CNES/CLS AC STATUS

Hugues Capdeville, Jean-Michel Lemoine,
Laurent Soudarin, Adrien Mezerette
CNES/CLS AC (GRG)

IDS AWG meeting, Greenbelt 15-16 October 2015

Status of the routine DORIS data processing

Processing context

- **We analyzed DORIS2.2 data with 3.5-day arcs and a cut-off angle of 12°**

ITRF2014 configuration
From January 2015 to June 2015
Satellites: SPOT5, JASON-2, CRYOSAT2, HY-2A, SARAL

DORIS data processing results

- **DORIS and SLR RMS of fit of the orbit determination**
- **OPR Acceleration Amplitude: Along-track and Cross-track / Radiation pressure coefficient**

| SATELLITE	RMS DORIS / SLR (mm/s) / (cm)	OPR amplitude average (10^{-9} m/s^2)		Solar radiation coefficient
		Along-track	Cross-track	
SPOT-5	0.35	2.6	1.5	1.05
JASON-2	0.32 / 1.1	2.6	1.6	0.97
CRYOSAT-2	0.35 / 1.2	3.3	2.4	1.0
HY-2A	0.34 / 1.3	0.5	1.7	0.86
SARAL	0.35 / 1.2	1.6	1.4	1.0

Status of the routine DORIS data processing

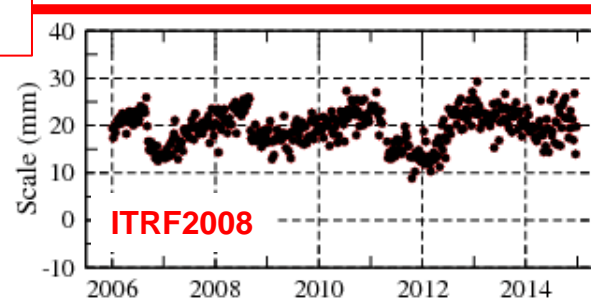## Positioning results by single satellite solution

• **SPOT-5 Single satellite Solution compared to ITRF2014P computed by CATREF**

Helmert parameters:

- scale and Geocenter
- number of stations in SINEX file
- number of stations used for CATREF processing
- WRMS of fit obtained by least-square adjustment of CATREF
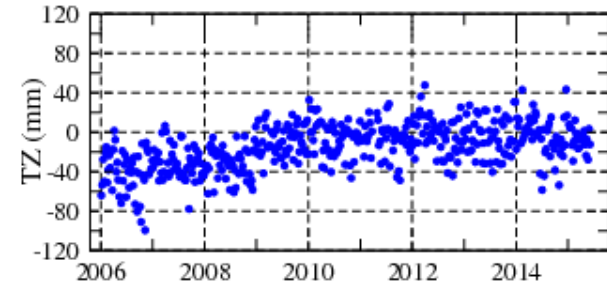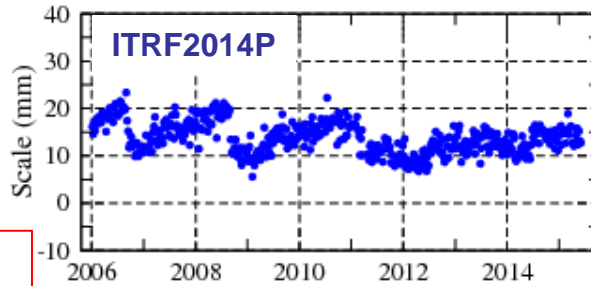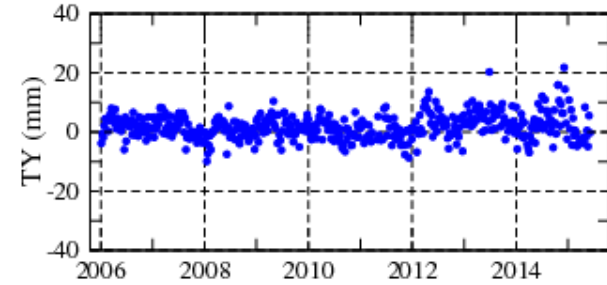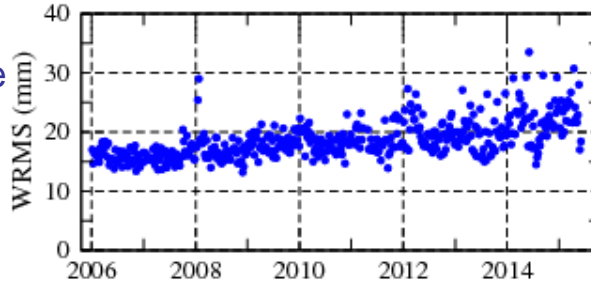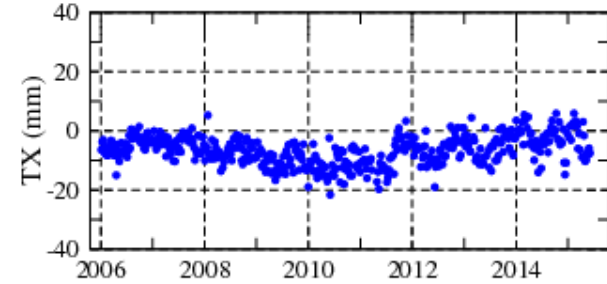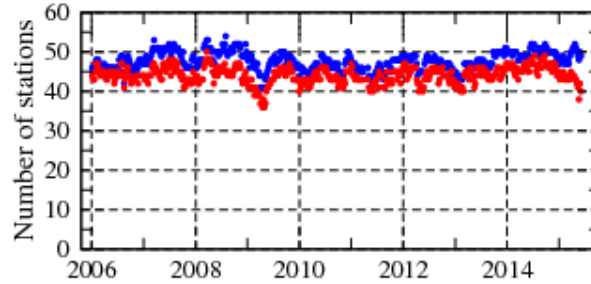
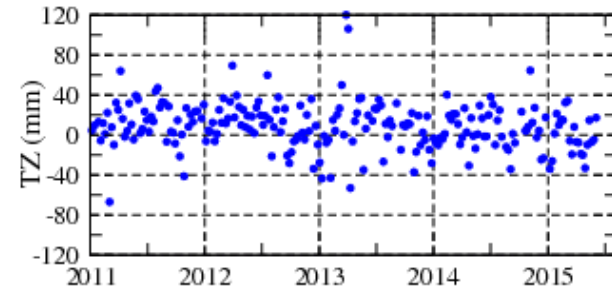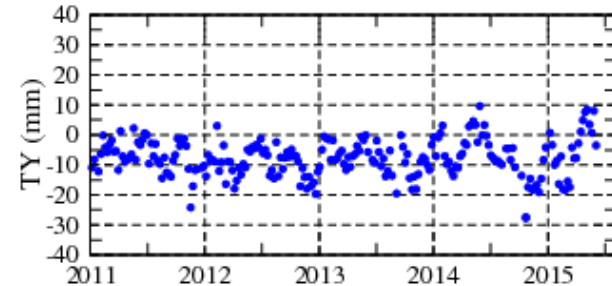**After 2012, the scale is smoother when we compare to ITRF2014P**

ITRF2014P

ITRF2008
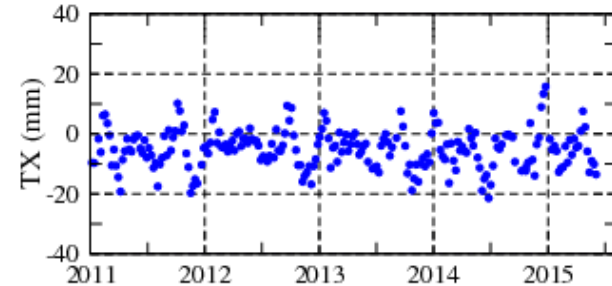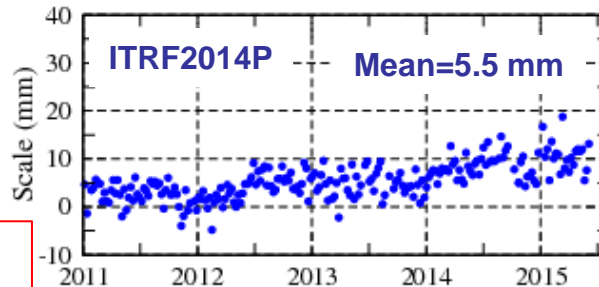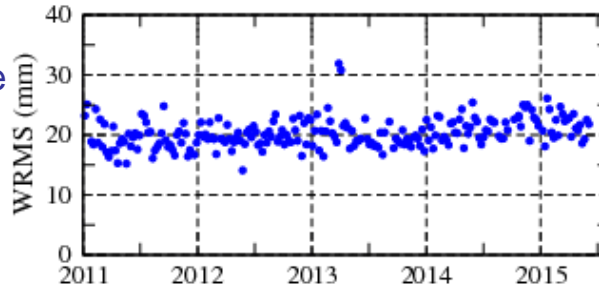
Comparison to ITRF2008
- Scale

Status of the routine DORIS data processing

Positioning results by single satellite solution

- JASON-2 Single satellite Solution compared to ITRF2014P computed by CATREF

Helmert parameters:

- scale and Geocenter
- number of stations in SINEX file
- number of stations used for CATREF processing
- WRMS of fit obtained by least-square adjustment of CATREF

The scale jump in 2012 is not so obvious when we compare to ITRF2014P

ITRF2014P   Mean=5.5 mm

Mean=12.8 mm   ITRF2008

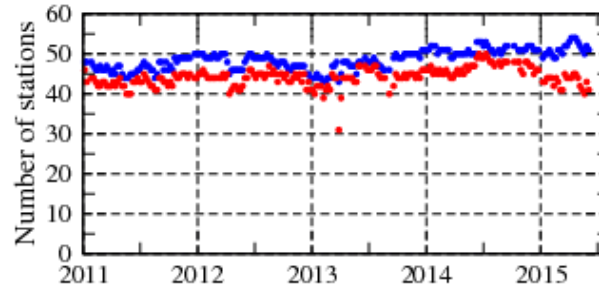**Comparison to ITRF2008**
- Scale

Status of the routine DORIS data processing
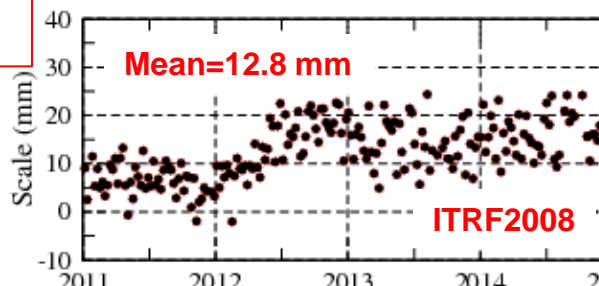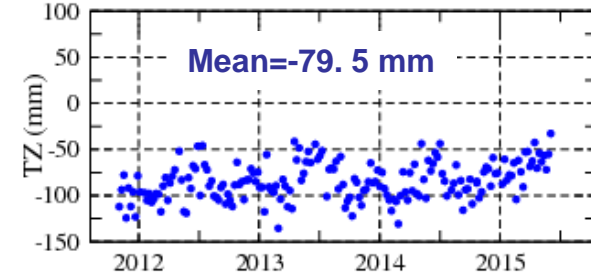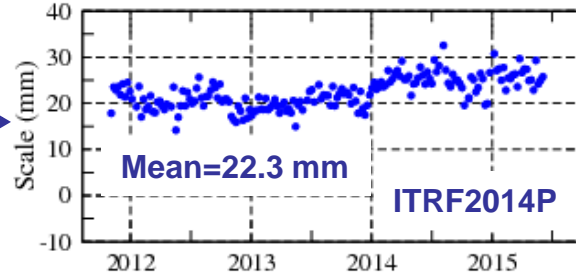
Positioning results by single satellite solution
• HY-2A Single satellite Solution compared to ITRF2014P computed by CATREF

Helmert parameters:
- scale and Geocenter
- number of stations in SINEX file
- number of stations used for CATREF processing
- WRMS of fit obtained by least-square adjustment of CATREF

The scale is less lower when we compare to ITRF2014P
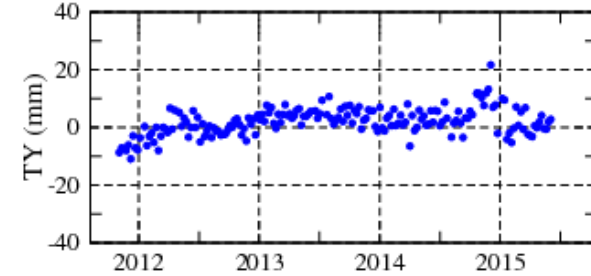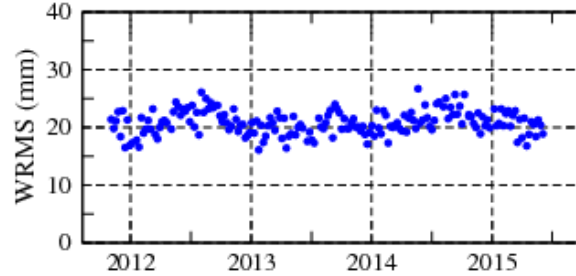
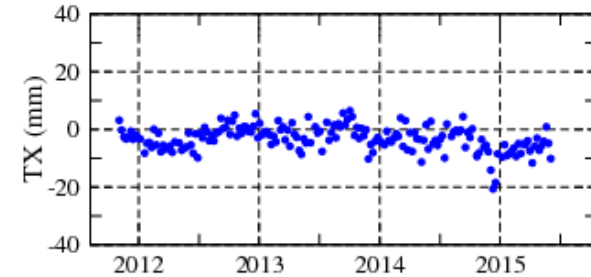**Comparison to ITRF2008:**
- Scale and Geocenter

Status of the routine DORIS data processing

Positioning results by single satellite solution
• **SARAL Single satellite Solution compared to ITRF2014P computed by CATREF**

Helmert parameters:

- scale and Geocenter
- number of stations in SINEX file
- number of stations used for CATREF processing
- WRMS of fit obtained by least-square adjustment of CATREF
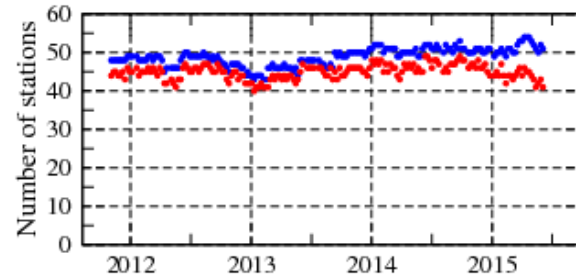
The scale is around 12 mm

Status of the routine DORIS data processing

Positioning results by single satellite solution
• CRYOSAT2 Single satellite Solution compared to ITRF2014P computed by CATREF
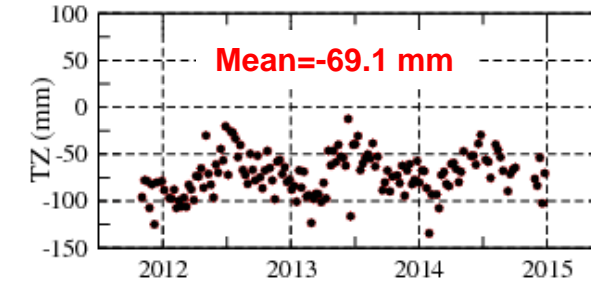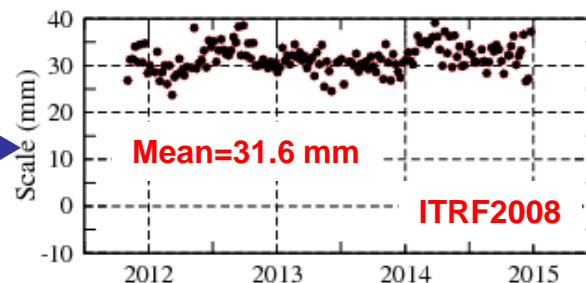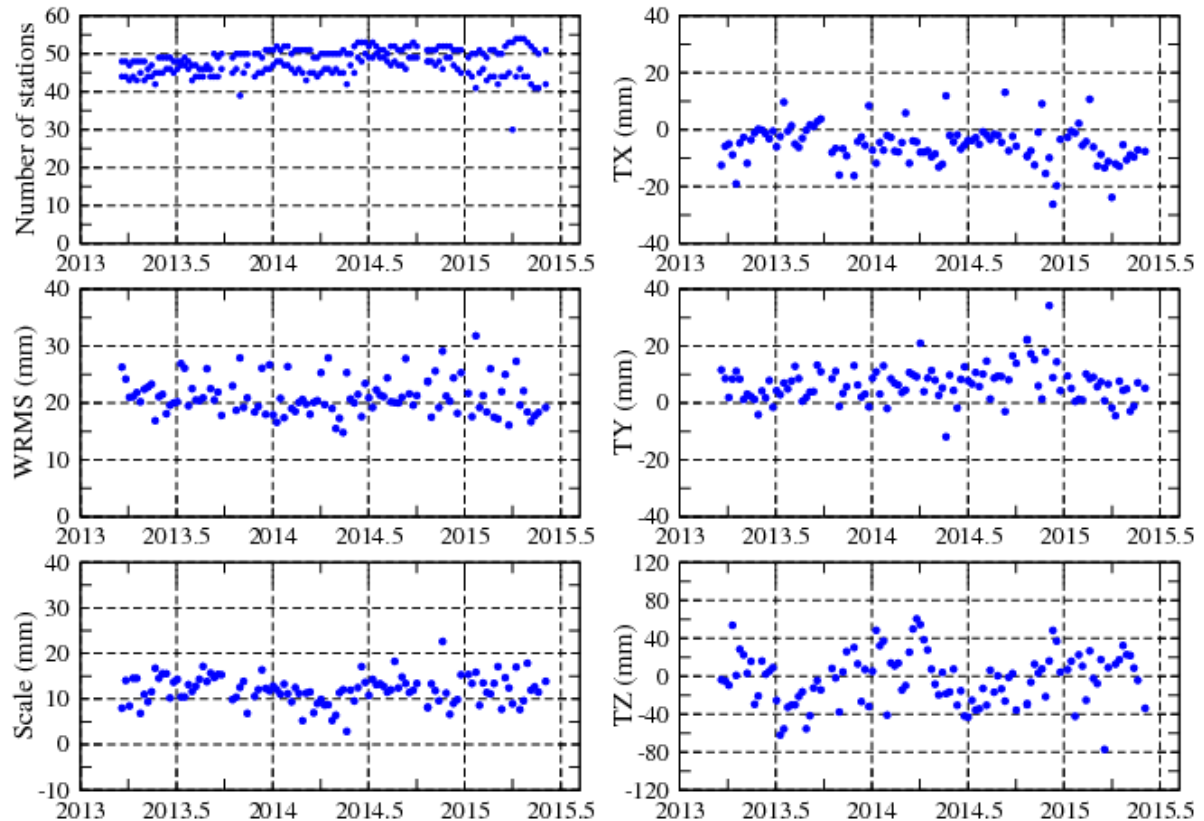
Helmert parameters:
- scale and Geocenter
- number of stations in SINEX file
- number of stations used for CATREF processing
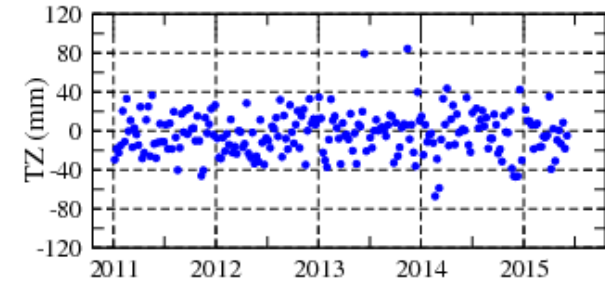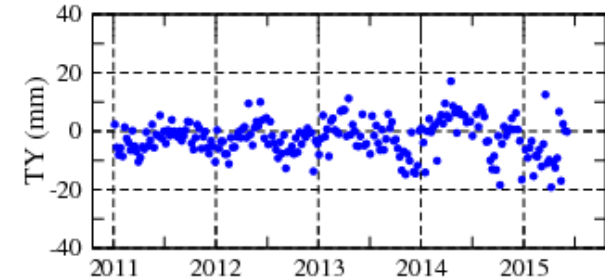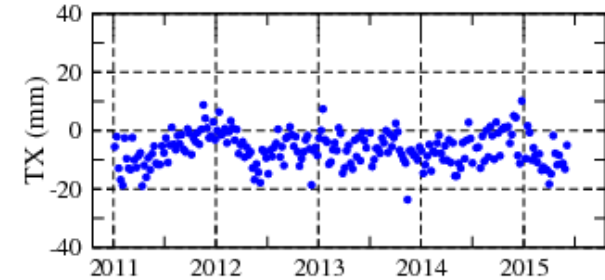- WRMS of fit obtained by least-square adjustment of CATREF

Scale jump in 2012

ITRF2014P   Mean=9.4 mm

ITRF2008   Mean=17.2 mm
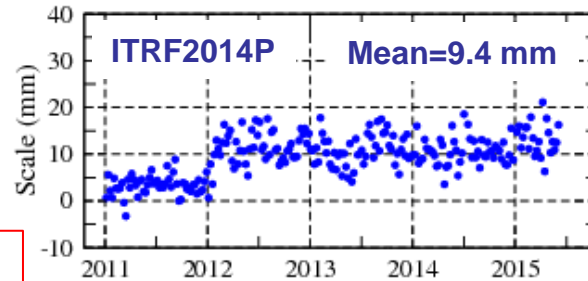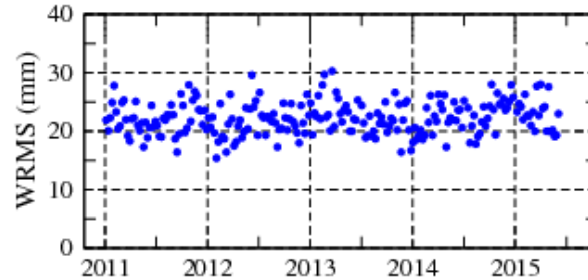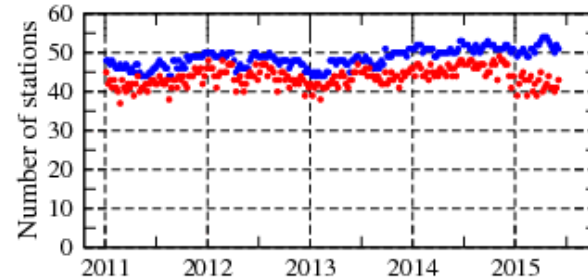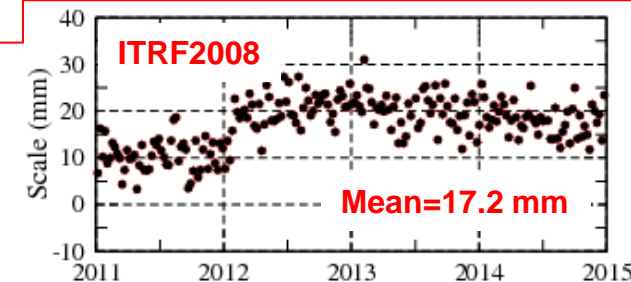
Comparison to ITRF2008
- Scale

CRYOSAT2 DORIS data processing

Processing context
We analyzed DORIS2.2 data with 3.5-day arcs and a cut-off angle of 12°
We use the ITRF2014 configuration
From January 2014 to June 2015
-with nominal attitude law
-with attitude quaternion from E. Schrama (including the 6°pitch in GINS software)

DORIS data processing results
•**Orbit results**
- DORIS and SLR RMS of fit of the orbit determination
- Comparison of the orbit obtained from the two sets

•**Positioning results:**
Single satellite solution compared to ITRF2014P computed by CATREF
Helmert parameters: Scale and Geocenter, WRMS

CRYOSAT2 DORIS data processing

Orbit results
- DORIS and SLR RMS of fit of the orbit determination
- Orbit differences RMS3D

Attitude	RMS DORIS / SLR (mm/s) / (cm)	OPR amplitude average (10^{-9} m/s^2)		Orbit differences RMS3D
		Along-track	Cross-track	
Nominal	0.352 / 1.25	3.2	2.4	< 1mm
Quaternion	0.356 / 1.26	3.3	2.3	

Positioning results by single satellite solution
• CRYOSAT2 Single satellite Solution compared to ITRF2014P computed by CATREF

Helmert parameters	Single Cryosat-2	
	Nominal	Quaternion
TX (mm)	-6.1 ± 6.4	-6.5 ± 6.3
TY (mm)	-1.9 ± 6.6	-2.2 ± 6.5
TZ (mm)	-2.0 ± 22.4	-3.2 ± 21.2
Scale (mm)	11.6 ± 3.3	12.4 ± 3.6
WRMS (mm)	21.9	22.0

Positioning results by single satellite solution
• **CRYOSAT2 Single satellite Solution compared to ITRF2014P computed by CATREF**

in blue with nominal attiude and **in red with quaternions attitude**

Helmert parameters:

- scale and Geocenter
- number of stations in SINEX file
- number of stations used for CATREF processing
- WRMS of fit obtained by least-square adjustment of CATREF

IDS AWG 10/2015