COST Proposal
Advanced GNSS Tropospheric Products for monitoring Severe Weather Events and Climate (GNSS4SWEC)

Jonathan Jones (1), Guergana Guerova (2) Jan Dousa (3), Galina Dick (4), Olivier Bock (5), Rosa Pacione (6), Gunnar Elgered (7), Henrik Vedel (8)

(1) Met Office, (2) Sofia University, (3) Geodetic Observatory Pecny, (4) GFZ German Research Institute for Geosciences, (5) Institute Geographique National, (6) e-geos S.p.A. ASI/Centro di Geodesia Spaziale, (7) Chalmers Institute of Technology and (8) Danish Meteorological Institute

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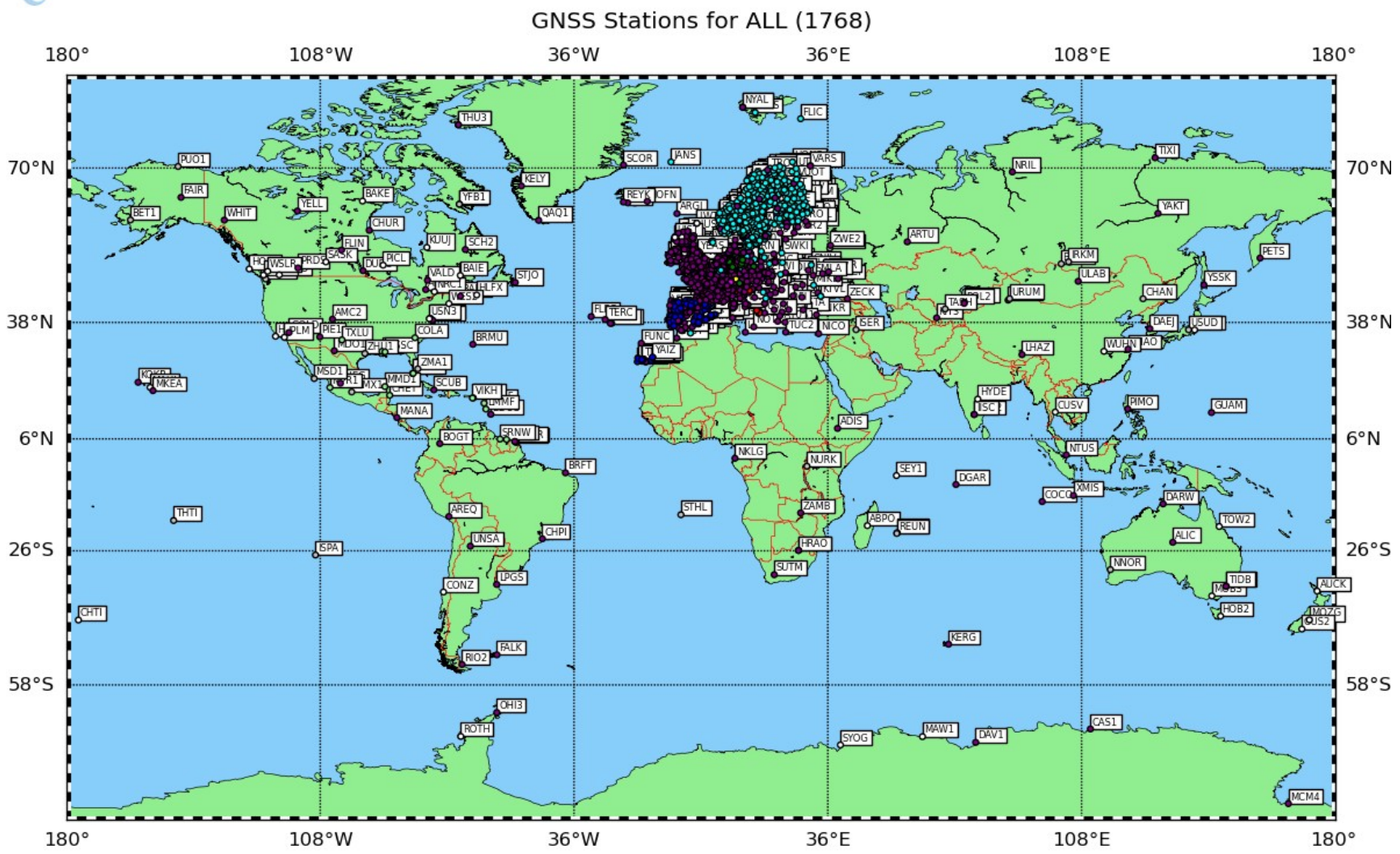
This presentation covers the following areas

- Background
  - Current Status of GNSS-Met in Europe
  - Meteorological Requirements
  - GNSS Developments
- Proposed new COST Action

Current Status (E-GVAP)

- Focused on hourly processing routines delivering ZTD within 90mins for assimilation into Euro and regional Numerical Weather Prediction (NWP)
- Operational assimilation at a few Euro National Met Services, others under testing
- ~1600 European sites' delivering ~10M ZTDs per month
- Some 15-min processing schemes in place
- Data monitoring and QC in place (+developing)

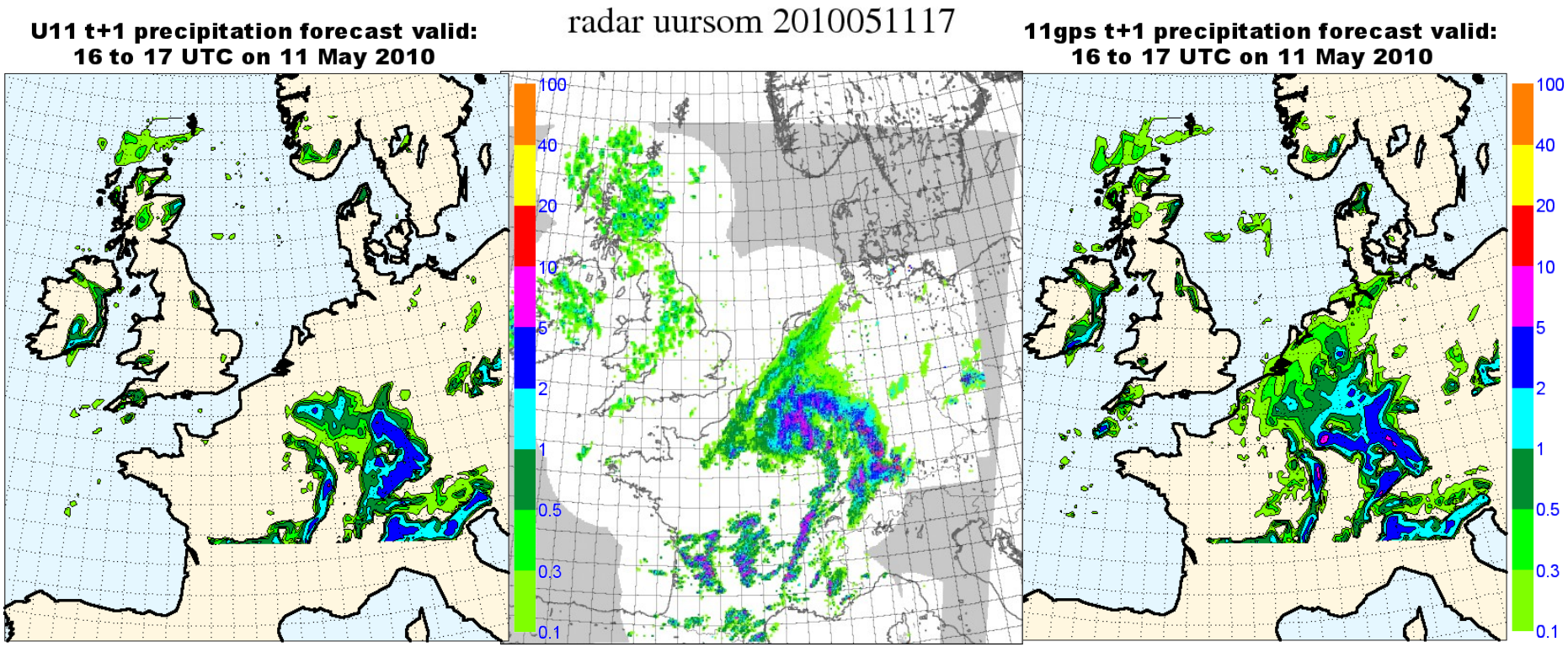
All Sites Processed by E-GVAP ACs



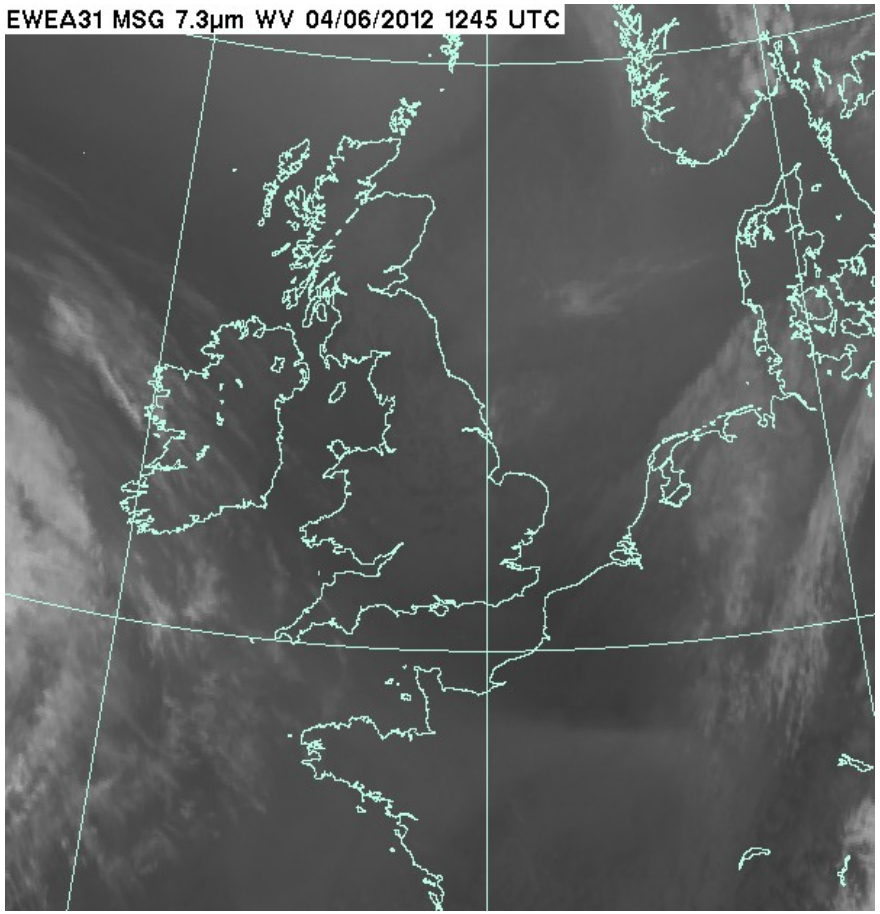
New Met/Climate Requirements

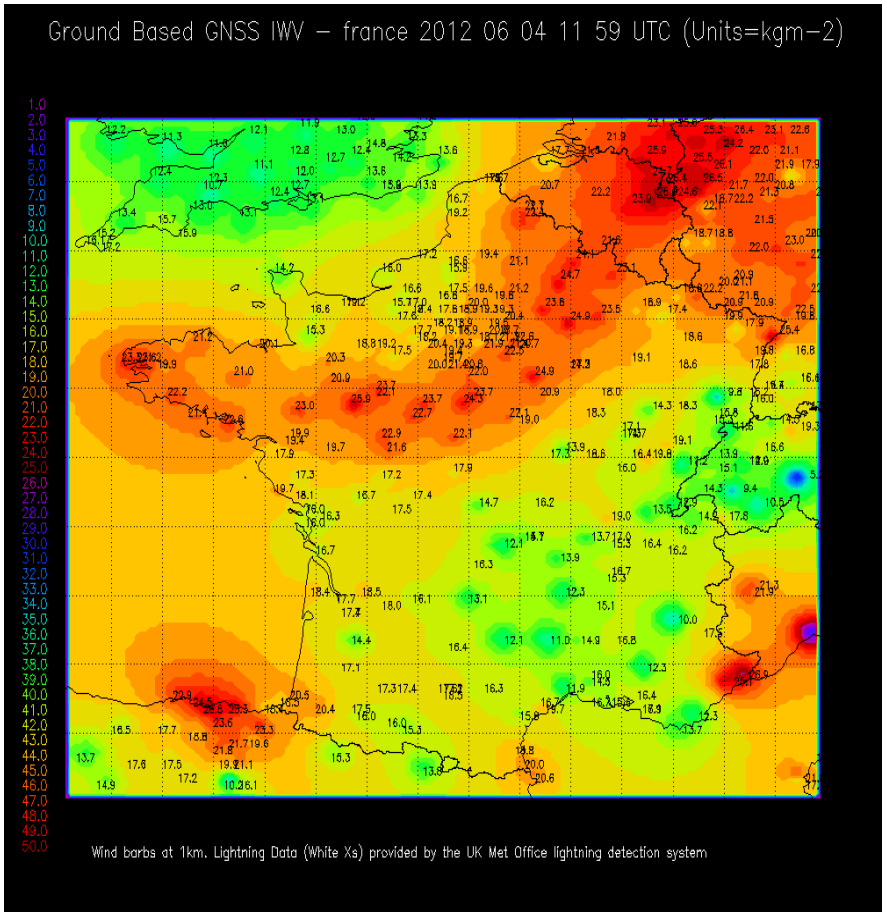
- New hi-res NWP models require ZTD with improved timeliness and greater spatial+temporal resolution (e.g. Met Office UKV 1.5km)
- Sub-hourly processing increases usefulness of GNSS products for nowcasting and forecaster displays
- Meteo community only now starting to use data for climatological use
- Need more advanced products desired for vertical resolution of IWV

High Resolution NWP



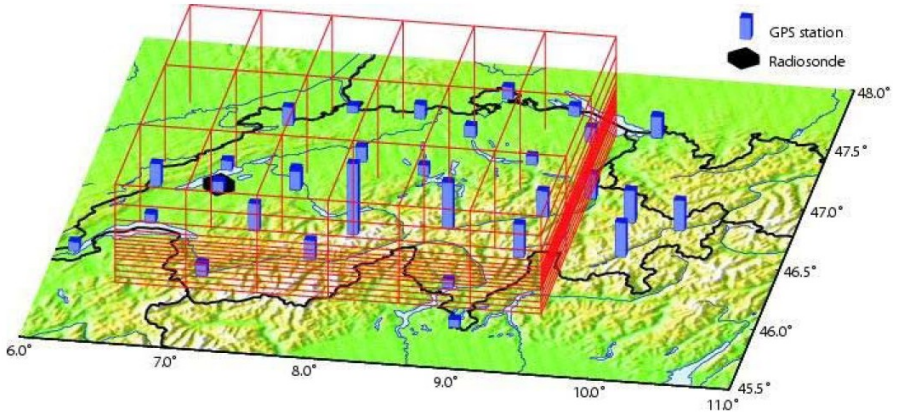
Forecaster WV Displays



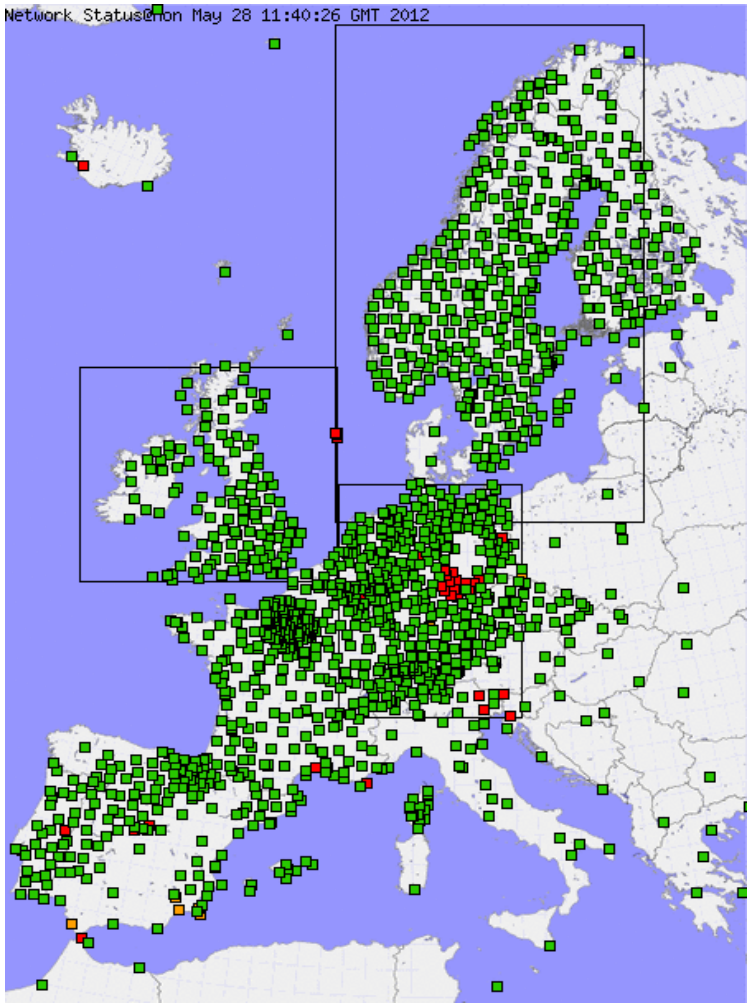


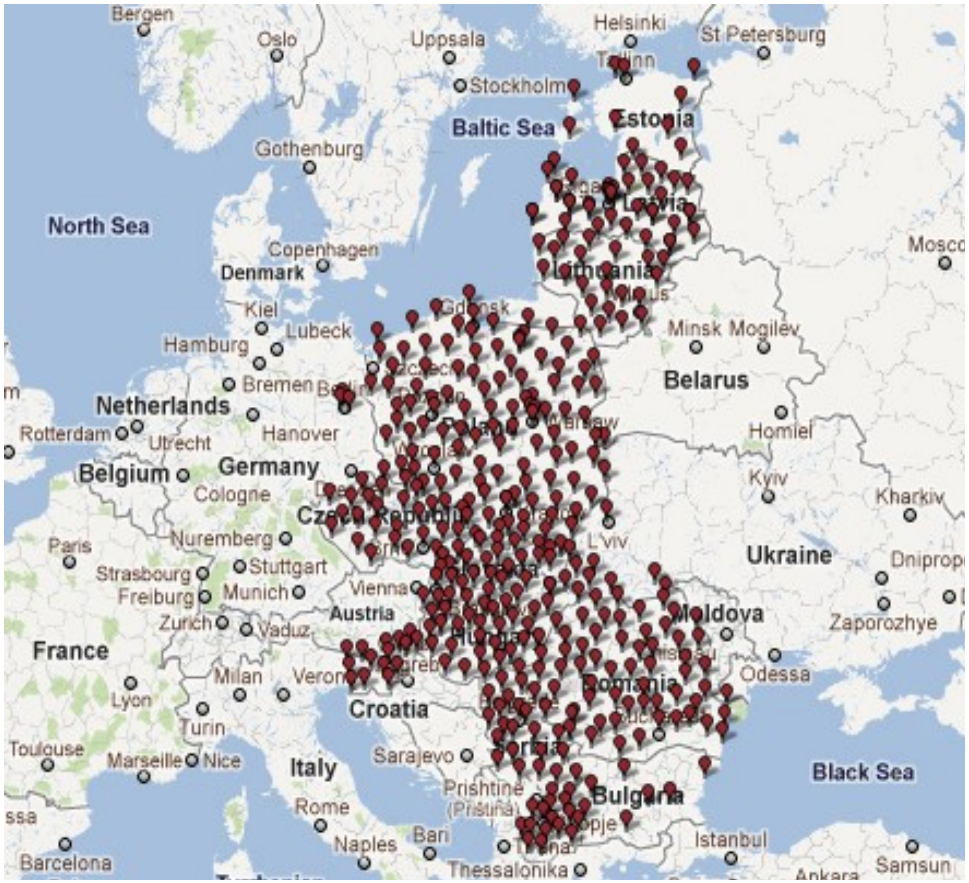
GNSS Developments

- NTRIP data streaming = more RT processing = data more use for nowcasting and visualisation
- More advanced tropospheric products becoming available (slants, gradients etc)
- High quality GNSS products available for climate analysis (IGS/EPN/CODE/others)
- Better geographic data coverage (e.g. E. Europe)



More coordination with E. Europe





E-GVAP vs. EPOS networks

Proposed New COST Action

GNSS for Severe Weather Events and Climate (GNSS4SWEC)

- Main Aims:
  - Help develop more advanced GNSS processing routines and products:
    - Real-Time
    - Multi-GNSS products
    - Slants/gradients/single-freq etc
  - Assess impact of GNSS ZTD/IWV in climate applications

GNSS4SWEC - Organisation

- Three working groups, with a strong working relationship between each group:
- WG1: Advanced GNSS processing techniques (AGNSS)
- WG2: GNSS for severe weather monitoring (GNSS4SW)
- WG3: GNSS for climate monitoring (GNSS4C)

GNSS4SWEC - Objectives

- Assess the potential of **new GNSS products** (slants/gradients/RT ZTD etc) for use in nowcasting and rapid cycle NWP
- Exploit the full potential of **multi-GNSS** solutions and assess the benefit to meteorology and climate analysis
- Assess what is the added value of the re-processed GNSS tropospheric data to the current state-of-the-art **climate** research
- Establish a database of reference tropospheric solutions to validate reprocessed GNSS ZTD/IWV against climate quality data from a range of other instrumentation (VLBI, RS, WVR, FTIR etc)
- Standardize the conversion of ZTD to IWV
- Stimulate exchange of data and expertise in the field of GNSS Meteorology including promotion of dialogue between ACs and end-users (particularly from Western to Eastern Europe)
- Stimulate the exploitation of atmospheric data as an input to improve the quality of **RT GNSS** processing

GNSS4SWEC - Outcomes

- The Action should:
  - improve the understanding of short-term atmospheric processes
  - promote the use of, and determine the impact of, re-processed long-term GNSS tropospheric datasets for climate
  - help develop new, multi-GNSS techniques and products
  - link activities of the IGS and EUREF, and work in support of E-GVAP
  - coordinate the exploitation of GNSS and meteorological data for mutual benefit
  - lead to a consolidation of collaborating groups

Collaborating Parties

- Dr Jonathan Jones / Dr Roger Saunders / Gemma Bennitt,Met Office,UK
- Dr Guergana Guerova,Sofia University,BG
- Dr Jens Wickert / Dr Galina Dick,GFZ German Research Centre for Geosciences,DE
- Dr Roland Potthast / Dr Michael Bender,Deutscher Wetterdienst,DE
- Prof Gunnar Elgered, Chalmers University of Technology, SE
- Dr Henrik Vedel, Danish Meteorological Institute, DK
- Dr Jan Dousa, Geodetic Observatory Pecny, CZ
- Dr Hans van der Marel,Technical University Delft,NL
- Dr Olivier Bock,Institut Geographique National,FR
- Dr Rosa Pacione,Centro di Geodesia Spaziale,IT
- Dr Elmar Brockmann, Federal Office of Topography Swisstopo, CH
- Dr Robert Weber, Technical University Vienna, AT
- Dr Eric Pottiaux, Royal Observatory of Belgium, BE
- Dr Hugues Brenot, Belgian Institute for Space Aeronomy, BE
- Dr Christo Georgiev, National Institute of Meteorology and Hydrology, BG
- Dr Keranka Vasileva, Bulipos, BG
- Dr Krystof Eben, Institute of Computer Science Academy of Sciences of the Czech Republic, CZ
- Dr Kalev Rannat, Tallinn University of Technology, EE
- Dr Piia Post, University of Tartu, EE
- Dr Rigel Kivi, Finnish Meteorological Institute, FI
- Dr Cedric Champollion, University of Montpellier 2,FR

Collaborating Parties

- Dr Yüksel Altiner/Dr Wolfgang Söhne, Federal Agency for Cartography and Geodesy, DE
- Dr Atthanassios Ganas, National Observatory of Athens, GR
- Dr Ambrus Kenyeres, FOMI Satellite Geodetic Observatory, HU
- Dr Rózsa Szabolcs, Budapest University of Technology and Economics, HU
- Dr Sigurdur Thorsteinsson, Icelandic Meteorological Office, IS
- Dr Sandra Spillane,Irish Meteorological Service,IE
- Dr Norman Teferle, University of Luxembourg, LU
- Dr Siebren de Haan,KNMI Royal Netherlands Meteorological Institute,NL
- Dr Harald Linge Lystad,Norwegian Meteorological Institute,NO
- Dr Mariusz Figurski / Dr Karolina Szafranek,Military University of Technology,PL
- Dr Rui Manuel,SEGAL,PT
- Dr Miroslava Igondova,Slovak University of Technology ,SK
- Dr Jana Sanchez Arriola,Spanish Meteorological Institute,ES
- Dr Andres Seco,Universidad Pública de Navarra,ES
- Prof Mahmut Karslioglu, Middle East Technical University, TR
- Dr Richard Bingley, University of Nottingham, UK
- Dr Bob Twilley, Geoscience Australia, AU
- Dr June Wang, NCAR, US
- Dr Vlad Sorta/National Agency for Cadastre and Land Registration, RO
- Eng. Miguel Ángel Cano Villaverde, ES
- Eng. José Antonio Sánchez Sobrino, ES
- Eng. Marcelino Valdés Pérez de Vargas, ES
- Dr Roger Randriamampianina, Hungarian Meteorological Service, HU
- Dr Nicolas Zinas, TEKMON Geomatics LLP, GR
- Dr Janis Zvirgzds, LatPos, LV

Met Office

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Questions?

Jonathan.jones@metoffice.gov.uk gnss4climate@gmail.com