First Summer School

Advanced Global Navigation Satellite Systems tropospheric products for monitoring severe weather events and climate GNSS4SWEC

Golden Sands, Bulgaria

8 – 11 September 2014

Summer School   8-11 September 2014

GNSS4SWEC First summer school 2014

8 September (Monday) – 11 September (Thursday) 2014, Golden Sandes, Bulgaria

Day, Time	Mo, 8 September 2014	Tu, 9 September 2014	We, 10 September 2014	Th, 11 September 2014
7:00 – 9:30	Breakfast	Breakfast	Breakfast	Breakfast
9:30 – 10:30	GNSS4SWEC Fundamentals of GNSS	Introduction to NWP	The climate system	Scientific writing
10:30 – 10:45	Coffee break	Coffee break	Coffee break	Coffee break
10:45 – 11:45	GNSS processing	Data assimilation	IPCC AR5	Scientific writing clinic
11:45 – 12:00	Break	Break	Break	Break
12:00 – 13:00	Tropospheric products	Extreme weather events	Climate modelling & reanalysis	Discussion
13:00 – 14:30	Lunch	Lunch	Lunch	Lunch
14:30 – 15:30	GNSS tomography	Weather systems and nowcasting	Climate DA and trends	
15:30 – 15:45	Break	Break	Break	
15:45 – 16:45	IS: PPP GNSS processing	IS: Nowcasting case studies	IS: GNSS homogenization	
16:45 – 17:00	Coffee break	Coffee break	Coffee break	
17:00 – 18:00	Discussion	Discussion	Discussion	
18:00 – 19:30	Dinner	Dinner	Dinner	
After 19:30	Poster session	Country presentation	Karaoke night	

Lectures

GNSS4SWEC - Dr. Jonathan Jones, the MetOffice
Fundamentals of GNSS – Dr. Hans van de Marel, TU Delft
GNSS processing – Dr. Hans van de Marel, TU Delft
Tropospheric products - Dr. Jan Dousa, RIGTC/GOP / Dr. Galina Dick, GFZ
GNSS tomography - Dr. Witold Rohm, Wroclaw University
Interactive session: PPP GNSS processing - Dr. Jan Dousa, RIGTC/GOP

Introduction to NWP - Dr. Henrik Vedel, DMI
Data assimilation - Dr. Henrik Vedel, DMI
Extreme weather events - Dr. Hugues Brenot, BIRA
Weather systems and nowcasting – Dr. Alexander Kann, ZAMG
Interactive session: Nowcasting case studies - Dr. Hugues Brenot, BIRA

The climate system - Dr. Elisaveta Peneva, Sofia University
IPCC AR5 – Dr. June Wang, University at Albany
Climate modelling & reanalysis - Dr. Ulrika Willen, SMHI / Dr. Elisaveta Peneva, Sofia University
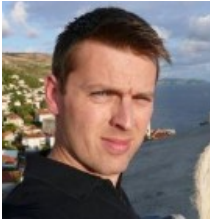Climate data analysis and trends - Dr. June Wang, University at Albany
Interactive session: GNSS data homogenization - Dr. Sybille Vey, GFZ

Scientific writing - Dr. Guergana Guerova, Sofia University
Scientific writing clinic - Dr. Guergana Guerova, Sofia University

Speakers

Dr. Jonathan Jones

Jonathan Jones holds a PhD from the Nottingham Geospatial Institute (formerly the Institute of Engineering, Surveying and Space Geodesy) at the University of Nottingham, and also holds a BSc (Hons) in Environmental Geoscience from Cardiff University. Actually he is head of Global Navigation Satellite System meteorology research and development work for the Met Office. He is working for the Met Office for over 10-years developing his GNSS expertise incorporating a strong blend of academic, commercial and cross government understanding through current and previous partnerships. Jonathan has both technical and GNSS processing expertise and has successfully delivered the operational GNSS - meteorology project and product management as well as partner channel expansion for the Met Office. Jonathan Jones is chair of the GNSS4SWEC Cost project.

Dr. Hans van de Marel

Dr. ir. Hans van der Marel is assistant professor at department of Geoscience and Remote Sensing of the Delft University of Technology. He obtained his PhD on data processing techniques for ESA's Hipparcos astrometric satellite. He has been working on high precision GNSS applications since 1989. His research interests lie in permanent GNSS networks, atmospheric applications of GPS, Precise Point Positioning, Network RTK, subsidence monitoring using GPS and INSAR, with a specific focus on the development of data processing algorithms and actual data analysis. He has been involved in several ESA and EU studies for the development of the European navigation system Galileo and other projects. In 1996 he became involved in GPS meteorology, when jointly with KNMI, a project was started to investigate the potential of using ground based GPS for meteorological applications. Later he chaired working group 2 of the European COST action (COST-716) for the exploitation of ground based GPS for climate and numerical weather predication applications and became involved in the EU TOUGH project. These projects gave birth to a network of 1500 GPS stations that are now available within EUMETNET for operational assimilation of GPS data into Numerical Weather Prediction (NWP) models. He was also co-chair of IAG Sub-Commission 4.3 "GPS as an atmospheric remote sensing tool". Furthermore has been a member of various other international and national bodies and commissions, including ESA's Galileo Science Advisory Committee, the International GNSS Service (IGS), EUREF and Unavco. Teaching activities include courses on Satellite Positioning, Navigation and dynamic data processing, data analysis, experimental research, GPS meteorology, simulation and visualization, both at graduate and undergraduate levels, and supervision of MSc and PhD students. Recent research activities include the synthesis of GNSS and INSAR for deformation and atmospheric studies.

Dr. Jan Dousa

Dr. Jan Dousa is senior scientist at the Research Institute of Geodesy, Topography and Cartography (RIGTC) - Geodetic observatory Pecný (GOP), Czech Republic, where he has been working since 1997. He obtained his PhD degree in 1999 at the Department of Advanced Geodesy, Czech Technical University in Prague. Dr. Dousa has participated in multiple international projects in the field of ground-based GNSS tropospheric research such as COST 716, TOUGH, E-GVAP, Trop4LAS, COST 1206, IGS Tropo WG and several other at national level. His primary areas of interest are advanced methods of precise GNSS processing with particular focus on reference frames (EUREF), precise GNSS orbit determination (IGS), troposphere monitoring (E-GVAP), support of solid Earth sciences (EPOS) and software development (G-Nut). Jan Dousa is chair of Working Group 1 of the GNSS4SWEC COST project, co-chair of EPOS Working Group 4 (GNSS and other geodetic data), member of EUREF Technical Working Group and associate member of the International GNSS Service.

Dr. Galina Dick

Dr. Galina Dick graduated in Mathematics from the University of Charkow, Ukraine and received her PhD in Mechanics from the Technical University in Tallinn, Estonia. In 1992 she started to work at the German Research Center for Geosciences GFZ at Potsdam in the different fields of satellite geodesy. Since 2000 she is responsible for the ground-based GNSS atmospheric sounding at GFZ and is involved in many international projects. She is head of GFZ GNSS Analysis Center within European Project E-GVAP, member of the GRUAN (GCOS Reference Upper-Air Network) GNSS Water Vapour Experts Group and of the IGS Tropospheric Working Group. Within ESSEM COST Action ES1206 (GNSS4SWEC) she is co-chair of the Working Group 1: "Advanced Processing Techniques".

Dr Witold Rohm

Dr Witold Rohm is an Assistant Professor at the Wroclaw University of Environmental and Life Sciences (WUELS). Witold Rohm holds a Bachelor degree in Geography from Wroclaw University, a Master Degree in Geodesy and a PhD in satellite geodesy from WUELS. He spent 2 years at the RMIT's SPACE Research Centre (Melbourne, Australia) working closely with staff and higher degree by research students on GNSS tomography for near-real-time weather and severe weather modeling and prediction research. Dr Rohm has a strong research track record in geodesy, meteorology and tomography research. His work at WUELS led to the successful design and development of a near-real-time GNSS tomography model for the Poland region. Dr Rohm is currently a co-chair of International Association of Geodesy Working Group IAG-WG4.3.2 "Inter-comparison and cross validation of tomography models" and GNSS4SWEC Cost project WG.2/WG.1 Tomography research area sub-group.

Dr. Henrik Vedel

Dr. Henrik Vedel has PhD in physics, MSc in physics and mathematics. Work on data assimilation, NWP, NWP nowcasting, climate monitoring and climate change, previously on theoretical astrophysics and astronomy. Active in GNSS meteorology since 1998. Coordinator of E-GVAP (EUMETNET GNSS Water Vapour Programme). Fanatic cyclist.

Dr. Hugues Brenot

Dr. Hugues Brenot is research scientist at the Belgian Institute for Space Aeronomy. He obtained his PhD degree in Geophysics at the Joseph Fourier University, Grenoble, France in 2006 (collaboration with Météo-France). Between 2006 and 2009 he was working as research scientist at the Royal Meteorological Institute of Belgium. Dr. Brenot's main area of scientific interest is in development of tropospheric/ionospheric GNSS products for meteorological and climate applications. He is also strongly involved in the monitoring of volcanic emissions using polar orbiting satellites (http://sacs.aeronomie.be).

Alexander Kann

Alexander Kann is head of the NWP applications section of the Central Institute for Meteorology and Geodynamics (ZAMG) in Vienna, Austria. He graduated from the Meteorology and Geophysics master of sciences program of the University of Vienna in 2001. He started his professional career as forecasting meteorologist in ZAMG and has been working in the same institute since 2000. Alexander Kann's main areas of research are numerical weather prediction, analysis and nowcasting, limited area ensemble forecasting, ensemble nowcasting, mesoscale meteorology and statistical forecasting methods.

Dr. Elissaveta Peneva

Dr. Elissaveta Peneva is associate professor at the Department of Meteorology and Geophysics of Sofia University, Bulgaria. She obtained her PhD degree in physical oceanography in 2001 at Sofia University. Her primary research interests are in the fields of numerical modeling of ocean and atmosphere processes, air-sea interaction, regional climate modelling, renewable sources of energy, Black Sea, Balkan Penninsula.

Dr. Junhong (June) Wang

Dr. Junhong (June) Wang is a research associate professor at the Department of Atmospheric & Environmental Sciences, University at Albany, NY, USA. She obtained her PhD in Atmospheric science at Columbia University, New York. Dr. Wang has been working from 1997 until 2014 at NCAR, Boulder, CO, USA. Her research interests are in the fields of climate observations, changes and variability, data creation and analysis, Global Navigation Satellite Systems (GNSS) measurements and applications, and sounding technology and data quality.

Dr. Ulrika Willén

Dr. Ulrika Willén is a senior scientist at the Rossby Centre, SMHI, working on regional and global climate modelling especially the parameterization and evaluation of clouds and radiation. Her main research interest is the interaction of clouds and radiation and the impact on the climate, how the models can be improved through the use of observations from satellite and ground-based measurements. She is currently involved in the FP7 projects EMBRACE, SPECS, HELIX and CLIPC and has previously been involved in EU projects for evaluation of models using ground-based observational networks, such as the CLIWA-NET and CloudNET projects and satellite projects ArcticCLIM, CLOUDMAP and CM SAF projects to assess the use of satellite products in climate research. Currently she is also active in ESA-CCI, leading the Climate research Group in Cloud-CCI and SMHI science leader for CMUG, the climate modelling user group, in ESA-CCI.

Dr. Sibylle Vey

Dr. Sibylle Vey works at the German Research Centre for Geoschiences (GFZ), Potsdam. She obtained her PhD in 2007 at the Technical University in Dresden in the field of GNSS meteorology. Sibylle Vey has had several practical trainings in Geodesy and Surveying in France and the USA. She has worked in several German institutes in the area of geodesy, surveying using the GNSS. Her current work is focused on estimation of soil moisture, snow depth and water level from reflected GNSS signals.

Dr. Guergana Guerova

Dr. Guergana Guerova is a Marie Curie Fellow at the Department of Meteorology and Geophysics of Sofia University, Sofia, Bulgaria and vice chair of the GNSS4SWEC Cost project. Qualified meteorologist, she is working in the field of ground - based GNSS Meteorology since 2000. In 2003, she received a PhD in Applied Physics from University of Bern, Bern, Switzerland. She is currently leading a project titled: "Exploitation of ground-based Global Navigation Satellite Systems (GNSS) for Meteorology and Climate studies in Bulgaria/Southeast Europe" (http://suada.phys.uni-sofia.bg/?page_id=185). She teaches courses at undergraduate (Introduction in Meteorology part 1, Synoptic Analysis) and graduate (Satellite Imagery Interpretation) levels.