

Use of satellite information in research and operational activities at NIMH of Bulgaria

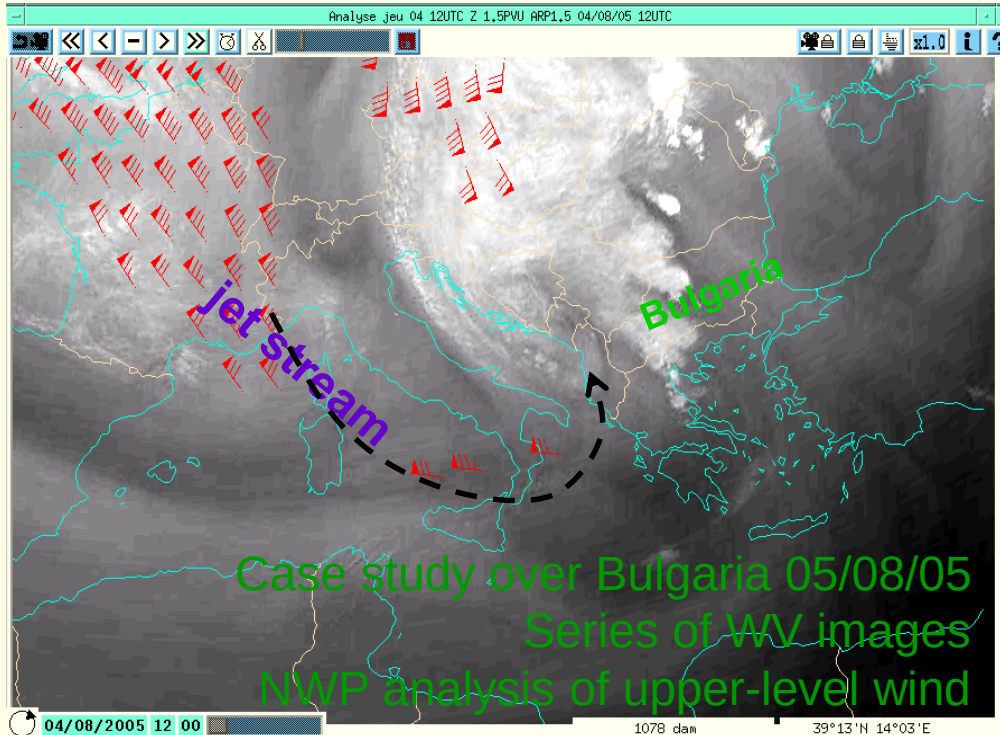
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Overview

1. Meteosat Data in the Forecasting environment at NIMH
 - Currently used operationally in the analysis and short range forecasting.
 - SYNERGY Forecasting System
 - A System for determining rainfall and snow cover using information from METEOSAT and terrestrial network and automatic stations: Precipitation module and Snow module
2. Participation of NIMH in H-SAF Consortium
 - Validation of soil moisture, precipitation and snow cover products
3. NIMH activities in Land Surface Analyses
 - EUMETSAT SALGEE Project (validation, development of methods for drought assessment with application in agrometeorology and forecasting of high impact weather, thermal anomalies detection, fire risk forecasts, biomass burning effects, etc.).
 - Training activities: biannual SALGEE Workshops
 - Participation of NIMH in LSA SAF Consortium

1. Nowcasting Applications

MSG WV image and upper-level wind by NWP model



The SYNERGIE system provides a set of tools to use satellite data in upper-level diagnosis.

Satellite data is used operationally for early forecasts of severe weather due to rapid cyclogenesis and convection.

This is an example of severe convection, where the use of satellite WV images was beneficial for observing the advection of a vorticity structure. This is a critical point in nowcasting of the convective development in combine with synoptic observation data and NWP output.

2. EUMETCast Data on SYNERGY Forecasting System

- The SYNERGIE at NIMH of Bulgaria includes options for processing **MSG images of MPEF & LAND SAF products** in support of the operational activities in the following areas:
 - Early and Short-range forecast
 - Land Surface Applications

3. Land Applications: Fire Detection

In support of the activities of State Forest Agency / Fire Rescue and Civil Protection Authorities

Thermal anomalies detection in operational regime

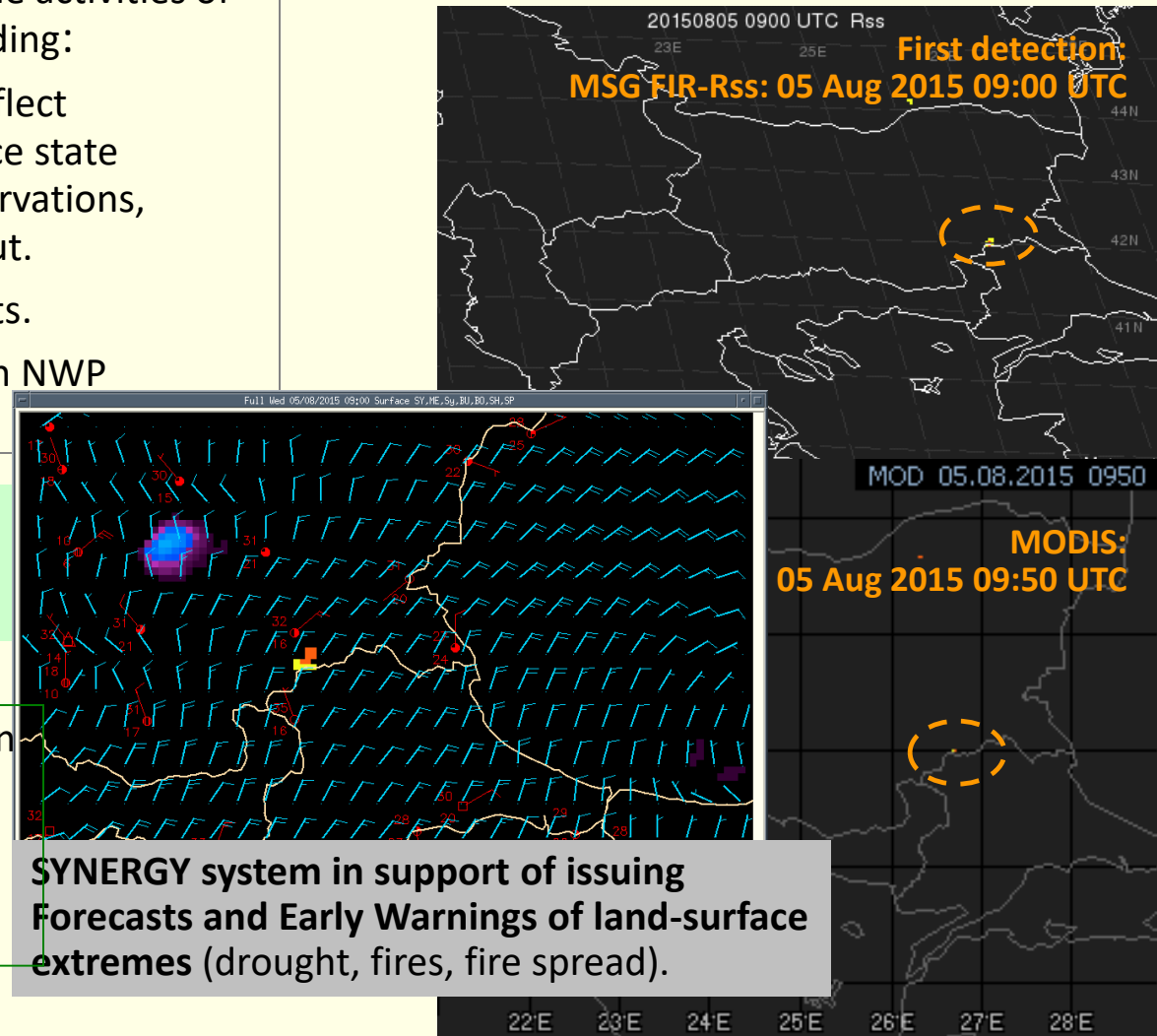
To meet the requirements of the national authorities, in fire weather situations NIMH supports the activities of Fire Rescue and Civil Protection by providing:

- Various indexes for fire risk (to reflect weather- and vegetated land surface state conditions) based on synoptic observations, meteorological models, NWP output.
- Fire detection by satellite products.
- Issuing specific forecasts based on NWP output and EUMETSAT products.

1. FIR and MPE precipitation products
2. Synoptic observations ALADIN NWP
3. 3-h forecast of wind valid for 12 UTC

- The windy environment (observation in red and ALADIN forecast for the next 3 hours in blue 7- 8 m/s) favour fire spread towards Turkey
- Precipitations are far to the NW.

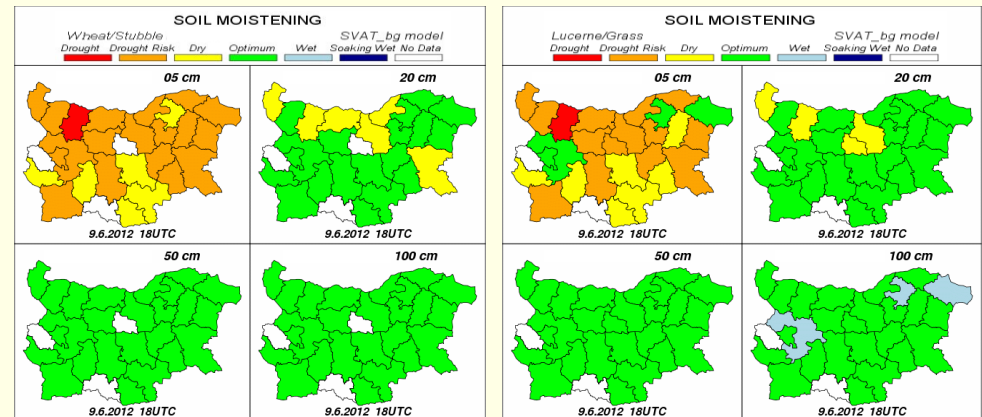
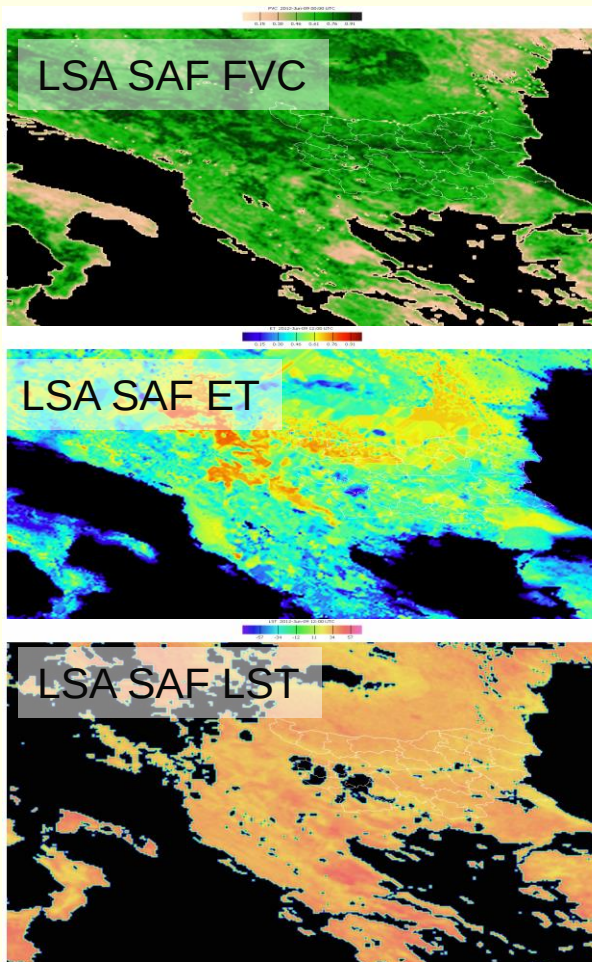
Example: First announcement for the fire in the National authorities: 05 Aug 2015 09:15 UTC. Early warning by EUMETSAT FIR product 15 min in advance.



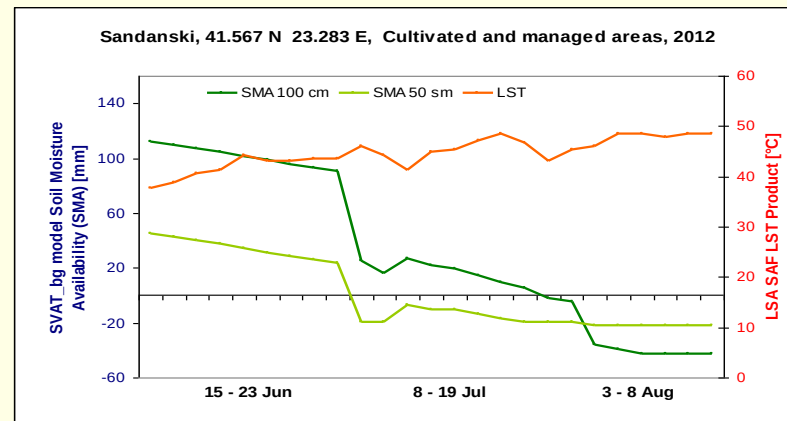
4. Land-Atmosphere Interactions: Land surface state & Processes

- **Modeling** (based on SVAT modeling)
- Agricultural drought assessment: onset, severity, duration
- Drought Warning System - drought assessment in operational regime and yield prediction.

- **LSA SAF Products application in drought assessment/forecast** (based on MSG data)
- Agricultural drought assessment– onset, severity, duration
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SVAT model products & Satellite: SMA depletion is accompanied by decrease of FVC, decrease of ET, increase of LST.



5. EUMETSAT SALGEE Project

SALGEE User Group

Satellite Applications in Land surface analyses Group for Eastern Europe

- **SALGEE** project of EUMETSAT was established in 2010. NIMH Bulgaria contributes to coordination activities with EUMETSAT and LSA SAF.
- **SALGEE user Group acts to support LSA SAF activities** in user services & training in the region of South Eastern-, Eastern- Europe and other regions of interest:
 - **Support the implementation of EUMETSAT SAF Strategy** related to climate monitoring.
 - **Maintain regional and global** partnership (NMSs, NOAA, NASA and other agencies, etc.).
 - **Organise biennial international** workshops to review and discuss progress in land surface applications.

6. SALGEE WORKSHOPS

5th SALGEE Workshop
**“MSG Land Surface Applications:
Heat waves, Drought Hazard and
Fire Monitoring”**

18-20 September 2017
Erevan, Armenia

Disturbances to land cover of drought
and fires are of a special importance
because of associated changes in
water and gas exchange.

SALGEE Workshops on MSG Land Surface Applications

3rd SALGEE



Drought and Fire Emissions
20 - 21 March 2013
Ericeira/Lisbon, Portugal

4th SALGEE



Drought and
Environmental Response
1-3 September 2015
Matera, Italy

1st SALGEE



Drought and Fires
7-10 Sep 2009
Sofia, Bulgaria

2nd SALGEE



Drought and Fires
4 - 7 April 2011
Antalya, Turkey

Methodology

- Regional applications of Land SAF products.
- Local scale assessment of Soil moisture deficit and related biophysical processes by LSMs (SVAT modeling).
- Ground observations.

The Land Surface Analyses Satellite Application Facility, LSA SAF has been especially designed to serve the needs of the meteorological community, particularly Numerical Weather Prediction (NWP). Nowadays, the LSA SAF program addresses a much broader community and operational applications.

LAND SURFACE ANALYSIS SAF NETWORK



<https://landsaf.ipma.pt/>



7. NIMH Bulgaria become a member of EUMETSAT LSA SAF Consortium since 2017

LSA SAF is an initiative of:



LSA SAF consortium in CDOP2 (2012-2017):

