Organization

Dates

15 December 2011
Applications due
22 December 2011
Notification of selected participants

Venue

The winter school will take place in the Institute for Meteorology and Climate Research (IMK-IFU) at Campus Alpine of the Karlsruhe Institute of Technology in the Bavarian mountain village of Garmisch-Partenkirchen, located at the foot of Germany's highest peak *Mount Zugspitze*.

Costs

Tuition, accommodation and meals are free for all participants. There will be no travel grants.

Target Group

The winter school is open to young researchers (PhD students & Post-Docs) worldwide in meteorology, hydrology, environmental sciences, signal processing applications, precipitation remote sensing.

Application

Participation is highly competitive and will be limited to a maximum of 25. Please send your application, including a motivation letter and a short CV, to Harald Kunstmann (harald.kunstmann@kit.edu).

Contact

Karlsruhe Institute of Technology (KIT)

Institute for Meteorology and Climate Research, IMK-IFU

Campus Alpin
Kreuzeckbahnstraße 19
82467 Garmisch-Partenkirchen, Germany

Prof. Harald Kunstmann

Phone: +49 8821 183 208
Fax: +49 8821 183 243
E-Mail: harald.kunstmann@kit.edu

Christian Chwala

Phone: +49 8821 183 246
Fax: +49 8821 183 243
E-Mail: christian.chwala@kit.edu

www.imk-ifu.kit.edu

Karlsruher Institut für Technologie

Microwave Links and Precipitation

Winter School on the Remote Sensing of Precipitation Using Microwave Links: Techniques and Applications

27.2.-2.3.2012
Garmisch-Partenkirchen, Germany

Institute for Meteorology and Climate Research IMK-IFU

KIT – Universität des Landes Baden-Württemberg und nationales Forschungszentrum in der Helmholtz-Gemeinschaft

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Basic Information

Background

For the improved understanding of all aspects of the regional water cycle, knowledge of the spatio-temporal distribution of precipitation is of crucial importance. Improved and scientifically sound water availability information, however, still suffers from the limited quality of available spatial rainfall products. Why is spatial rainfall estimation still so problematic? Traditional rain gauges provide good local measurements but their spatial representativeness is very low. In contrast, radar reflectivity measurements provide spatial pattern information but the transformation of reflectivity to rain rate values is accompanied by large uncertainties. The need for additional measurements has inspired the use of microwave links, which have been proven to provide more accurate rainfall estimates at the near-surface level.

Aim

The winter school will introduce the new technique of precipitation remote sensing using terrestrial microwave links to young researchers. The potential and limitations of the new technique, as well as solutions and practical examples will be presented by leading scientists in this field.

Covered Topics

Theory

- EM-Theory of microwave propagation
- Effects of rain and humidity

Methodology

- Baseline determination
- Error estimation

Microwave hardware

- High frequency hardware in a nutshell

Microwave link applications

- Tomographic reconstruction
- Improved hydrological statistics
- Copula integration of link, radar and gauge
- Detection of faulty rain gauges
- Radar rain rate adjustment

Experiments

- Monostatic small scale experiment
- Microwave and optical links

Simulation

- EM-Simulation of scattering from hydrometeors

Exercises

- Data preprocessing
- Spatial methods

Excursion

One afternoon is reserved for a field trip to the pre-alpine region north of Garmisch-Partenkirchen, visiting the PROCEMA and TERENO project hydrometeorological test sites.

Lecturers

Prof. Harald Kunstmann (Karlsruhe Institute of Technology, Institute for Meteorology and Climate Research, Germany)

Prof. Uwe Siart (Technische Universität München, Institute for High Frequency Engineering, Germany)

Prof. Hagit Messer, Prof. Pinhas Alpert, Dr. Rana Samuels (Tel Aviv University, Institute for Electrical Engineering & Department of Geophysics and Planetary Sciences, Israel)

Prof. Remko Uijlenhoet (Wageningen University, Hydrology and Quantitative Water Management Group, The Netherlands)

Prof. Alexis Berne (École Polytechnique Fédérale de Lausanne, Environmental Remote Sensing Laboratory, Switzerland)

Dr. Hidde Leijnse (KNMI Royal Netherlands Meteorological Institute, The Netherlands)

Dr. Alon Rimmer (Yigal Allon Kinneret Limnological Laboratory, Israel)

and several PhD students of the organising institutions working in the field of microwave links.