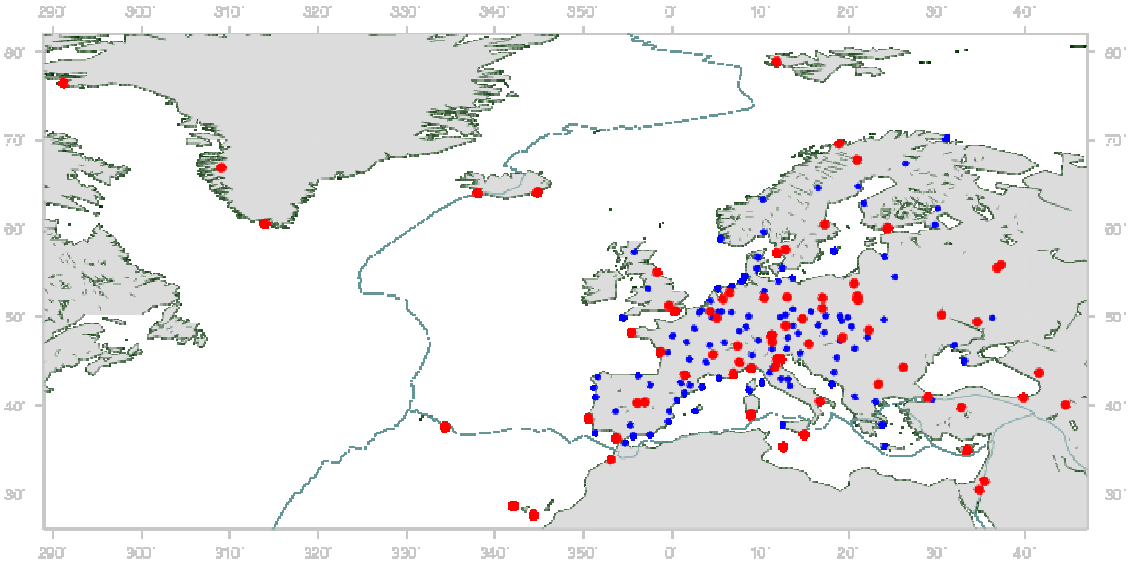
ITRF2005 Densification

Introduction

Objectives

- ITRF2005 was released in summer of 2006
- 79 ITRF2005 stations in Europe (218 EPN stations)



- Need to have coordinates for missing EPN stations in ITRF2005
- EUREF must produce a cumulative EPN solution well referenced in the ITRF2005

Work done up to now (1)

- TWG 22 (Frankfurt, Nov. 2006):
  - TWG asks EPN ACC to prepare ITRF2005 densification solution
- TWG 23 (Lisbon, March 2006):
  - EPN ACC status report on EPN cumulative solution:
    - Definition of solution numbers and outliers
    - 3h computing time
- TWG 24 (London, June 2007):
  - EPN ACC report on EPN cumulative solution:
    - Problem with huge outliers in reference stations (15 cm)

Work done up to now (2)

- TWG 24 (Paris, Nov. 2007):
  - EPN ACC report shows a problem with velocity estimation (new velocities were set up after each discontinuity)
  - TWG asks HH, AK, ZA to perform comparison between ITRF2005, TSP and AC solutions
- TWG 25 (Helsinki, March 2008):
  - No EPN ACC update (no time)
- TWG 26 (Brussels, June 2008):
  - EPN ACC report on EPN cumulative solution:
    - Problem with computed velocities, need to analyze results in more detail; ACC should go to Bern
  - TWG asks HH, AK, ZA to perform comparison between ITRF2005, TSP and AC solutions
  - Need to final decision on ITRF2005 densification solution

Today

- Comparison of EPN cumulative solutions from EPN ACC, TSP and ITRF2005 available
  - Report by HH
  - Report by AK
- Key issues:
  - Input
  - Methodology
  - Validation

Input

- Weekly EPN combined solutions
- Period: GPS week 860 – 1355 (ITRF2005)
- Solution numbers (coordinate validity periods):
  - Important for reference stations : use same soln as ITRF2005!
  - Important for comparison of solutions
  - Use IGS (ITRF) solution numbers for ITRF reference stations
  - Use EPN (TSP) solution numbers for EPN stations not included in ITRF2005 reference list

Methodology

- Software (Bernese, CATREF)
- Choice of input solutions
  - Theoretically the same
- Choice of solution numbers
  - Theoretically the same
- Choice of datum definition
  - Selection of ITRF2005 reference stations
  - Method used to realize the datum (coord + veloc)
    - Minimal constraints (# parameters)
    - Constraints

Validation

- Densification solution must be in ITRF2005
  - No Helmert wrt ITRF2005 (Role of reference stations!, # param.)
    - Coordinates
    - Velocities!
  - Agreement with ITRF2005 on chosen reference stations
    - Max 1 cm residuals for coordinates (Class A) ?
    - Max 1 mm residuals for velocities (1 cm after 10 years) ?
    - No bias!

Final Product

- List of ITRF2005 coordinates (epoch 2000,0) + velocities for EPN stations
- SINEX file of cumulative EPN solution tied to ITRF2005