



**Workshop on drought and remote sensing  
11-15 November 2013, Brdo, Slovenia**

**WORKSHOP REPORT**

**1. Introduction**

In the framework of the IPA/2012/290552 multi-beneficiary project “Building Resilience to Disasters in Western Balkans and Turkey”, a workshop on application of remote sensing data for drought monitoring was organized on 11-15 November 2013 in Brdo, Slovenia. The overall objective of the project is to reduce vulnerability of IPA beneficiary countries to disasters caused by natural hazards in line with the Hyogo Framework for Action and increase their resilience to climate change. The direct beneficiaries are the national authorities in charge for the disaster risk reduction and disaster risk management and the National Meteorological and Hydrological Services (NMHSs) of Albania, Bosnia and Herzegovina, Croatia, Montenegro, Serbia, Kosovo\*, the former Yugoslav Republic of Macedonia and Turkey. The project activities are grouped in eight tasks, of which four are implemented under WMO management. Among others, major efforts will be undertaken to strengthen the capacities of the NMHSs regarding hazard analysis and mapping.

Training workshop on application of remote sensing data for drought monitoring with emphasis on EUMETSAT LSA SAF products was organized by Slovenian Environment Agency/DMCSEE with the support from the project. The workshop was participated by 6 experts from project beneficiaries (participant list is attached as Annex II). Participants are experts in field of drought analyzing and monitoring from national meteorological services of SE Europe.

Vegetation parameters and evapotranspiration, calculated from measurements of the geostationary satellite Meteosat and prepared in scope of Land Surface Analysis Satellite Application Facility (LSA SAF) were presented. The operational system of monitoring and determining drought at Slovenian Environment Agency was introduced. It is based on monitoring of current satellite vegetation images, prepared in the frame of LSA SAF and compared with averaged vegetation conditions calculated on the basis of archived values from the year 2006. In the training part of the workshop, practical directions for operating with LSA SAF products, such as data input and processing in GIS environment were given.

## **2. Activities**

The opening session was devoted to introduction to basic properties of remote sensing data and application of satellite measurements in meteorology. Special emphasis was devoted to METEOSAT satellites – mainly due to the fact that METEOSAT data is already available in most of the regional meteorological services and there are some experiences in data treatment. Introduction to METEOSAT satellite system was given by expert in satellite meteorology Ms. Mateja Iršič Žibert from Slovenian Environment Agency.

Following sessions were focused on Land-surface analysis satellite application facility (LSA –SAF) developed by Institute of Meteorology and Geophysics from Portugal (IPMA). Lectures were given by Ms. Carla Sofia Barroso from IPMA; main emphasis was given to theoretical description of vegetation and soil temperature and to practical information on data formats etc. next session was devoted to assessment of evapotranspiration; although limited information on ET process can be obtained from satellites, it is still valuable source of information in combination with other datasets (ie. Global forecast data). Lectures were given by Mr. Nicholas Ghilain from Royal Meteorological Institute of Belgium.

Second part of the workshop was devoted to practical training. After initial lectures, Mr. Boštjan Muri from space institute Vesolje-SI led hands-on training; the goal of this session was that participants gain experiences in opening, visualizing and using LSA-SAF data.

## **3. Major issues, outcomes and problems**

The participants of the workshop understood and learned importance of remote sensing data for drought analysis. It represents valuable alternative to classical ground measurements; also more complex and recently developed drought indicators are based on point measurements of temperature and precipitation. Satellite measurements reveal vegetation response on conditions and through actual impacts reveal influence of drought conditions on crops.

The tools presented and used during hands-on training were not optimal; in order to enable participants to use data as soon as possible, a simple command-line tool was prepared to read and reformat files with satellite measurement data. All participants were able to process sample data and open it in desktop GIS environment where it can be visualized and/or overlaid with other data layers.

The LSA-SAF products are suitable for operational analysis; however spatial resolution is low (pixel size cca. 4 km for our geographical latitude) so there are limited options for their applications; definitely they are appropriate for general overview of situation.

## **4. Conclusions and recommendations – round table discussion**

Participants from Bulgaria see possibilities for monitoring of wheat status in combination with other methods (ie. »GIS vesion« of the ISAREG model). It is also possible to gain additional knowledge on crop coefficients.

In FYR Macedonia remote sensing data is not implemented. However they see potential in tobacco fields and vineyards.

In Montenegro they already have experiences with performance of remote sensing data. Assessment was done for whole country. For 3 agriculture areas in the country the results were satisfactory (flat areas near rivers and coast). They recommend to select and focus

implementation of remote sensing data on relevant areas. A lot of potential is also for monitoring danger of forest fires.

In NMHS of Serbia application of remote sensing data in agrometeorology is in development. Data (incl. LSA SAF) is received. There is need to study previous drought periods and to create a reference data set in order to study and define most appropriate indicators. Currently indicators such as SPI, PDSI, Z-index and model CropSyst are implemented.

Request for LSA data – we should organize common request for study purpose.

Precipitation anomalies (station level, seasonal grids) and SPI maps are basic products for drought monitoring in Croatia. Vulnerability map is also available. They have completed relevant internal projects (definition of less favourable agricultural areas etc.). Forest fire index is also used. Remote sensing data is currently used for weather forecasting, it is not archived. SAF data is used for analysis of albedo and radiation budget. LSA SAF is currently not used, they will explore possible applications.

In Bosnia remote sensing data is used in synoptic department. Currently they calculate monthly drought indicators based on ground measurements. Participants from Bosnia see potential applicability of LSA-SAF data, mainly for improvement of monthly and seasonal analysis.

\*This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence

## AGENDA

Monday, 11<sup>th</sup> November

14:00 - 16:00	Registration of participants
15:00 - 16:00	Welcome by Environmental Agency of Slovenia
16:00	Opening of the workshop

Tuesday, 12<sup>th</sup> November

8:30 - 9:30	Registration of participants	
9:30 - 10:15	Introduction to EUMETSAT products	Mateja Iršič Žibert, ARSO
10:15 - 10:30	<i>Coffee break</i>	
10:30 - 11:15	Overview of LSA SAF products	Carla Sofia Barroso, IPMA
11:15 - 12:00	Drought monitoring and remote sensing	Boštjan Muri, SPACE-SI
12:00 - 14:00	<i>Lunch</i>	
14:00 - 15:30	LSA SAF land surface temperature and vegetation	Carla Sofia Barroso, IPMA
15:30 - 15:45	<i>Coffee break</i>	
15:45 - 16:30	LSA SAF products: files and formats	Carla Sofia Barroso, IPMA

Wednesday, 13<sup>th</sup> November

9:30 - 10:30	Satellite-derived evapotranspiration: products and methods	Nicolas Ghilain, RMI
10:30 - 10:45	<i>Coffe break</i>	
10:45 - 12:00	Satellite-derived evapotranspiration: files, formats and applications	Nicolas Ghilain, RMI
12:00 - 14:00	<i>Lunch</i>	
14:00 - 15:00	Hands-on training - introductory lectures <ul style="list-style-type: none"> <li>- GIS software</li> <li>- HDF5 format</li> <li>- Working with satellite projection</li> </ul>	Boštjan Muri, SPACE-SI
15:00 - 15:30	Working with drought monitoring products - Introduction to hands-on training	Boštjan Muri, SPACE-SI
15:30 - 15:45	<i>Coffee break</i>	
15:45 - 16:30	Working with drought monitoring products - Hands-on training	Boštjan Muri, SPACE-SI

## Thursday, 14<sup>th</sup> November

9:00 - 10:30	Working with drought monitoring products - Hands-on training (continued)	Boštjan Muri, SPACE-SI
10:30 - 10:45	<i>Coffee break</i>	
10:45 - 12:00	Working with drought monitoring products - Hands-on training (continued)	Boštjan Muri, SPACE-SI
12:00 - 14:00	<i>Lunch</i>	
14:00 - 16:00	Working with drought monitoring products - Hands-on training (conclusion)	Boštjan Muri, SPACE-SI
15:00 - 15:30	<i>Coffee</i>	

## Friday, 15<sup>th</sup> November

9:00 - 9:30	Application of remote sensing data in Slovenia - methods and products	Boštjan Muri, SPACE-SI
9:30 - 10:30	Round table discussion <ul style="list-style-type: none"><li>- application of remote sensing for drought monitoring in participating countries</li><li>- improvement of DMCSEE drought monitoring bulletins</li><li>- plans</li></ul>	Moderated by ARSO
10:30 - 10:45	<i>Coffee break</i>	
10:45 - 12:00	Round table discussion (continued)	Moderated by ARSO
12:00	Closure of the workshop	

## LIST OF PARTICIPANTS

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