



**INTERNATIONAL TRAINING SEMINAR ON  
SNOW COVER REMOTE SENSING AND IMPACT TO WATER MANAGEMENT  
(DATA, TECHNIQUES AND APPLICATIONS)**

**18-20 April 2012**

**TURKISH WATER FOUNDATION**

**ISTANBUL, TURKEY**

### **Background**

International Initiative Group on Remote Sensing of Snow IIRSS is an international group of academicians, researchers and remote sensing experts working in the area of remote sensing of snow. IIRSS members are mainly involved in the development of algorithms and techniques to infer information on snow cover properties from remote sensing data. IIRSS was formed at the first Snow Seminar held at METU (Middle East Technical University) CCC (Cultural and Convention Center) in April 2011 in Ankara, Turkey.

### **Objective**

Seasonal snow cover is an important element of the Earth's climate system. It can change the land surface albedo, affects the heat and radiative fluxes at the land surface-atmosphere boundary and influences dynamics of the water cycle. Climate studies provide indications of decreasing wintertime snow cover duration and snow depth in high mountainous areas of Turkey. This may cause serious problems for the country's water management since about 70% of river runoff in the mountainous area in Turkey results from melting snow. Besides hydrology and water management, accurate and timely information on the snow cover distribution is crucial for many practical applications including meteorology, agriculture, hydropower generation, transportation and recreation.

Snow cover is also a sensitive indicator of the climate change. Climate change is a real and overarching challenge. The dominant processes occur throughout the entire earth system and the resulting consequences for the natural environment have impacts at all spatial scales from local to global and all temporal scales from short-lived extreme events to long-term climate trends and low-frequency variations. Moreover, the effects of climate change are manifested across all economic and societal dimensions. With GMES (Global Monitoring for Environment and Security), the European Commission has begun to sustain and enhance an observations infrastructure that is complementary to the existing operational and research observation infrastructure. At the same time it is crucial to build the analysis tools that will permit the comprehensive monitoring of land, atmosphere and ocean (the entire earth system) utilizing these combined infrastructures.

Since early 1970's satellite observations have been used to map and monitor the global snow cover. Information on the spatial distribution, snow extent and some bulk snow pack properties have been derived from observations in the visible, infrared and microwave spectral bands made from both polar orbiting and geostationary satellites. Both interactive and automated techniques were applied in order to infer information about the snow cover extent

from satellite data. A number of satellite-based operational and research snow cover datasets have been developed and made available for application in numerical weather prediction, hydrological and climate models. With more than 30 years of observations, satellite-based snow datasets present a valuable source of information for climate change studies. Despite substantial improvements in satellite instrumentation in recent years, mapping and monitoring of snow cover properties present substantial challenges.

The main objective of this workshop is to transfer to participants the current knowledge of remote sensing of snow, physical background of optical and microwave satellite data and to present the most recent results achieved in the snow product and algorithm development, snow products validation in the climate and hydrological applications using snow products.

### **Scope**

The IIRSS group will hold an International Training Workshop on Snow Monitoring on April 18-20, 2012 in Istanbul, Turkey. The workshop will include a series of lectures given by the members of group and invited speakers.

### **Topics**

- Meteorological/Environmental satellites and images
- Physical principles of remote sensing of snow
- Snow retrieval from satellite observations in the VIS/IR and microwave
- Blended snow product
- Available snow cover products and their features
- Use of satellite-based snow products in water management
- Long-term changes and trends in the snow cover distribution and extent
- Remote sensing of snow and instrumentation techniques.
- Satellite vs ground-based observations of snow cover properties.
- Evolution and utilization of water cycle

### **Target Audience**

The expected target audience of the Workshop includes graduate, master and PhD students from Universities as well as experts and post-docs from National Meteorological and Hydrological Services and other research institutions interested in remote sensing of snow cover and in the potential use of satellite-derived information on snow in environmental applications. Candidates should have basic knowledge of remote sensing, meteorological satellites and concept of water cycle. The Seminar language is English.

### **Seminar Fee**

|                                      | Normal (Euro) | Student (Euro) |
|--------------------------------------|---------------|----------------|
| Early bird – before 27 February 2012 | 250           | 125            |
| After 27 February 2012               | 300           | 150            |

\* There will be limited fund available for the registration fee. This fund will be used for students. Selection will be done based on motivation letter and CV of the participation. In order to apply for free registration students should attach their CVs and motivation letter when they submit their registration.

**Organization Comitee:**

## INTERNATIONAL INITIATIVE GROUP ON REMOTE SENSING OF SNOW (IIRSS)

Aydın Gürol Ertürk, Turkish State Meteorological Service  
Dr. Zühal Akyürek, Middle East Technical University  
Dr. Peter Romanov, NOAA, NESDIS  
Dr. Ali Nadir Arslan, Finnish Meteorological Institute  
Matias Takala, Finnish Meteorological Institute  
Serdar Sürer, MSc., Middle East Technical University

**Registration**

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## **Tentative Program**

### **Day 1 Remote Sensing of Snow & Importance of Snow in Water Management: Theory & Application**

|                      |  |
|----------------------|--|
| <b>08:50 – 09:00</b> | <i>Opening</i>   |
| <b>09:00 – 10:30</b> | <i>Optical Remote Sensing of Snow and Instrumentation Techniques (Akyürek)</i>       |
| <b>10:30 – 11:00</b> | Coffee Break   |
| <b>11:00 – 12:30</b> | <i>Microwave Remote Sensing of Snow and Instrumentation Techniques(Arslan)</i>       |
| <b>12:30 – 14:00</b> | Lunch Break  |
| <b>14:00 – 15:30</b> | <i>Snow Mapping and Monitoring: Techniques, Products, and Applications (Romanov)</i> |
| <b>15:30 – 16:00</b> | Coffee Break   |
| <b>16:00 – 17:00</b> | <i>Impacts of Snow Monitoring on Water Management (TBD)</i>                          |
| <b>17:00 – 17:30</b> | <i>Recognition Product from MSG-SEVIRI (Ertürk)</i>                                  |
| <b>17:30 – 18:00</b> | <i>Fractional Snow Product from NOAA-AVHRR (Sürer)</i>                               |

### **Day 2 Snow Parameters Retrieval Algorithms, Techniques & Validation**

|                      |   |
|----------------------|---|
| <b>09:00 – 10:00</b> | <i>Algorithms &amp; Techniques on Retrieval of Snow Water Equivalent (Arslan)</i>       |
| <b>10:00 – 11:00</b> | <i>Snow Water Equivalent Product from AMSR-E for mountainous areas (Beşer)</i>          |
| <b>11:00 - 11:30</b> | Coffee Break  |
| <b>11:30 – 12:30</b> | <i>Snow cover long-term changes and trends from satellite data (Romanov)</i>            |
| <b>12:30 – 14:00</b> | Lunch Break   |
| <b>14:00 – 15:00</b> | <i>Blended Snow Product Algorithms Using Optic and Passive Microwave Data (Akyürek)</i> |
| <b>15:00 – 15:30</b> | Coffee Break  |
| <b>15:30 – 16:30</b> | <i>Snow Product Validation (Sürer/Bolat)</i>  |
| <b>16:30 – 17:30</b> | <i>Snow measurement campaigns at FMI (Takala/Arslan)</i>                                |

### **Day 3 Hands on Application**

|                      |  |
|----------------------|--|
| <b>09:00 – 10:00</b> | <i>End-User Applications of H-SAF Snow Products (Takala)</i> |
| <b>10:00 – 10:30</b> | <i>How to utilize MODIS Snow Products (Kenan Bolat)</i>      |
| <b>10:30 – 11:00</b> | Coffee Break   |
| <b>11:00 – 12:00</b> | <i>Snow Product &amp; Hydrological Applications (TBD)</i>    |
| <b>12:00 – 13:00</b> | <i>Conclusion/Discussion (All)</i>                           |