BULGARIAN ACADEMY OF SCIENCES
NATIONAL INSTITUTE OF METEOROLOGY AND HYDROLOGY

FINAL REPORT

4th SALGEE Workshop:
"MSG Land Surface Applications: Drought and Environmental Response"

Matera, 1– 3 September 2015, Italy

SALGEE Secretary
October 2015

1) Introduction

The 4th SALGEE2015 training workshop **"MSG Land Surface Applications: Drought and Environmental Response"** was held at Matera /*Hotel S. Domenico al Piano*/, Italy, on 1-3 September 2015 and was hosted by the Institute of Methodologies for Environmental Analysis in the National Research Council (CNR – IMAA) of Italy. CNR – IMAA is involved in the development and the integration of satellite, airborne and ground-based Earth Observation Technologies for studying and monitoring environmental and geophysical processes related to atmosphere, hydrosphere, lithosphere and biosphere plus their interactions both for the development of meteo-climatic applications and risk prediction, prevention and mitigation. The Workshop is supported by EUMETSAT in the frame of SALGEE (**S**atellite **A**pplications for **L**and surface analyses **G**roup for **E**astern **E**urope) project. It is a next step forward for exchanging experience and advanced knowledge and training for the meteorological user community in Eastern part of Europe on using MSG satellites information in conjunction with ground observations and numerical/meteorological modelling, reinforcing the use of Meteosat beyond the meteorological applications. Some aspects of environmental response to weather and climate provoked drought phenomena are put in consideration for the first time in the viewpoint of research, operational applications, and forecasting. The venue of the workshop, the town Matera is a remarkable old historic town in southern Italy is selected as 2019 European Capital of Culture.

2) 4th SALGEE Workshop objectives

The 4th SALGEE training workshop "MSG Land Surface Applications: Drought and Environmental Response" was designed to foster the use of MSG satellite observations to monitor a wide range of biogeophysical processes related to terrestrial drought. The specific goals were:

1) To review the state of knowledge and various applications of MSG based algorithms and LSA SAF products (*including in combination with modeling, ground observations, and*

data from other satellite systems) in various reveals of drought. The main accent is given to the land surface temperature (LST) product estimates from remote sensing platforms.

2) To accent on the drought provoked fire risk, fire spread and biomass burning effects assessments by MSG algorithms and other satellite systems.
3) To provide a forum to review the key uses of satellite data in this field and share experience among the NMSs (mainly) user community in South Eastern Europe and developers of satellite products NASA, NOAA, CNR – IMAA Italy and others, /trainers from EUMETSAT, LSA SAF, and ultimately
4) To facilitate initiation of international collaborations among participating countries to combine knowledge and experience for broadening the range of land related applications using MSG.

3) Administrative organization of the 4th SALGEE

The CNR–IMAA of Italy in cooperation with EUMETSAT organized the logistic aspects of the 4th SALGEE Workshop, as:

- The Workshop was announced on the EUMETSAT Training zone web page (*http://training.eumetsat.int/course/view.php?id=158*). Invitation Letters, signed by the by the CNR Director and to were sent all sponsored participants.
- The Workshop was held at the Hotel "*Sant Domenico al Piano*" in the town Matera, southern region of Basilicata, southwest from the Bary, Italy. The opening was at 09:00 hr on Tuesday, 01 September 2015. The closure was at 12:30 h on Thursday, 03 September.
- Logistics: Responsible person for the CNR–IMAA Local Organising Committee in Italy regarding the organization of all logistic matters was Dr. Nicola Pergola with the assistance of Dr. Lauramaria Figundio. All participants (lecturers and students) were staying at "*S. Domenico al Piano*". The lecture Hall was in the hotel with good facilities for presentations. Most of the participants arrived on 31 August; only single persons arrived on 01st September (for the day of their presentations). The transportation from/to Matera to the Bary airport was by taxi, train or shared shuttle. Training equipment: All SALGEE presentations were given as oral talks using hotel technical equipment for PowerPoint presentations. Very good Internet connection was available in the Hotel.
- Social events: Two social events were organised for the 4th SALGEE participants:
    - Icebreaker cocktail in the Hotel on 31 August. After the cocktail; A short walking tour in the centre of Matera, with guidance for the historic 'sassi' was organised by Dr. Lauramaria Figundio (CNR–IMAA).
    - Workshop dinner on 02 September 2015 in a typical Italian restaurant.
- Finances: The workshop was sponsored by EUMETSAT and co-sponsored for the Icebreaker cocktail by the CNR–IMAA of Italy.
- For administrative matters the responsible person from EUMETSAT was Ms. Regina Hoefenmayer.

A high level organization of the workshop including: logistics, facilities for presentations, coffee breaks, social events, and transportation were ensured at a high level.

4) Scientific program of the 4th SALGEE

- The scientific organising committee of the Workshop comprise from SALGEE Steering Group members - EUMETSAT (Jose Prieto), LSA SAF (Luis Pessanha) and NIMH Bulgaria

(Julia Stoyanova). The LSA SAF representative Dr. Luis Pessanha does not participate in the organization of the workshop but actively participated in the 'Discussion' panels of the workshop.

- The SALGEE secretary (Dr. Julia Stoyanova), NIMH Bulgaria was the chairperson of the 4th SALGEE Workshop.
- Scientific aspects of the workshop were prepared in accordance to the EUMETSAT contract with NIMH Bulgaria, PO Number/Date 4500010438/29-January-2014. The SALGEE Secretary, Julia Stoyanova elaborated workshop agenda as a part of the EUM P.O. 4500010438/29-January-2014 - WP4) and has responsibility to get in contact with the proposed lecturers and ensure their availability.

The work on the EUMETSAT P.O. 2014 was framed in 5 Work Packages, aimed to contribute the development of the workshop agenda, and to mark and illustrate by case study examples different aspects of the MSG use in terrestrial drought assessments and its environmental response, including:

Work Package 1: Use of satellite data in support to Drought Warning System (site/regional scale).
Work Package 2: From Drought to Fire risk warning.
Work Package 3: Climatic Applications of the relation between Vegetation types and Fire occurrence.
Work Package 4: The preparation of the draft programme of the 4th SALGEE Workshop (in 2015).
Work Package 5: Further development of the SALGEE web page, hosted under the EUMETSAT Internet Moodle platform.

Some of the potential lecturers were prevented to attend the workshop but other presenters covered their talks (see the agenda, **Appendix 1**), i.e.:

- Martin Wooster gave the talks of Darren Ghent (Univ. of Leicester);
- Sofia Ermida gave the talk of Prof. Carlos DaCamara.

5) 4th SALGEE Workshop structure

The agenda of the 4th SALGEE Workshop covers a broad scale of MSG applications related to different aspects of the complex drought problem and corresponding environmental response provoked by weather and climate extremes. In general we followed the scope of the preceding SALGEE WS, covering the problem of drought and vegetation fire but broadening the aspects of their reveals. The agenda (see **appendix 1**) included four general sessions based to the following respective topics and sub-topics:

Topic1: EUMETSAT activities in Land Surface Analyses (*covering overview lectures of the activities in IMAA-CNR, LSA SAF, SALGEE and the forthcoming CDOP-3*).

Topic 2: Drought monitoring from space

Sub-topic 2.1. Satellite data and processing (*include overview of operational LSA SAF products and perspectives with special attention to LST product –IR and passive microwave, software packages for processing).*

Sub-topic 2.2. Drought related applications (*accent is given on Meteosat information for evaluation soil/vegetation state, including soil moisture, agricultural drought assessments, development of early warning systems).*

Topic 3: Fires-Climate-Ecosystem Interactions

Sub-topic 3.1. Fire detection and monitoring (*including detection of active fire and affected area using MSG-SEVIRI/ VIIRS based algorithms, evaluation of fire behavior, capabilities for fire risk forecast*)

Sub-topic 3.2. Ecosystems – Environment – Sustainability (*characterising the complex relations between climate and ecosystems including: vegetation distribution, biomass burning, NPP/GPP, vegetation dynamics and disturbances based on SEVIRI/MODIS satellite products, capabilities of future satellite missions*).

Topic 4: Regional Applications (*cover the presentations of representatives of SEE and EE countries on and surface applications).*

Jose Prieto from EUMETSAT and Luis Pessanha opened the Workshop. Dr. Nicola Pergola being the responsible person the Local Organising Committee gave introduction talk. The CNR-IMAA Director - Dr. Vincenzo Lapenna, attended this introduction session. The first two days of the workshop included topics overview presentations by the invited lecturers (see **Appendix 2**) and selected presentations from some more experienced participants (see **Appendix 2**). A brief discussion (on 'Discussion/Collaboration perspectives') was conducted at the conclusion of each working day. The third day (morning) focused on the presentations of the specific regional applications in Bulgaria, Italy, Turkey, Moldova, followed by a general discussion session for the workshop conclusion. Each session was chaired by two of the invited lecturers and SALGEE Steering committee members chaired the all discussion sessions (intermediate and general).

6) Workshop attendance

16 persons (lecturers and participants), representing nine different countries, participated in the 4th SALGEE Workshop. These are remote sensing specialists, modelers and members of NMSs user community. Invitation letters, signed by the CNR-IMAA Director, Dr. Vincenzo Lapenna were sent to all participants. The full participants list is presented in **Appendix 2:**

- Lecturers who are satellite product developers, leading experts in satellite applications for LSA, and trainers gave high-level lecture support to the 4th SALGEE Workshop. The presenters work for national meteorological services or environmental institutions (Bulgarian NIMH, University of Basilicata - School of Engineering, Potenza in Italy), satellite agencies and institutions (EUMETSAT, Land SAF Consortium, NOAA/NESDIS University of Maryland), CNR-IMAA.
- Invited participants were representatives of the Meteorological Institutions in the region of South-eastern and Eastern Europe: (Bulgaria, Moldova, Turkey) and related Universities – Univ. Reading, UK; /Univ. Basilicata - School of Engineering, Potenza, Italy or CNR-IMAA Research canter;
- Additionally, participants from the host institute CNR–IMAA have attended too, but their names are not included in the **Appendix 2**.
- One participant from Greece, Aristotel University of Thessaloniki was approved to participate but at a later stage he cancelled his participation due to personal reasons.

7) Add value of the 4th SALGEE Workshop

- Extending the scope and problems concerning MSG data and products applications focusing on the environmental reveals related of weather/climate, applying integrated interdisciplinary approach; Steps foreword to include the couple consideration of the energy-water-carbon cycles are made;
- Extend knowledge on LST satellite products from various platforms/algorithms.
- Enlarged institutional involvement in the SALGEE initiative with new members, developers of satellite products from CNR – IMAA of Italy; University of Basilicata - School of Engineering from Italy;

- Strengthening collaboration with ESA through the GlobTemperature Project. Established link since 2014 with participation in two DUE GlobTemperature User Consultation Meeting 2014 and 2015. Presentations from the ESA GlobTemperature Project and included in the Workshop agenda.
- Extend the user community of LSA SAF products, including Moldova in the SALGEE user Group.

8) Summary of the discussions: Recommendations for the next SAGEE activities

The recommendations proposed during the intermediate and General Discussions are in the scope to continue building the SALGEE community. The agreed recommendations are focused on the following directions:

- Efforts to be made to combine knowledge and expertise to build international teams for strengthening the complex use of MSG based products in combination with other sources of information (*in situ* measurements, NWP/meteorological models, other satellite platforms) for solving specific drought related environmental problems.
- To test the utility of satellite products for different parts of the target SALGEE region for the purposes (in general) of:
    1. Assessment/forecast of complex phenomena like drought;
    2. Validation sensitivity/accuracy of thermal anomalies detection algorithms.
- To developed scientific background and teams for elaboration of case study examples.

Specific actions planned for 2016 are listed below /as proposed by Italy/:

- 3 months after the 4th SALGEE (end of November - beginning of December 2015), a shorts summary of the personal contributions of each participant to be shared on the SALGEE web page.
- 6 months after the 4th SALGEE (the end of March 2016), satellite-based products related to drought environmental response to be defined.
- 6 months after the 4th SALGEE - fire cases for validation to be proposed.
- After about one year (Nov-Dec 2016) discussion on the selected case studies to be organized.

All presentations are collected and distributed among the participant in the 4th SALSEE workshop 2015 on individual flash memory.

9) Place of the 4th SALGEE 2015

The place of the next 5th SALGEE Training workshop in 2017 was not discussed. In previous personal talks, there was a suggestion for its organisation in Sofia, also the idea to be held in Darmstadt was mentioned by an Italian colleague.

Sofia,
07 October2015
25 October 2015 Updated
19 November 2015 last update

SALGEE Secretary: . . . . . .

/Assoc.Prof. Dr. Julia (Stoyanova) Georgieva/

Appendix 1

4rd SALGEE Workshop 2015

MSG LAND SURFACE APPLICATIONS: DROUGHT AND ENVIRONMENTAL RESPONSE

Matera, Hotel S. Domenico al Piano, Italy, 01 - 03 September 2015

31 August 2015

20:00 Welcome Icebreaker

01 September 2015

Topic 1
EUMETSAT activities in Land Surface Analyses

Chair: Jose Prieto

09:00	**09:30**	Registration
09:30	**09:40**	Workshop opening Nicola Pergola, CNR – IMAA Italy
09:40	**10:00**	CNR-IMAA satellite activities for Land applications Nicola Pergola, CNR – IMAA Italy
10:00	**10:15**	LSA SAF Programme: Status and perspectives for further developments. CDOP-3Luis Pessanha, LSA SAF Portugal
10:15	**10:30**	SALGEE Project for Land Surface Analyses Julia Stoyanova, NIMH Bulgaria
10:30	**11:00**	**Break**

Topic 2

Drought monitoring from space

2.1. Satellite data and processing

Chair: Luis Pessanha and Julia Stoyanova

11:00	**11:30**	Short overview of operational LSA SA products: Status and developments. Luis Pessanha, LSA SAF
11:30	**12:00**	Towards a harmonized LST product. IR and passive microwave techniques for retrieval of LST. Sofia Ermida, Univ Lisbon, Portugal
12:00	**12:30**	Kalman filter for Simultaneous Retrieval of Emissivity and LST from SEVIRI data Carmine Serio, Univ Basilicata, Italy
12:30	**14:00**	**Lunch break**
14:00	**14:30**	DUE GlobTemperature Project. Available LST datasets. Darren Ghent, Univ. Leicester, UK / Sofia Ermida, Univ Lisbon, Portugal
14:30	**15:00**	Integration of Land SAF Products in the TMet Software Package. Erdem Erdy, TSMS Turkey

2.2. Drought related applications

Chair: Julia Stoyanova and Luis Pesanha

15:00	**15:30**	Meteosat information on soil dryness and vegetation evolution. Jose Prieto EUMETSAT
15:30	**16:00**	**Coffee break**
16:00	**16:30**	Soil moisture monitoring by passive microwave sensors Teodosio Lacava, CNR-IMAA, Italy
16:30	**17:00**	Warning system for agricultural drought assessment: Meteorological approach based on modeling, in situ observations and MSG information. Julia Stoyanova, NIMH Bulgaria
17:00	**17:20**	Operational drought risk assessment using satellite observations and in situ measurements. Elena Tarnavsky, Univ. Reading, UK
17:20	**18:00**	**Discussion/ Collaboration perspectives** *Chair: Jose Prieto, Luis Pesanha, Julia Stoyanova*

Social event: 31 August 2015, 19:00 - Icebreaker

02 September 2015

Topic 3
Fires-Climate-Ecosystem Interactions

Chair: Nicola Pergola and Valerio Tramutoli

3.1. Fire detection and monitoring

09:00	**09:30**	Advances on active fire detection by using MSG-SEVIRI Valerio Tramutoli, Univ. Basilicata, Italy
09:30	**10:00**	Application of new VIIRS active fire data for direct mapping of fire-affected areas and seeding of existing burned area mapping products. Wilfrid Schroeder, NOAA
10:00	**10:30**	LSA SAF Fire Radiative Power Product (capabilities, validation) Martin Wooster, King's College, UK
10:30	**11:00**	**Break**
11:00	**11:30**	Application of satellite active fire data as input to a cutting-edge fire behavior modeling framework Wilfrid Schroeder, NOAA
11:30	**12:00**	The Fire Risk Mapping (FRM) product of the LSA SAF: its application to forest management Carlos DaCamara/Sofia Ermida, Univ. Lisbon, Portugal
12:00	**12:30**	Regional scale fire risk assessment and its combined use with LSA SAF Fire Risk Mapping (FRM) product. Julia Stoyanova/Mariana Popova, NIMH Bulgaria
12:30	**14:00**	**Lunch break**

3.2. Ecosystems – Environment – Sustainability

Chair: Martin Wooster and Wilfrid Schroder

14:00	**14:40**	LSA SAF Fire Radiative Power Product Application.

		Martin Wooster, King's College, UK
14:40	**15:10**	LSA SAF products in support to regional climatic applications: Ecosystem Functional Types identification, bioclimate and biomass burning effects. Julia Stoyanova, NIMH Bulgaria
15:10	**15:40**	The MODIS GPP/NPP products: assessing the land CO2 sink from space. Ana Bastos, Instituto Dom Luiz, Portugal
15:40	**16:10**	**Coffee break**
16:10	**16:40**	Studying vegetation dynamics under disturbance using MODIS products. Ana Bastos, Instituto Dom Luiz, Portugal
16:40	**17:10**	Land degradation and desertification processes using polar orbiting satellites. Tiziana Simoniello, CNR – IMAA, Italy
17:10	**17:30**	Sentinel-3 Mission Martin Wooster, King's College, UK/ Darren Ghent, Univ. Leicester, UK
17:30	**18:00**	**Discussion/ Collaboration perspectives** *Chair: Jose Prieto, Luis Pesanha, Julia Stoyanova*

20:30 Social event: Workshop dinner

03 September 2015

Topic 3
Regional Applications

Chair: Jose Prieto, Luis Pesanha, Julia Stoyanova

09:00	**10:00**	**Reports of NMSs participants** - Italy, CNR-IMMA - Bulgaria, NIMH - Turkey, TSMS - Moldova NIMH
10:00	**10:30**	**Break**
10:30	**12:30**	**General Discussion**

Appendix 2

4th SALGEE Workshop 2015 List of Lecturers and Participants

MSG LAND SURFACE APPLICATIONS: DROUGHT AND ENVIRONMENTAL RESPONSE

Matera, Hotel S. Domenico al Piano, Italy, 01 - 03 September 2015

List of Lecturers and Participants

No.	Country	Name	Organisation / Institute/Address
LECTURERS			
1.	Germany	Jose Prieto	EUMETSAT E-mail: Jose.Prieto@meteo.bg
2	Portugal	Luis Pessanha	Dr. Luis Pessanha, LSA SAF Instituto Português do Mar e da Atmosfera, I.P. Rua C ao Aeroporto 1749-077 Lisboa Phone: +351 218 447 158 Fax: +351 218 462 199 E-mail: luis.pessanha@ipma.pt
3.	Bulgaria	Julia Stoyanova	Assoc. Prof. Dr. Julia (Stoyanova) Georgieva Forecasting Department/ Remote sensing division National Institute of Meteorology and Hydrology 66 Tsarigradsko chaussee Blvd. 1784 Sofia Bulgaria Phone: (+359 2) 462 4603 E-mail: Julia.Stoyanova@meteo.bg
4.	UK	Martin Wooster	Prof. Martin Wooster King's College London, London, UK Earth & Environmental Dynamics Research Group Dept. of Geography, King's College London, Strand, London WC2R 2LS, Tel:0207 848 2577 E-mail: Martin.Wooster@kcl.ac.uk
5.	USA	Wilfrid Schroeder	Dr. Wilfrid Schroeder Research Associate Professor Dept of Geographical Sciences University of Maryland 4321 Hartwick Rd Suite 400 College Park MD 20740 USA phone: +1 301-314-1467 E-mail: wschroed@umd.edu
6.	Italy	Nicola Pergola	Dr. Nicola Pergola CNR – IMAA, Italy Research Scientist CNR - IMAA C. da S. Loja 85050 Tito Scalo (Pz) - ITALY

			tel: +39-0971-427268 E-mail: nicola.pergola@imaa.cnr.it
7.	Italy	Valerio Tramutoli	Dr. Valerio Tramutoli University of Basilicata - School of Engineering Via dell'Ateneo Lucano, 10 85100 - Potenza tel/fax: +39-0971-205205 E-mail: valerio.tramutoli@unibas.it
8	Italy	Carmine Serio	Prof. Carmine Serio Univ. Basilicata – School of Engineering, Italy Via dell'Ateneo Lucano, 10 85100 - Potenza E-mail: carmine.serio@unibas.it
9.	Portugal	Sofia Ermida	PhD Sofia Ermida Univ. Lisbon, Portugal E-mail: snermida@fc.ul.pt
10.	France	Ana Bastos	Dr. Ana Bastos IPSL – LSCE CEA CNRS UVSQ Centre d'Etudes Orme des Merisiers 91191 Gif sur Yvette France E-mail: afbastos@fc.ul.pt and ana.bastos@lsce.ipsl.fr
PARTICIPANTS			
11.	Turkey	Erdem Erdi	Erdem Erdy Turkish State Meteorological Service Remote Sensing Division CC:401 Ankara / TURKIYE Office: +90 312 3022624 Tel : +90 312 302 2624& Fax :+90 312 360 62 76 e-mail : eerdi@mgm.gov.tr
12.	Bulgaria	Mariana Popova	Mariana Popova Forecasting Department, Operational forecast division National Institute of meteorology and Hydrology 66 Tsarigradsko chaussee Blvd. 1784 Sofia, Bulgaria e-mail: mariana.popova@meteo.bg
13.	Bulgaria	Evgeni Vladimirov	Evgeni Vladimirov Forecasting Department, Remote sensing division National Institute of Meteorology and Hydrology, Bulgarian Academy of Sciences 66 Tsarigradsko chaussee Blvd. 1784 Sofia, Bulgaria tel. +359 2 462 4600 e-mail: evgeni.vladimirov@meteo.bg
14.	Italy	Teodosio Lacava	Dr. Teodosio Lacava Institute of Methodologies for Environmental Analysis (IMAA), National Research Council (CNR) C. da S. Loja 85050 Potenza, Italy E-mail: teodosio.lacava@imaa.cnr.it
15.	Italy	Tiziana Simoniello	Dr. Tiziana Simoniello CNR – IMAA Italy C. da S. Loja 85050 Potenza, Italy E-mail: tiziana.simoniello@imaa.cnr.it
16.	Italy	Sara Venafra	Sara Venafra, PhD School of Engineering, University of Basilicata Potenza, Italy

			sara.venafra@unibas.it
17.	UK	Elena Tarnavsky	Dr Elena Tarnavsky, Senior Research Fellow TAMSAT Research Group & NCEO Impact Team University of Reading, Meteorology Department tel +44 (0)118 378 7897 e.tarnavsky@reading.ac.uk
18.	Moldova	Valentina Bildina	Valentina Bildina State Hydrometeorological Service, Forecasting department 193, Grenoble Str. 2043 Chisinau Moldova v.bildina@gmail.com
19.	Italy	Some CNR – IMAA Italy participants	
20.	Greece	Representative of Aristotle University of Thessaloniki	Does not attend Greece