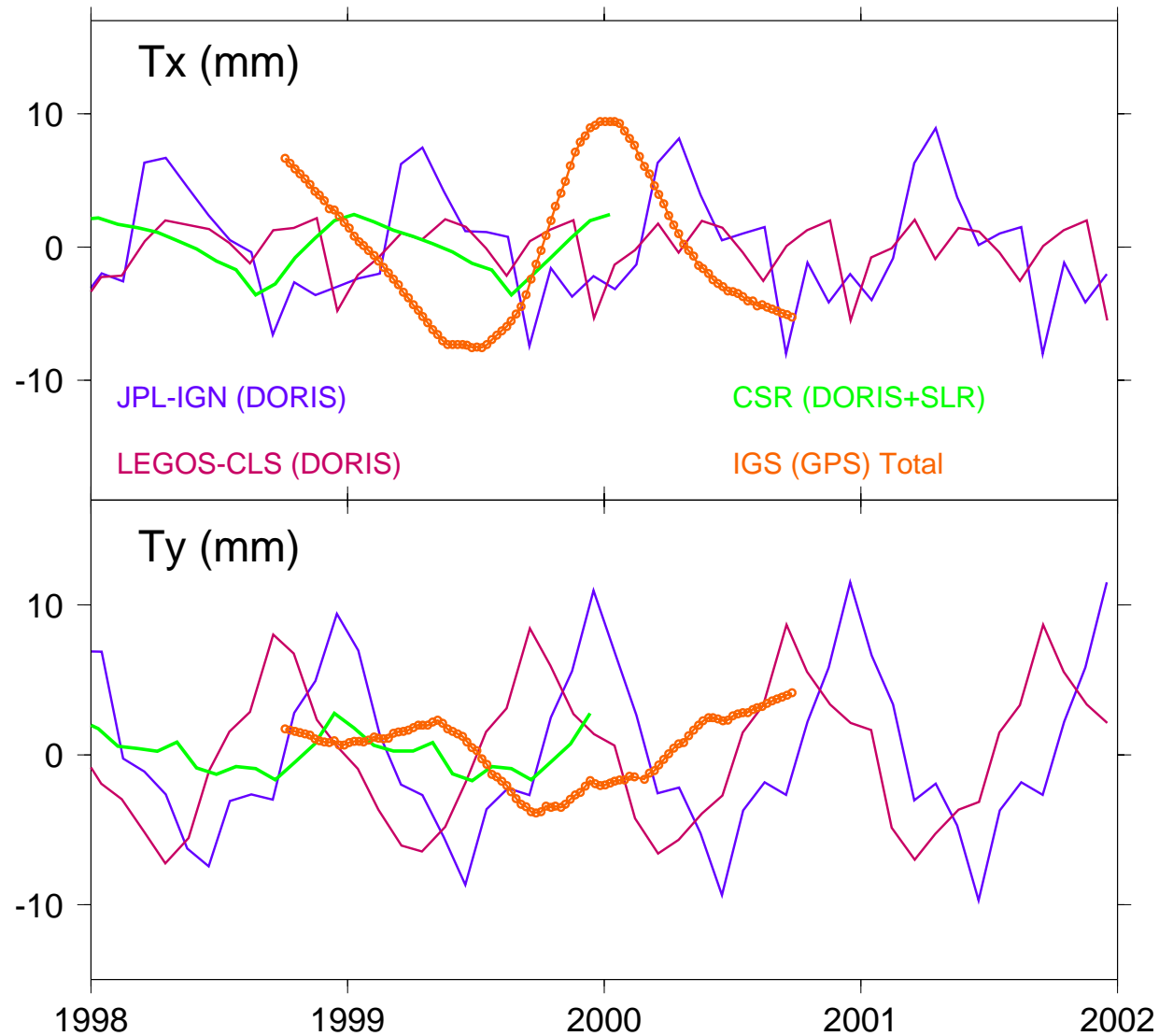
# Geocenter: DORIS, SLR

Annual oscillation of equatorial components



# Geocenter: DORIS, SLR, GPS

Annual oscillation of equatorial components





# What more should we expect from an International DORIS Service?

- **Enhanced international coordination**  
Analysis Coordination: <http://lareg.ensg.ign.fr/IDS>
  - **More analysis centers**
  - **Stronger participation in IERS and IGGOS**
- => better DORIS products**
- ... using permanently improved  
DORIS technology and operation