

**11TH EARSEL FOREST FIRES SIG WORKSHOP ON 'NEW TRENDS IN FOREST FIRE RESEARCH INCORPORATING BIG DATA AND CLIMATE CHANGE MODELING'
Chania, Greece, 25-27 September 2017**

REPORT

The 11th International Workshop on 'New Trends in Forest Fire Research Incorporating Big Data and Climate Change Modeling' was organised by the Mediterranean Agronomic Institute of Chania (MAICh) and the Laboratory of Forest Management and Remote Sensing, Aristotle University of Thessaloniki (AUTH), in collaboration with National Aeronautics and Space Administration (NASA) and supported by the European Space Agency (ESA).

The Chania workshop is the most recent of a series of technical meetings that were organised by the EARSeL SIG on Forest Fires after its foundation in 1995. The previous meetings were held in Alcalá de Henares (1995), Luso (1998), Paris (2001), Ghent (2003), Zaragoza (2005), Thessaloniki (2007), Matera (2009), Stresa (2011) Coombe Abbey (2013) and Limassol (2015).

The workshop was focused on global systems for monitoring wildfires, as well as the missions providing data for this purpose, and the modeling endeavours with regards to climate change, considering the contribution of forest fires. In addition, there were a number of contributions related to the growing need for extraction of valuable information from large volumes of spatio-temporal data and exploitation of dense satellite time-series, derived from multiple observation systems, for forest fire detection and monitoring and mapping of burned areas. The noted satellite systems include the Sentinel-1 and -2 missions, Landsat-8, FireBIRD and MODIS/MERIS.

The workshop was attended by more than 55 participants from 16 different countries. The European participants originated from Spain, Italy, Greece, the U.K., the Netherlands, Germany, Switzerland, Austria and Romania, while non-European participants included delegates from the U.S.A., Canada, the Russian Federation, The People's Republic of China, Australia, Algeria and the Lebanon.



The main activities of the Workshop included 4 keynote lectures given by invited speakers, 6 oral sessions and a poster session. The different activities of the Workshop are presented, in more detail, below:

KEYNOTE LECTURES

The invited lectures focused on the following topics:

- The ESA Climate Change Initiative by Pascal Lecomte (European Space Agency, UK)
- The combined use of Landsat-8 and Sentinel-2 for burned area mapping by David Roy (Geospatial Sciences Center of Excellence, Wecota Hall, South Dakota State University, USA)
- Wildfire Applications at NASA and extension of GEO-GWIS Support by Vince Ambrosia (CA. State University, Monterey Bay and NASA- Ames Research Center, USA)
- Towards the global monitoring of wildfires: The Global Wildfire Information System (GWIS) by Jesús San-Miguel-Ayanz (European Commission Joint Research Centre, Italy)

ORAL COMMUNICATION SESSIONS

The oral communication sessions focused on six topics, namely, 'Forest fires and climate change' (1st session), 'Opportunities with Sentinel missions for forest fire research' (2nd session) 'Big data and time series for fire disturbance monitoring' (3rd session), 'Forest fire detection and monitoring on multiple scales' (4th

session), 'Improved capabilities with large-volume fire data sets' (5th session) and 'Methods of modelling post-fire vegetation trends' (6th session).

It should be noted that the oral communication sessions included presentations of the works as well as discussion with the authors.

WORKSHOP CONCLUSIONS

At the end of the workshop the following conclusions were made:

- Ongoing need for research and development integrating different systems for improved decision-making (e.g., multi-sensor integration of LiDAR, optical, thermal, radar) while expanding efforts on pre-processing (e.g., addressing atmospheric conditions stability), sensor intercalibration, and validation.
- Recognition for improved data access and data processing opportunities from cloud and high performance supercomputing, including "bringing applications to the data".
- Desire for data providers to better provide satellite data following common standards (formats, metadata, services) to enable the fire developer and applications community to work more easily with disparate fire data sets.
- Small fire research (quantification and characterization) will benefit from new medium to high spatial resolution satellite data (e.g., Sentinel-2, Landsat-8, FireBIRD).
- Increasing demand for early/timely fire detection including small-smoldering fires.
- Ongoing outstanding need for a satellite constellation of fire sensors to provide improved temporal and spatial resolution observations than currently available.
- Further research to demonstrate that radar data can be used to map burned areas reliably is encouraged.
- Recognition of new fire observation opportunities provided by new geostationary systems (e.g., GOES-R and Himawari) and opportunities for research and development on polar-geostationary synergy.
- Concern about potential data gap and harmonization/continuity issues among global moderate resolution polar orbiting systems (e.g., MODIS, VIIRS, Sentinel-3).
- Desire for better international interaction and interchange between space agency funded science teams working on fire products.
- More physically based approaches and understanding of fire retrievals from satellite data is encouraged.
- Recognized need for common protocols for QA and validation of systematically generated fire products.
- Desire for the establishment of external and independent entities for product validation.
- Research on quantitative uncertainty propagation is needed, to enable fire product uncertainty estimation as a function of the uncertainty of the satellite data inputs, and of the algorithm design.
- Recognized need for data reprocessing (e.g., ESA Sentinel-2 data) to ensure consistent long-term data record for fire science and applications.

- Research on emissions, smoke impacts on human health, changing fire regimes and forecasting under future climates and land use needed. .
- Ongoing need to organize capacity building and training mechanisms to support the user community, particularly in under-developed and developing countries.

PUBLICATION

Selected papers will be included in the MDPI Remote Sensing special issue titled 'New Trends in Forest Fire Research Incorporating Big Data and Climate Change Modeling'

(http://www.mdpi.com/journal/remotesensing/special_issues/foresetfire_bigdata) while extended abstracts of the presented lectures and papers will be included in the following published volume:

Gitas, I., Ambrosia, V., Kalaitzidis, C. (Editors) (2018) New Trends in Forest Fire Research Incorporating Big Data and Climate Change Modeling. South-Eastern European Journal of Earth Observation and Geomatics. e-ISSN: 2241-1224

