



**Earth System Science and  
Environmental Management  
(ESSEM)**

#### Participating countries

AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
EL, ES, FI, FR, HU, IS, IT, LT, LU, MT,  
NL, NO, PL, PT, RS, SK, SE, TR, UK

COST Action no. ES1206

## Advanced GNSS tropospheric products for monitoring severe weather and climate (GNSS4SWEC)

2013 | 2017

### Objectives

- Coordinate the development of new multi-GNSS solutions
- Assess the potential of new GNSS products for use in nowcasting and rapid cycle NWP
- Determine the added value of re-processed GNSS tropospheric products to the current state-of-the-art climate research
- Establish a database of reference tropospheric solutions to validate re-processed GNSS ZTD/IWV against climate quality data from a range of other instrumentation
- Stimulate the use of atmospheric data as an input to improve real-time positioning
- Standardize the conversion of ZTD to IWV
- Stimulate exchange of data and expertise in the field of GNSS Meteorology

### Main Achievements

- Workshop for ~80 participants held in conjunction with the International Symposium on Data Assimilation (<http://www.isda2014.physik.uni-muenchen.de/index.html>)
- Establishment of the ES1206 website: <http://gnss4swec.knmi.nl/>
- 6 STSMs completed, 3 in application
- Warsaw University now processing GNSS in near real-time (NRT)
- Sofia University soon to be processing GNSS in NRT (with aid of STSM)
- Database for severe weather case studies established at UKMO
- Database for climate comparisons (GNSS + RS) established at GOP
- Creation of several WG sub-groups (+leaders) to coordinate work on specific topics

### Working Group 1

- 4 members have implemented Ultra Rapid/Real-Time (UR/RT) processing strategies
- 3 members have implemented first-level multi-GNSS processing (GPS+GLONASS).
- 7 new GNSS Analysis Centres (ACs) from 7 EU countries are being established
- Addition of over 130+ new stations to the operational European GNSS network
- Reprocessed tropospheric products will be available in 2014 from >4 ACs
- Strong correlation identified between GNSS and NWP atmospheric asymmetry

### Working Group 2

- A (first) review of the existing requirements of GNSS tropospheric products
- An inventory of existing GNSS products and tools that can be exploited for nowcasting
- Definition of guidelines for selecting severe weather event case studies
- First step in designing benchmark datasets for validation and testing of new products, including severe weather case studies and the use of NWP data for RT positioning
- Participation to the review of the ZTD to IWV conversion methods (with WG3)

### Working Group 3

- Inventory of existing GNSS (reprocessed) tropospheric datasets
- Review ZTD to IWV conversion methods and auxiliary data used by the community
- Review of past multi-instrument IWV validation studies
- First steps in establishing cooperation between geodetic and climate communities

### Contact details

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COST is supported  
by the EU RTD  
Framework Programme



ESF provides the COST  
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Commission contract