EPN antenna models

- Epn_05.atx = indiv. calibr. + igs05.atx
 - Used in EPN repro
- Epn_08.atx = indiv. calibr. + igs08.atx
 - Used in EPN analysis from GPSWK 1632(April 2011)

Questions:

- Position error on IGS08 stations, if EPN uses indiv. calib. instead of type calib?
- Size of biases caused by switch from igs05.atx to igs08.atx?
 - Need to apply correction on repro1 results?
 - Which correction?
 - How to apply it?

Individual antenna calibrations

- LEICATR25.R3: Individual calibration from
 - GEO++
 - University of Bonn
 - (both recognized by IGS)

Differences?

Effect on position (only GPS observations)?

Individual antenna calibrations



Individual – type 05 horizontal



Individual – type 08 horizontal



Individual - type 05 Vertical



Individual - type 08 Vertical



Individual antenna calibrations

- Differences between indiv. calibrations from different sources: North : 0.2 mm East: -0.7 mm Up: 4.0 mm
- Indiv. Type 05



Indiv. – Type 08



Individual – type 08 Only for IGS08 stations in EPN

STAT	ANT#	ANT./RADOME TYPE		North [mm]	East [mm]	Up [mm]
ANKR	06	TPSCR3_GGD	CONE	0.383	0.960	3.079
BUCU	03	LEIAT504GG	LEIS	1.703	-1.453	-0.343
HOFN	05	TPSCR3_GGD	CONE	0.359	-1.017	-1.392
NICO	03	LEIAT504GG	LEIS	-1.379	1.133	0.913
SOFI	04	LEIAR25.R3	LEIT	-2.146	1.929	-9.624
WTZR	03	LEIAR25	LEIT	0.447	4.354	2.619
WTZR	04	LEIAR25.R3	LEIT	0.555	-0.316	3.858

If possible, do not use the stations with indiv. calib. as IGS08 reference stations

Comparison of position using epn_05 and epn_08 antenna models

Horizontal component



Comparison of position using epn_05 and epn_08 antenna models

Vertical component





Comparison of position using

epn_05 and epn_08 antenna models

Latitude-dependent model to take in to account the switch from igs05.atx to igs08.atx

Rebischung (IGN, France)

$$dx = a + b\varphi + c_2 \cos(2\varphi) + s_2 \sin(2\varphi) + c_4 \cos(4\varphi) + s_4 \sin(4\varphi)$$

dx (*North, East, Up*) *Coefficients depend on antenna/radome type*

Comparison of position using epn_05 and epn_08 antenna models : difference between computed biases and IGS model



Horizontal component

Comparison of position using epn_05 and epn_08 antenna models : difference between computed biases and IGS model



Vertical component

Comparison of position using epn_05 and epn_08 antenna models

5 stations with Antenna+Radome not present in igs05.atx but present in igs08.atx

Code	Soln	Antenna	Radome	Bias north (mm)	Bias east (mm)	Bias up (mm)
HFLK	04	ASH701945C_M	OLGA	2.596	5.047	6.030
QAQ1*	01	ASH701941.B	SCIS	2.472	1.794	18.464
QAQ1*	03	ASH701941.B	SCIS	2.463	1.753	18.632
SBGZ	04	ASH701945C_M	OLGA	2.531	4.897	5.608
SCOR*	01	ASH701941.B	SCIS	2.110	1.858	10.871

*For IGS stations

still 63 EPN stations without Antenna+Radome in igs08.atx (NONE radome used instead in analysis)

Conclusion

- Evaluation of individual calibrations. Carefull with
 - individual calibrations! 4mm diff in up-component
 - IGS08 reference stations that have individual calibrations
- Full analysis of all historal EPN Data:
 - Position jumps caused by switch igs05.atx to igs08.atx can be well-modelled by Rebishung model (exceptions are known)
 - But GPS only! No idea how these values change when including GLONASS observations
- Remaining question is how to use the information on position jumps to generate homogeneous cumulative solution for the EPN consistent with epn_08.atx

Options ?

- Cumulative solution:
 - Provide ITRF2008 coordinates or IGS08 coordinates?
 - If to be used for densifications, then IGS08 (compatible with igs08.atx/epn_08.atx)



Option 1



Resulting coordinates: Aligned with IGS08, but part 1 will have positions computed with old antenna calib.

Correct part 1 with epn_05.atx \rightarrow epn_08.atx values?

Only recent part will be used for ETRS89 densifications

Option 2



Resulting coordinates: Aligned with IGS08

Quality epn_05.atx \rightarrow epn_08.atx values??