

## **COST Action ES1206 - GNSS4SWEC**

Advanced GNSS Tropospheric Products for  
monitoring Severe Weather Events and Climate

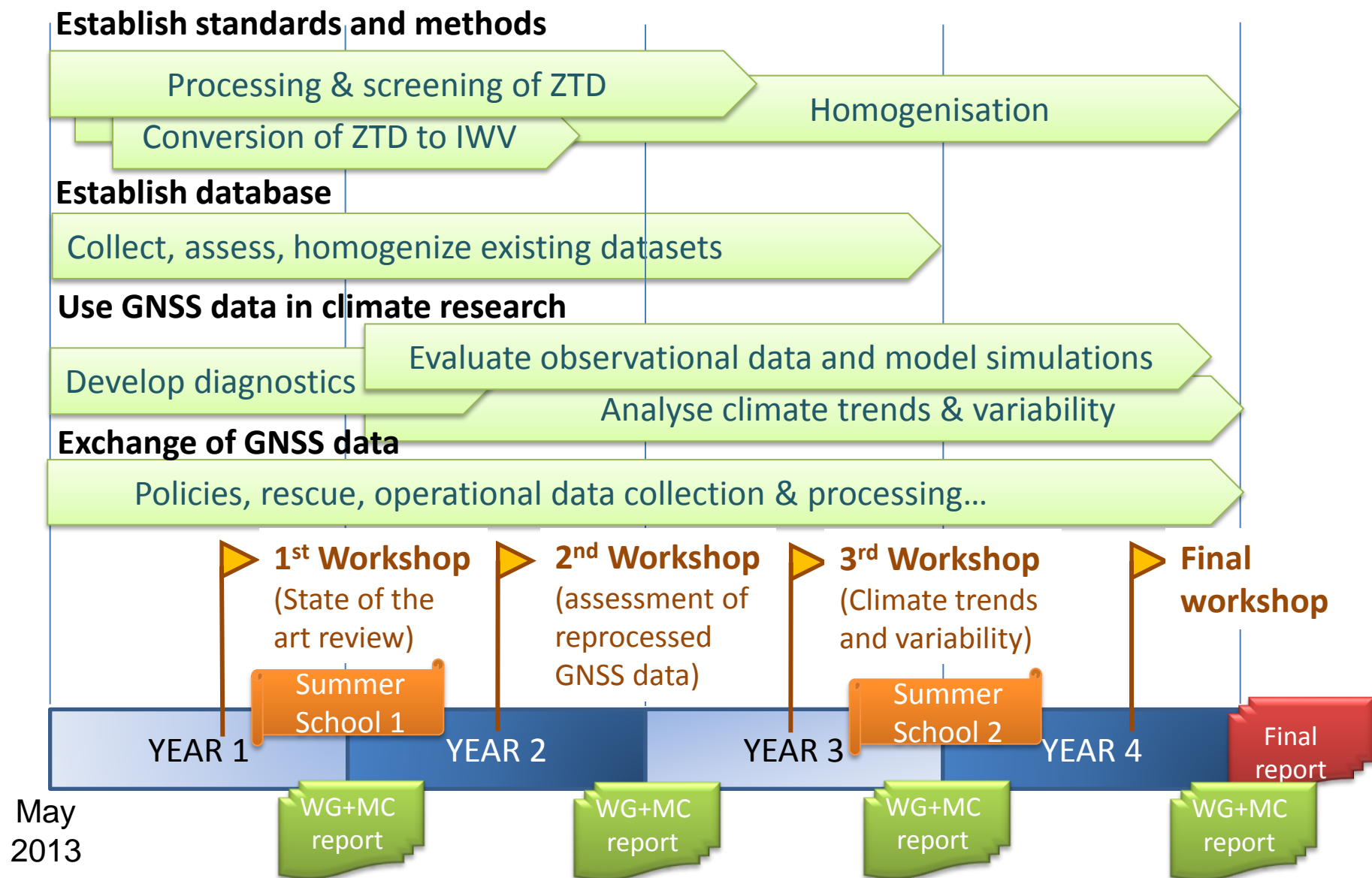
# **WG3: GNSS for climate monitoring**

Olivier Bock (IGN, France)

Rosa Pacione (e-geos, ASI/CGS, Italy)

- **Establish standards and methods for climate applications**
  - GNSS processing: study and reduce bias and uncertainties in ZTD series (recommendations for future repro)
  - Establish standards for ZTD screening, ZTD to IWV conversion, homogenisation of long time series, interpolation of meteo data and ZTD/IWV data for intercomparisons (“tropo ties”)
- **Set up a database of high quality GNSS ZTD and IWV data**
  - Collect information on existing ZTD & IWV datasets (potentially available to the climate community for process studies and long term trends/variability)
  - Select and assess one/several dataset(s) => release dataset & assessment method (to be used for assessment of future repro data)
- **Assess the benefit of GNSS IWV data for climate research**
  - Evaluate (1) accuracy and (2) long term stability of GPS IWV dataset(s)
  - Collaborate on calibration/validation of other data (radiosondes, satellites...) and evaluation of climate model simulations => modes of variability
- **Enhance exchange and use of GNSS data and products**
  - Update data formats for exchange of GNSS products with climate community
  - Support data rescue and reprocessing of data

# WG3: Scientific Work Plan



# WG3: Organization

- **Work Plan 1<sup>st</sup> draft sent after Munich workshop (Feb 2014)**
- **Work Plan Revised version (Sep 2014)**
  - **WP3.1: GNSS networks and datasets** (F. Ahmed, R. Pacione)
    - Inventory of existing (global, Eu, regional) networks & data (incl. Rinx/ZTD/IWV; incl. DORIS+VLBI) => useful for various studies
    - Assessment & setup of reference dataset(s); database issue !
  - **WP3.2 Standards and methods** (R. Pacione, O. Bock)
    - Processing, screening, conversion, homogenisation (from rinex to climate product)
  - **WP3.3 Assessment of GNSS IWV accuracy** (R. Van Malderen)
    - IWV intercomparisons at GRUAN & NDACC Sites => IWV absolute accuracy
    - Long term accuracy & stability of IWV datasets
  - **WP3.4 GNSS IWV data and climate research** (O. Bock, U. Willen)
    - Intercompare IWV trends & variability from GNSS datasets, satellites & models
  - **WP3.5 Enhance exchange and use of GNSS data and products** (R. Pacione)
    - making recommendations on GNSS observation practices consistent with the requirements for climate applications, setting up data policies, defining formats for the dissemination of GNSS tropospheric data, organize data rescue and reprocessing...

## 45 Members with different expertise

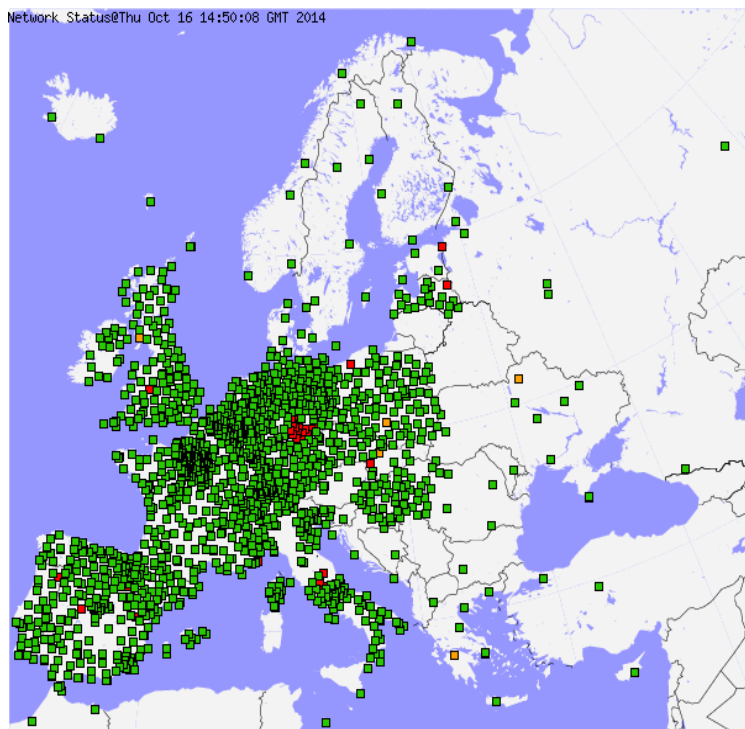
1. Production & assessment of long GNSS series
2. Methodology
3. IWV intercomparisons on long term dataset
4. Climate study of trends and variability/climate model

11 Early Stage Researchers

11 Ladies

## WG3: Liaison with other programmes

- IGS-TWG => J. Dousa (points of contact for GNSS4SWEC)
  - collaborate on repro2 processing and validation
- EUREF-TWG => R. Pacione
  - collaborate on repro2 processing and validation
- GRUAN => K. Rannat
  - intercomparison of IWV data (GNSS vs. RS, MWR)
- NDACC => R. Kivi ?
  - intercomparison of IWV data (IGNSS vs. idars, FTIR...)
- GEWEX – VAP => R. Van Malderen ?
  - GPS – satellite IWV comparisons
- HYMEX => O. Bock
  - Data and model simulations of severe weather in Mediterranean
- E-GVAP => H. Vedel
- IPCC, CORDEX, ECMWF, COST ES1303 TOPROF, ...



- E-GVAP Network is the largest GNSS/met network in the world but E-GVAP ZTDs are not suitable for climate applications (processing is not homogeneous between countries and in the long term) => we need reprocessed ZTD data, and therefore rinex data...
- Agreement with E-GVAP ACs and GNSS data providers on access to rinex data and metadata for stations not included in IGS and EPN would be helpful to establish a rinex database that could be reprocessed and used for climate research over Europe in the framework of GNSS4SWEC or as a GNSS climate service to be set up.
- GNSS4SWEC is planning to run ZTD/IWV intercomparisons at GNSS sites collocated with other techniques. We could provide feedback information on ZTD data quality for those E-GVAP stations and/or ACs.
- National Weather Services participating in E-GVAP could provide useful P and Tm data to convert ZTD in IWV.