

MAINTENANCE OF THE ETRS89 COORDINATES AND VELOCITIES AT EPN SITES

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OUTLINE

- CUMULATIVE SOLUTIONS

ITRFyy; ITRFyy DENSIFICATION; EPN

- STATION CLASSES

WHY AND HOW?

- NEW EPN PRODUCT:

'CLASSED' EPN COORDINATE AND VELOCITY SOLUTIONS

CUMULATIVE SOLUTIONS

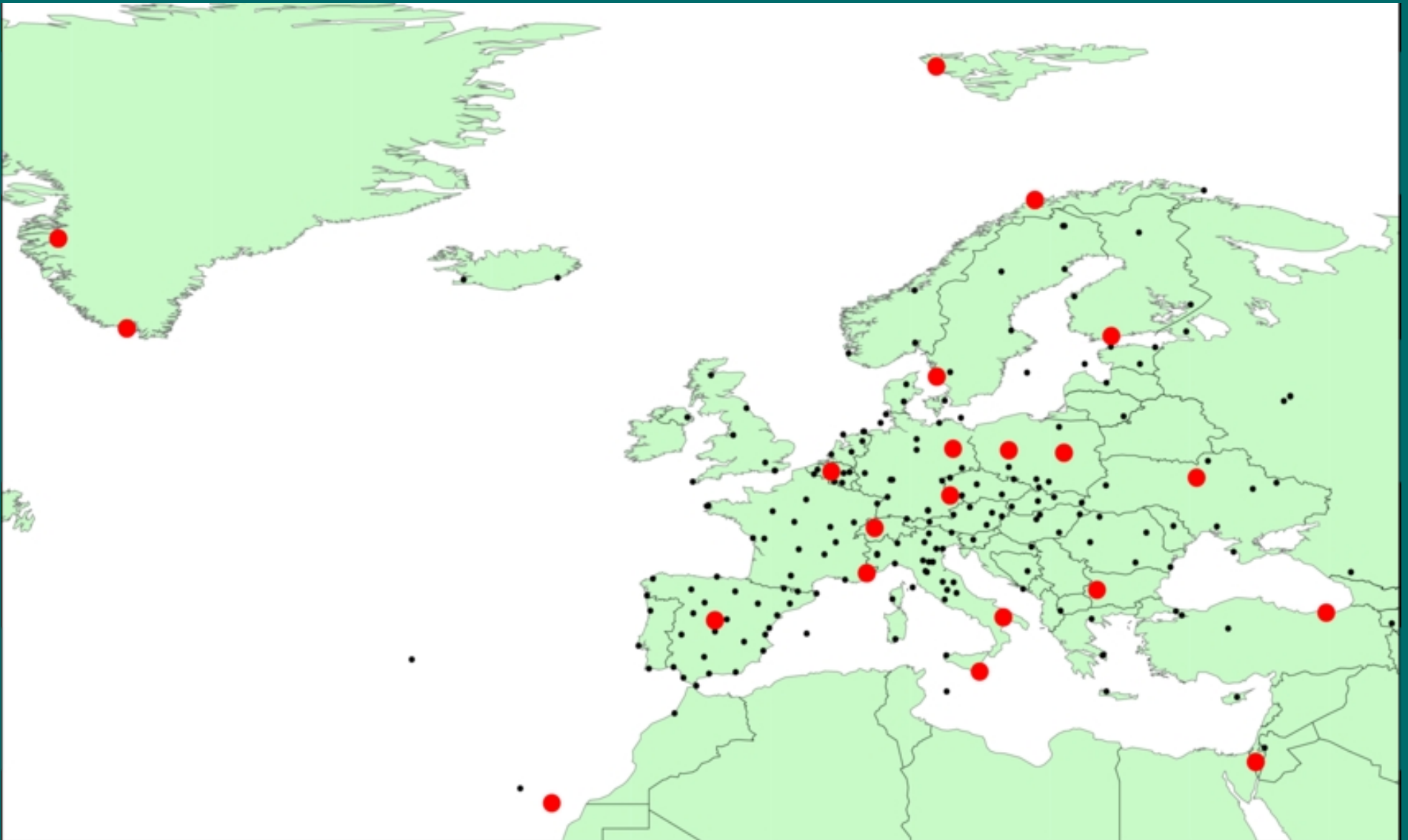
- STACKING OF LONG TERM SINEX SETS
(GLOBAL, REGIONAL, ...)
- PRODUCT: CUMULATIVE SNX AND SSC SOLUTIONS
 - ITRF2005 (ITRF2005_TRF.SNX)
 - ITRF2005 DENSIFICATION (EPN_**C1355**.SNX)
 - ITRF2008 

ITRF2005 DENSIFICATION

- **CREATED BY CATREF (A.K. - TIME SERIES PROJECT)**
 - MINIMUM CONSTRAINT APPROACH
 - DATUM: 22 ITRF2005 SITES 43 SOLUTIONS
 - ITRF/IGS DISCONTINUITY HARMONIZATION
 - INCLUDED EPN SINEXES: GPSweek 860 - 1355
- **RELEASED 12.2008(WK 1508) EUREFmail 4142**
- **AVAILABLE AT EPNCB WEBSITE**

ITRF2005 REFERENCE NETWORK

22 SITES, 43 SOLUTION NUMBERS



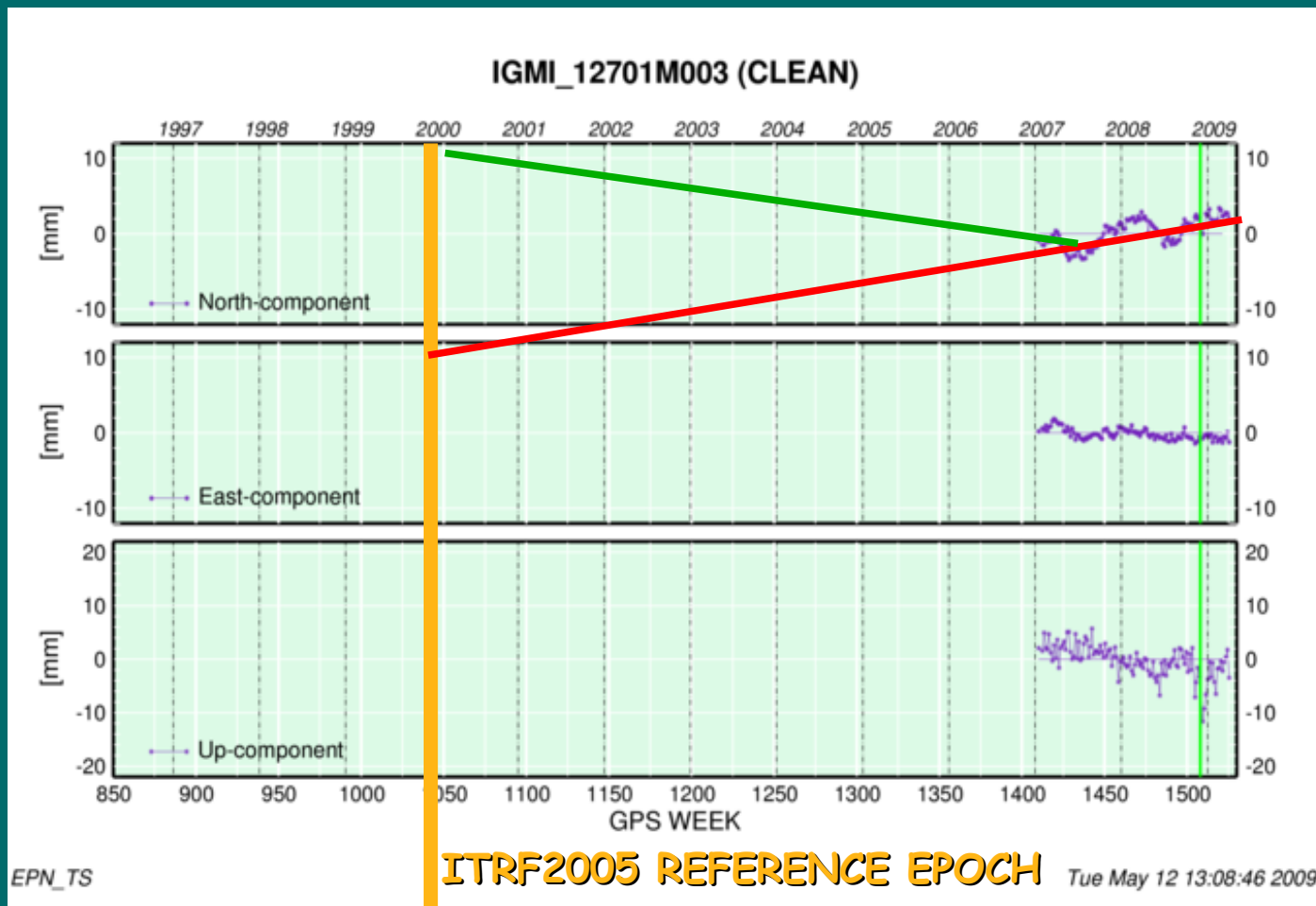
CUMULATIVE SOLUTIONS

- STACKING OF LONG TERM SINEX SETS (GLOBAL, REGIONAL, ...)
- PRODUCT: CUMULATIVE SNX AND SSC SOLUTIONS
 - ITRF2005 (ITRF2005_TRF.SNX)
 - ITRF2005 DENSIFICATION (EPN_**C1355**.SNX)
- 'CLASSIC' TYPE: ALL COORDINATES REFER TO THE SAME EPOCH
 - ➔ COORDINATES MAPPED USING THE ESTIMATED VELOCITY ←

COORDINATE MAPPING

FOR 'YOUNG' SITES

USING DIFFERENT LENGTH OF DATA THE MAPPING COULD
RESULT VERY DIFFERENT COORDINATES!



TARGET:

UP-TO-DATE CRD&VEL PRODUCT

HOW?

- WEEKLY COMBINED (AC)
 - COORDINATE VARIABILITY
- ITRF DENSIFICATION
 - RARE UPDATES
- 'CLASSIC' CUMULATIVE SOLUTION
 - CRD VARIABILITY FOR 'YOUNG' STATIONS
- 'CLASSED' CUMULATIVE SOLUTION
 - + STABLE COORDINATES
 - + SAME QUALITY AS THE ITRF DENSIFICATION
 - + FREQUENT UPDATE

EPN SITE CATEGORIZATION

STATIONS WITH SUFFICIENT LENGTH OF OBSERVATIONS AND HAVING HIGH QUALITY VELOCITIES SHOULD BE DISTINGUISHED FROM 'YOUNGER' SITES.

EUREF ANALOGY:

CLASS_A: $\ll 1$ CM PRECISION ETRS89 CRD AND
 $\ll 1$ MM/YEAR VEL AT **ANY** EPOCH

CLASS_B: $\ll 1$ CM PRECISION ETRS89 CRD (~~VEL~~)
AT EPOCH OF MINIMUM VARIANCE
(NORMALLY == MEAN EPOCH)

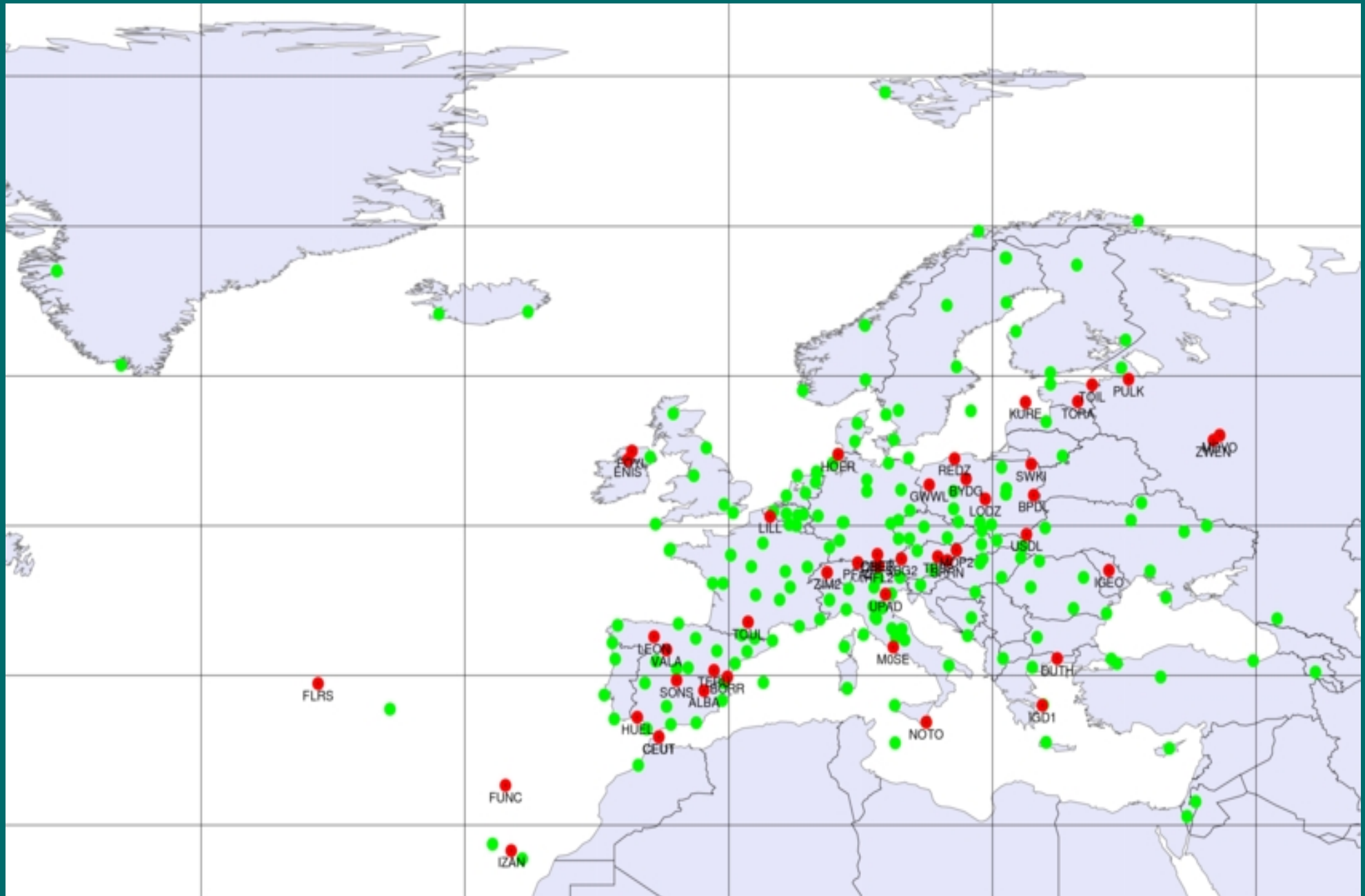
SITE CATEGORIZATION

TESTING A SERIES OF CUMULATIVE
SOLUTIONS COMPUTED IN EACH 5 WEEKS

CLASS_A STATION CRITERIA:

- MINIMUM OBSERVATION LENGTH: 1 YEAR
- VELOCITY 'REPEATABILITY' < 0.5 MM/YEAR
OVER THE LAST 10 SOLUTIONS (45 WEEKS)
- THE UNCERTAINTY OF THE LAST VELOCITY
SOLUTION IS < 0.5 MM/YEAR
- LAST SOLUTION NOT OLDER THAN 2 YEARS

EPN SITE CLASSES - C1525



CATEGORIZATION IN THE PRODUCTS

EPN_CWwww.SNX - EPN cumulative SINEX



includes all weekly solutions up to GPS week **www**

INTERNALLY

EPN_A_ITRF20yy_CWwww.SSC / SNX CRD & VEL

EPN_B_ITRF20yy_CWwww.SSC no **SNX** ! CRD no VEL !

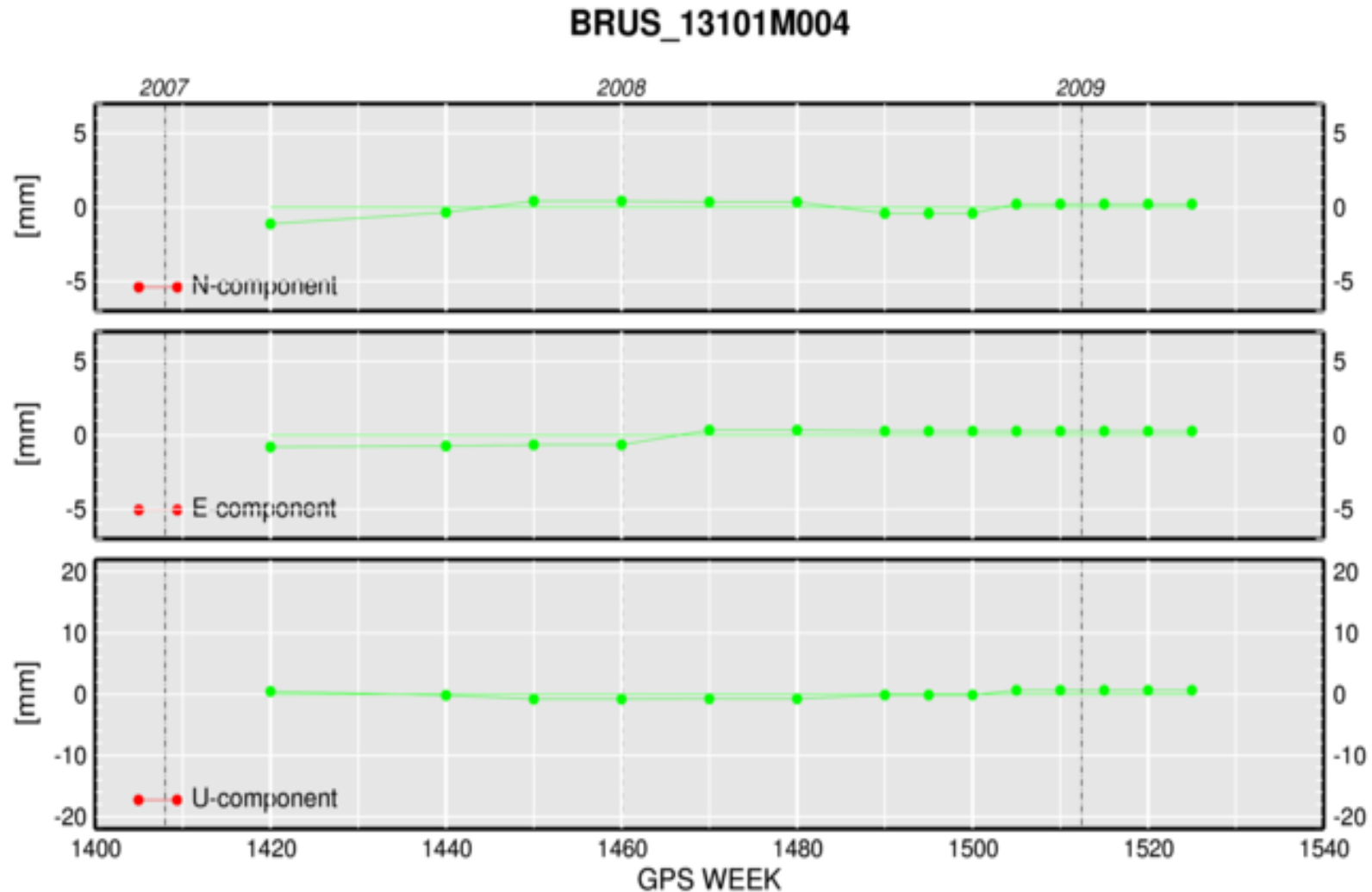
EPN_A_ETRF2000_CWwww.SSC / SNX CRD & VEL

EPN_B_ETRF2000_CWwww.SSC no **SNX** ! CRD no VEL !

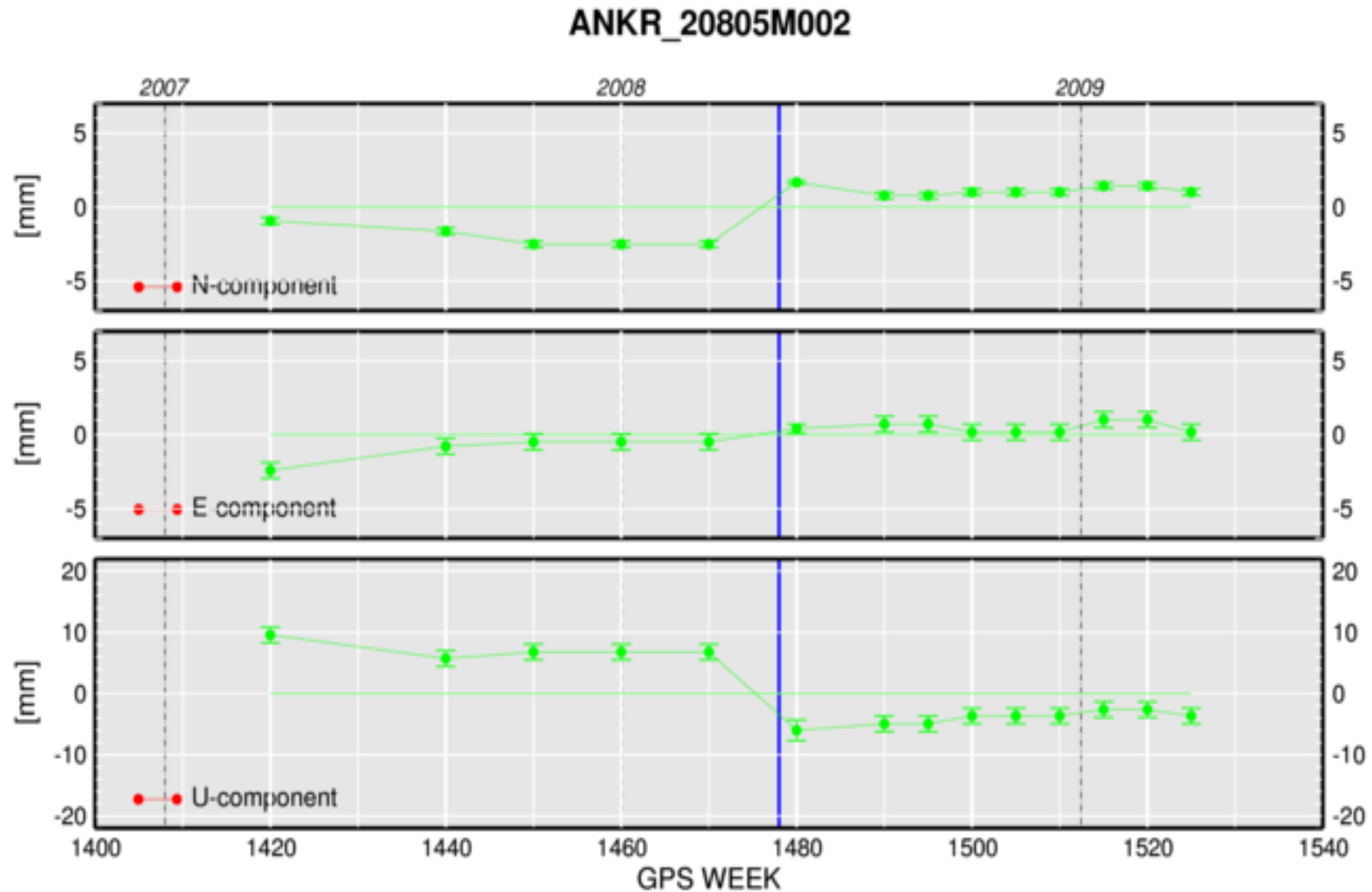
A - pre-defined single epoch (2005.0)

B - the actual epoch of minimal variance for each station

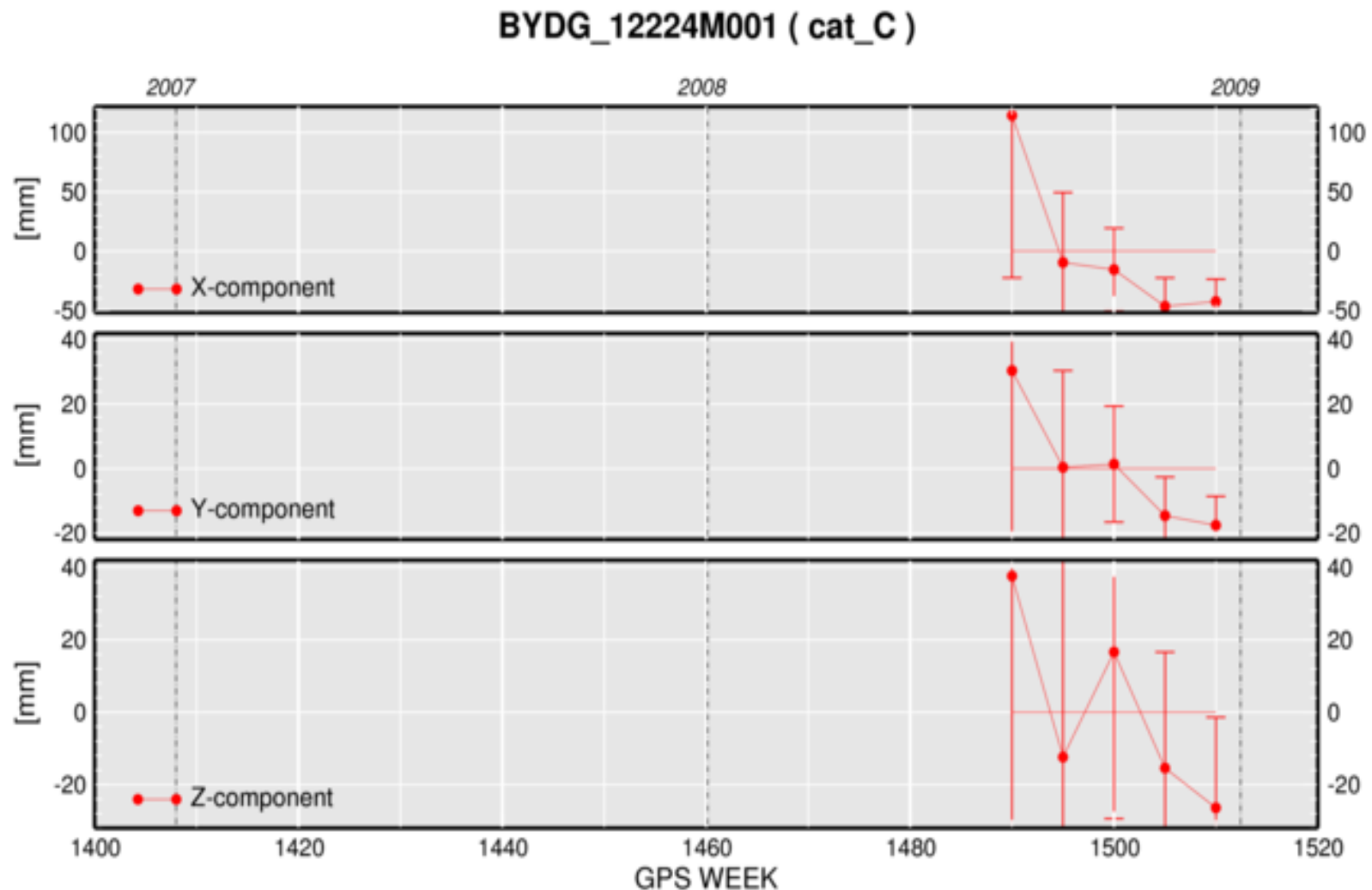
'OLD' STATION: BRUS



OFFSET: ANKR



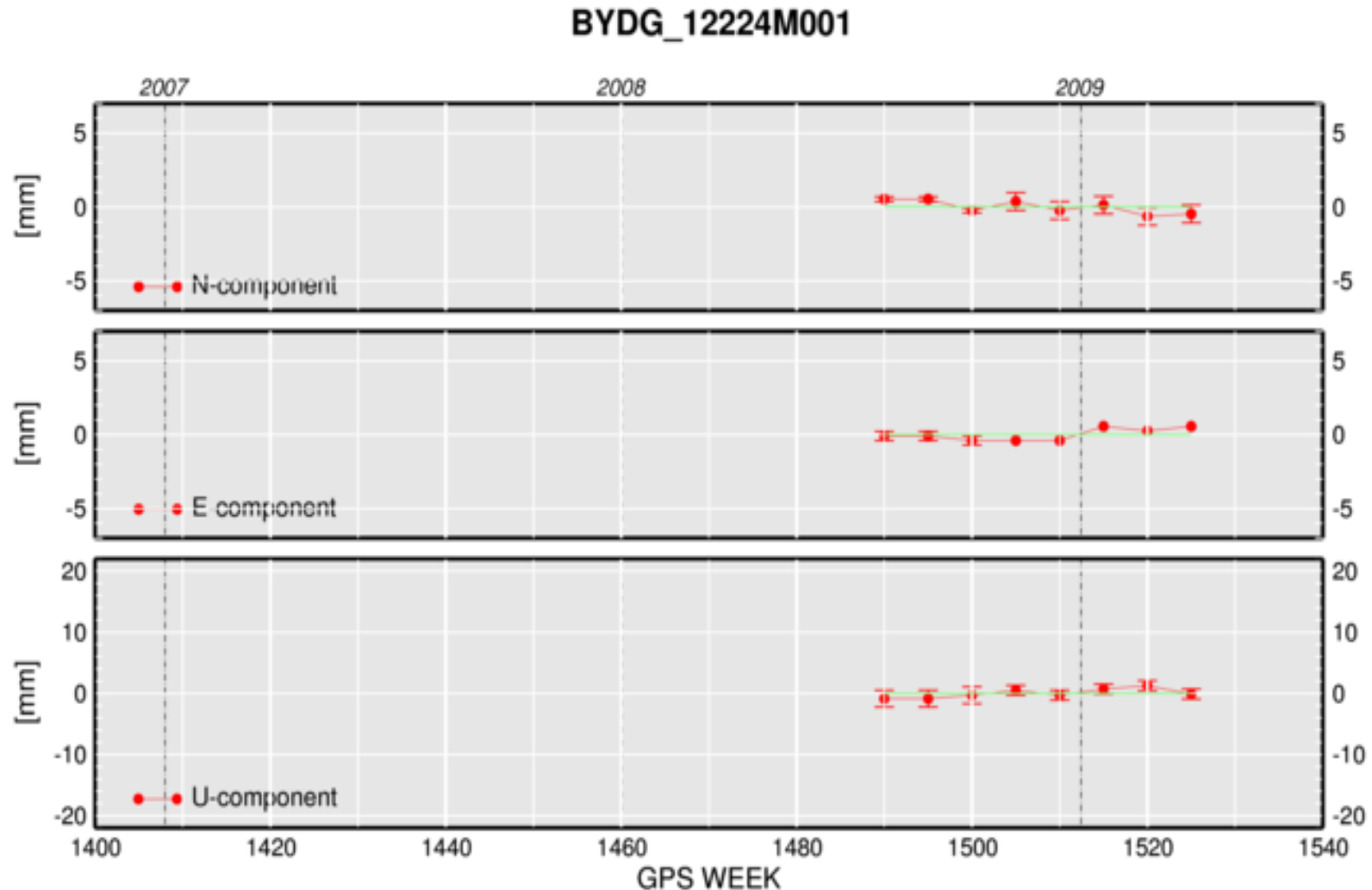
'VERY YOUNG' STATION: BYDG



EPN cumulative solutions by AK

Coordinate repeatabilities

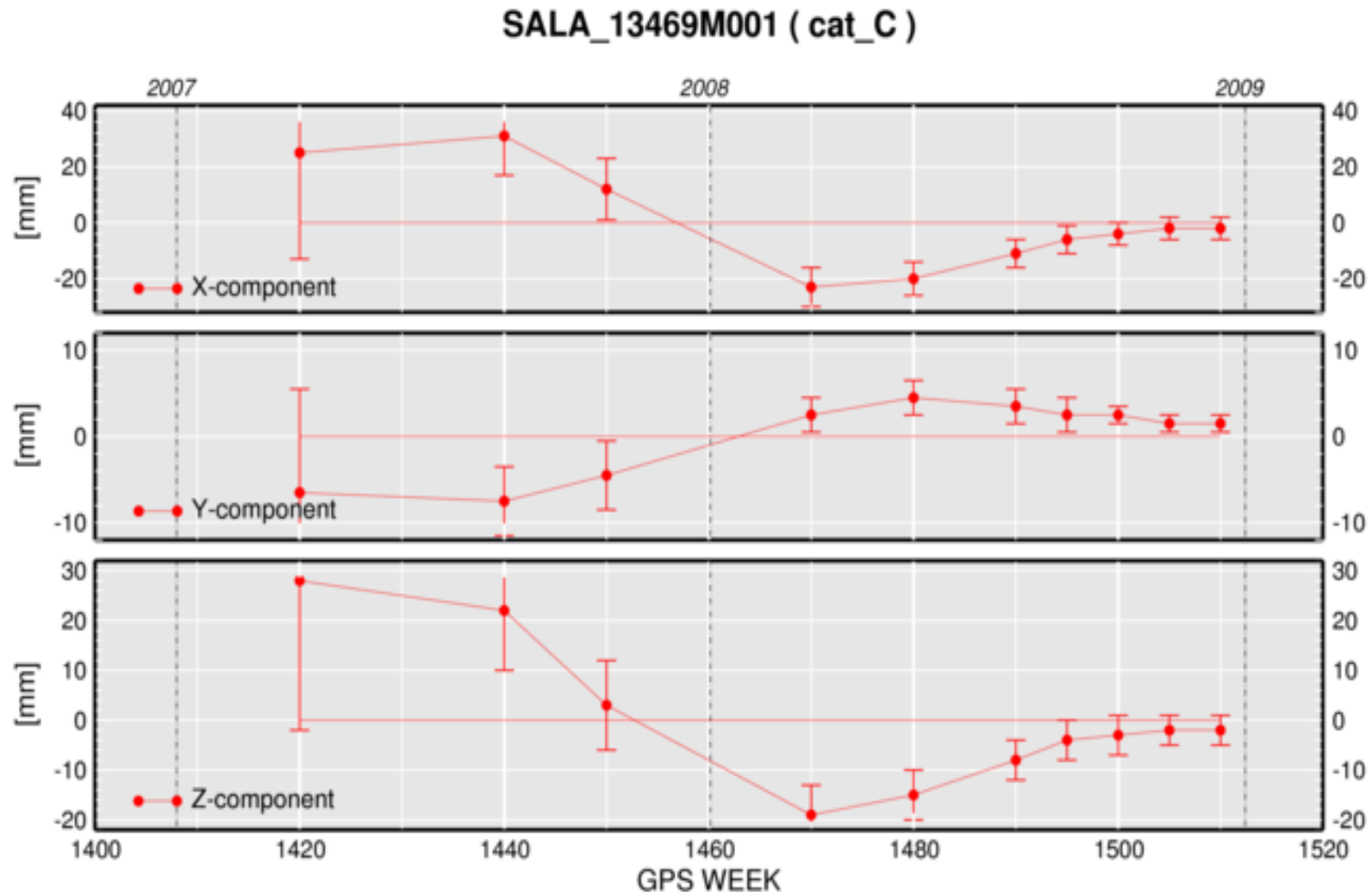
'VERY YOUNG' STATION: BYDG



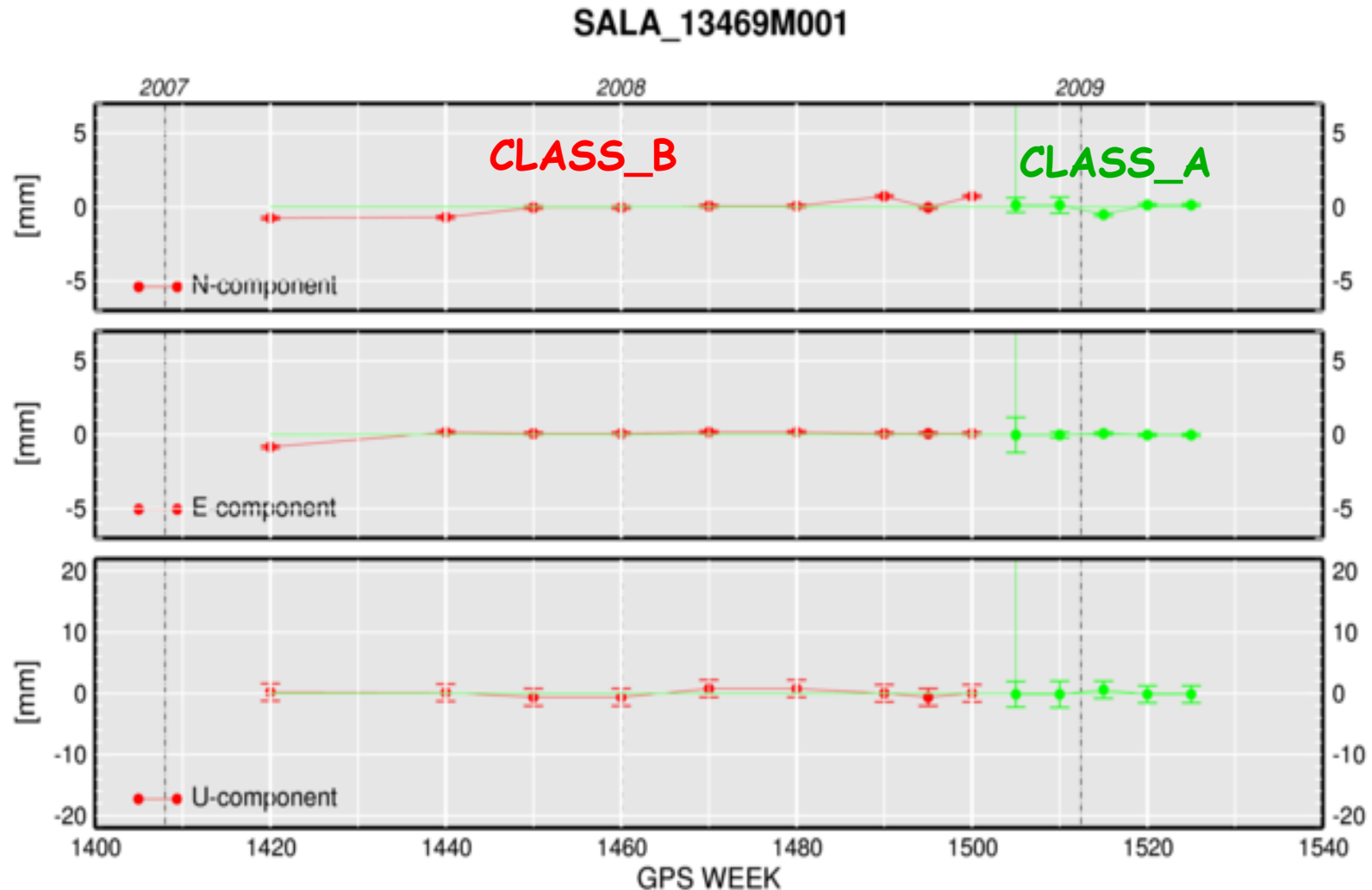
EPN cumulative solutions by AK

Coordinate repeatabilities

'YOUNG' STATION: SALA



'YOUNG' STATION: SALA



-- SUMMARY_1 --

- ITRF2005 DENSIFICATION: THE 1ST EPN MAINTENANCE STEP
- 'INTERNAL' CUMULATIVE SOLUTIONS ARE COMPUTED EACH 5 WEEKS USED FOR SITE CATEGORIZATION
- THE MAINTENANCE CUMULATIVE SOLUTION IS UPDATED IN EACH 15 WEEKS (C1525)
- CLASS_A & B SNX AND SSC SOLUTIONS ARE PUBLISHED IN ITRF2005 AND ETRF2000

Sample class_B SSC file

CLASS_B EPN STATION POSITIONS

REFERENCE FRAME: ETRF2000 AT EPOCH OF MINIMAL VARIANCE

CUMULATIVE SOLUTION OF GPSWEEKS [860 - 1525]

RELEASE NAME: EPN_B_ETRF2000_C1525

RELEASED ON 12/05/2009 BY EUREF (A.KENYERES, FOMI)

DOMES NB.	SITE NAME	TECH. ID.	X	Y	Z	Sigmas			SOLN	DATA_START	DATA_END	REF. EPOCH
			----- [m] -----									
13452M001	ALBA	GPS ALBA	4962848.194	-160854.377	3990884.188	0.001	0.000	0.001	1	07:252:00000	09:094:86399	08:130:20875
13480M001	BORR	GPS BORR	4899519.296	-7115.824	4069961.400	0.001	0.000	0.001	1	07:294:00000	09:094:86399	08:162:32647
12223M001	BPDL	GPS BPDL	3615990.152	1544390.853	5005373.512	0.000	0.000	0.000	1	08:161:00000	09:094:86370	08:292:61342
12224M001	BYDG	GPS BYDG	3647217.200	1184604.089	5079624.980	0.000	0.000	0.001	1	08:161:00000	09:094:86370	08:302:28316
13449M002	CEU1	GPS CEU1	5150907.999	-478415.039	3718518.221	0.001	0.000	0.001	1	08:069:00000	09:094:86399	08:228:81067
13449M001	CEUT	GPS CEUT	5150601.969	-478834.668	3718884.592	0.000	0.000	0.000	1	01:343:00000	05:007:86399	03:212:36329
13449M001	CEUT	GPS CEUT	5150601.954	-478834.678	3718884.594	0.001	0.000	0.001	2	05:069:00000	06:210:86399	05:170:51301
12621M001	DUTH	GPS DUTH	4362690.114	2026647.871	4174234.056	0.001	0.001	0.001	1	09:053:00000	09:094:86370	09:076:10862

-- SUMMARY_2 --

- NAMING CONVENTION:
 - INTERNAL EPN_A/B_ETRF2000_CW~~WWW~~
 - PUBLICATION EPN_A/B_ETRF2000
- THE COORDINATES BOTH IN CLASS_A & B ARE STABLE ON THE MM-LEVEL
- CLASS_A STATIONS ARE PROMOTED TO USE FOR EUREF DENSIFICATION
- THE 'HISTORICAL' SOLUTIONS ARE ARCHIVED