SERV_FORFIRE

INTEGRATED SERVICES AND APPROACHES FOR ASSESSING EFFECTS OF CLIMATE CHANGE AND EXTREME EVENTS FOR FIRE AND POST FIRE RISK PREVENTION

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JPI Climate

SERV_FORFIRE – INTEGRATED SERVICES AND APPROACHES FOR FIRE MONITORING

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1.Biomass burning impacts on atmospheric composition (Metaponto Natural Reserve case study)

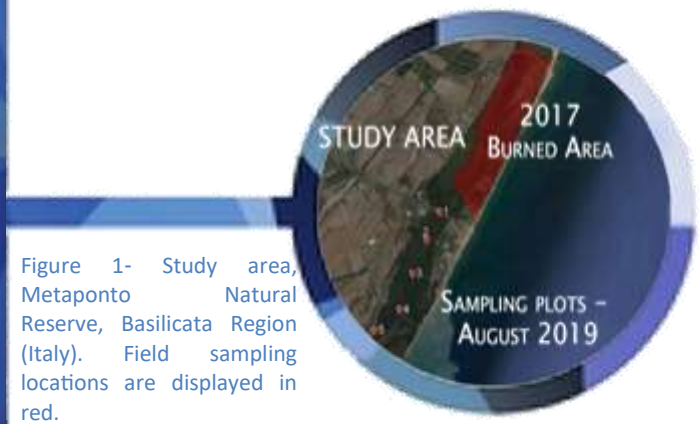

Figure 1- Study area, Metaponto Natural Reserve, Basilicata Region (Italy). Field sampling locations are displayed in red.

RET CNR carried out a field sampling campaign at the Metaponto National Reserve (Basilicata Region, South of Italy) in August 2019. The site was selected for both its proneness to fire and its proximity to a burned area, similar in both vegetation and topographic complexity. (Fig. 1). The collected samples are being analysed with the combustion chamber, which continuously quantifies emissions throughout the different phases of a fire (pre-ignition, flaming and smoldering).

The aim is an accurate parameterization of the emission factors of various compounds such as CO2, CO, CH4, particulate matter (PM) and volatile organic compounds (VOCs). Within Serv_ForFire project, the speciation profile of emission will contribute to the effective quantification of biomass-burning impacts on atmospheric composition.

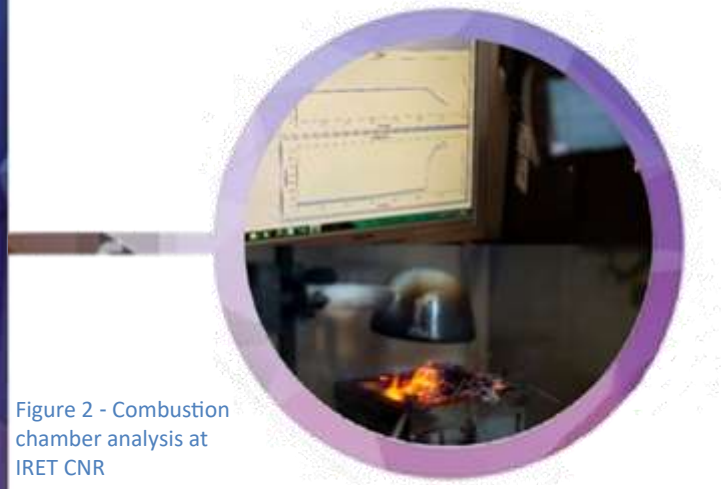

Figure 2 - Combustion chamber analysis at IRET CNR

2.EARSeL Workshop "Remote sensing of forest fire: Data, science and operational applications" Rome, 3-5 October 2019

Sala Marconi, CNR, Piazzale Aldo Moro 7, 00185 Roma, Italy

The workshop, organized by the European Association of Remote Sensing Laboratories "EARSEL" was held in Rome at CNR headquarter from 3 to 5 October 2019. It was the 12th EARSeL Forest Fires SIG Workshop. It was chaired by Rosa Lasaponara (CNR-IMAA), Lead Principal Investigator of SERV_FORFIRE project and by Ioannis Gitas, Aristotle University of Thessaloniki, and has benefited from the presence of all the principal investigators of the project and other well-known experts, who are part of the Workshop's Scientific Committee.

The Workshop topic was the "Remote sensing of fire: Data, science and operational applications". The workshop has brought together experts in remote sensing, forest managers, researchers, local governments and global organizations to address the key strategic issues of fire data science, modelling, management, and monitoring. Among the invited speakers, it is worth noted, Emilio Chuvieco, Professor

of Geography and director of the Environmental Ethics chair at the University of Alcalá (ES), Antonello Provenzale, Director of the Institute of Geosciences and Earth Resources, CNR (IT) and Jesus S. Miguel, Senior researcher at the European Commission Joint Research Centre.

The thematic session has included presentations and poster on the use of historical archives and data delivered by the most recent satellite missions, employing big data and time-series for:

- Dynamic modelling fire occurrence, fuel structure and fuel moisture models
- Application of image processing techniques and machine learning to support fire management
- Integration of satellite, airborne, and field sensor for wildfire management
- Fire detection and monitoring on multiple scales
- Fire behaviour and fire impacts
- Burned area, severity estimation and ecological impacts,
- Fuel consumption and fuel load estimation
- Laboratory and field studies of fire and post-fire residues
- Fire emissions estimation and air quality monitoring
- wildfire impacts and post-fire treatments.
- Exploitation of Big Earth Data and satellite time-series for fire disturbance monitoring
- Studies on the impact of climate change on forest fires occurrence and severity;
- Contribution of Sentinel missions on forest fire research;
- Improved methods of modelling post-fire vegetation trends;
- Modelling and Monitoring post fire vegetation recovery

SERV_FORFIRE project was presented by the contribution "INTEGRATED SERVICES AND APPROACHES FOR ASSESSING EFFECTS OF CLIMATE CHANGE AND EXTREME EVENTS FOR FIRE AND POST FIRE RISK PREVENTION", with the participation of all partner.

Conference website: https://cnrfire2019.eu/#organizers

3.Training on forest fire organized by ESA, EARSEL CNR | ESA ESRIN Frascati 30 Sep-1 Oct 2019

Figure 4 - Training on forest fire organized by ESA, EARSEL CNR | ESA ESRIN Frascati 30 Sep-1 Oct 2019

On the occasion of the 12th EARSeL Forest Fires SIG Workshop, a training course was organized on the application of active and passive remote sensing techniques for fire research. The training course was held from 30 September to 1 October in Rome at European Space Agency building. The course was focused on the use of active and passive Earth Observation (EO) Technologies for fire monitoring.

EO has long been considered as a key tool for fire data, science, modelling, management, and monitoring. The most recent developments in computer technology, data processing, artificial intelligence (AI), deep learning approaches, and geospatial data mining techniques, enable advanced dynamic modelling, tools, data integration, and assimilation schemes, and are expected to significantly support and improve fire science and operational applications. Recently, the availability of new sensors from satellite, aerial, drone, and ground, along with the free access to large archives of data, has opened new perspectives for both fire science and applications.

The training was addressed to early career researchers, students, phD students and young professionals from European institutions and Canada with background in Remote Sensing and working in topics related to wildfire. 26 Applicants from different countries have participated.

Training course website: https://cnrfire2019.eu/#training

4. Presentation of SERV_FORFIRE at the European Researchers' Night

Matera (Italy), 27 September 2019

The official language of the training course was English.

The project SERV_FORFIRE was shown at the European Researchers' Night, held in Matera (Italy) on 27 September 2019, within the BRAINCITIES project, which was acknowledged as Associated Event to the European Researchers' Night. The project was shown both as a video and a panel at the European Corner, set up in the square of the University of Basilicata, where the core of the activities of the project have been realized.

5. Participation in 4th European Climate Change Adaptation conference – ECCA 2019

Participation in 4th European Climate Change Adaptation conference – ECCA 2019

SERV_FORFIRE team will take part at 4th European Climate Change Adaptation conference (ECCA) on 29 May 2019 in Lisbon. SERV_FORFIRE "Integrated services and approaches for Assessing effects of climate change and extreme events for fire and post fire risk prevention" project started on 15 September 2017 with the aim of creating an international collaborative community, expert in remote sensing soil and vegetation, risk management and mitigation, and the challenge of providing climate information along with decision makers and planning authorities for the fire and post fire risk prevention.

The project partnership is coordinated by the Department of Earth system science and environmental technologies of the National Research Council of Italy (DTA-CNR) and it is composed by the Finnish Meteorological Institute (Finland), Bureau de Recherches Géologiques et Minières (France), National Center for Scientific Research "Demokritos" (Greece), the Global Change Research Institute of the Czech Academy of Sciences (Czech Republic) and the Royal Netherlands Meteorological Institute (The Netherland).

Rosa Lasaponara, from CNR-IMAA, as Lead Principal Investigator of SERV_FORFIRE will present the main activities and results achieved so far by the project Consortium from the beginning of the project on the climate booth of the Joint Programme Initiative (JPI), at the session "Climate services for the water, agriculture and energy sectors". The following highlights have been obtained within the project: the seasonal and subseasonal forecast of fire and post-fire risk (as landslides, erosion, etc.) for improving mitigation strategy, a drought-monitoring and forecasting system to provide a semi-automatic, more detailed, timely and comprehensive operational service for decision making, water authorities, researchers and general stakeholders; forecast particulate matter emissions from wildfires worldwide to be used in global-scale air quality forecasting simulations.

https://www.ecca2019.eu/29-may/

6. Amazzonia fire 2019: notes based on satellite data

The fires season of the Amazon rainforest of 2019 was characterized by a significant increase events in the first eight months of 2019, compared to fires in 2018 between Brazil, Bolivia, Paraguay and Peru during the dry tropical season. The increasing rates were first reported by the National Space Research Institute of Brazil (Instituto Nacional de Pesquisas Espaciais , INPE) in June and July 2019 through the satellite monitoring systems, the same used by NASA.

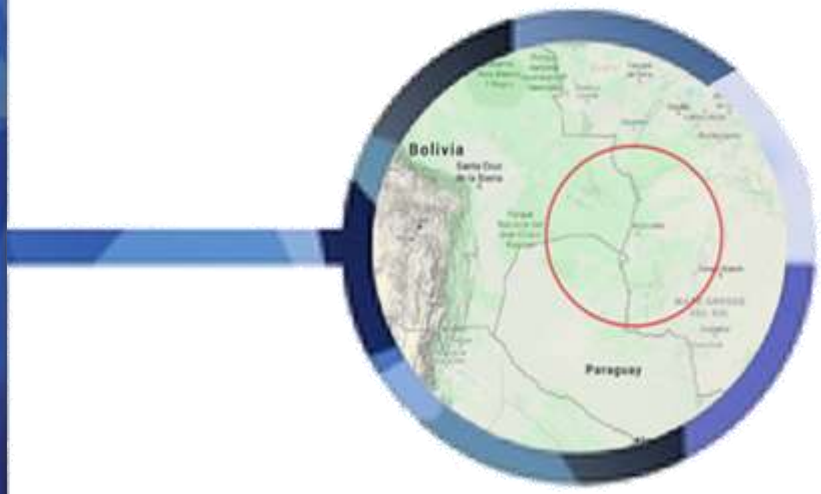

Figure 6 - Case study : Corumbà, Mato Grosso do Sul, Brazil.

As of 29 August 2019 , INPE recorded over **80,000 fires throughout Brazil**, out of which more than 40,000 have occurred in the Brazil's Legal Amazon (Amazônia Legalo BLA), which contains 60% of the rainforest. INPE has recorded an increase of 77% over 2018, in respect with the same reference period.

In addition to the impact on the global climate, with the increase in temperatures, it is necessary to consider the different biodiversity affected by the excess of carbon dioxide and carbon monoxide emitted. In the same way, from a social, anthropological and human point of view, the situation of the indigenous tribes, now devastated by the several fires that caused the loss of their homes and habitats, with almost 6,000 displaced people, risks to erase a part of history and to loss the traditions of ancient people.

INPE has estimated that 99% of fires in the Amazon basin are the result of human actions, intentional or accidental. Local farmers, the major multinationals, exploit the burnt areas for the new intensive crop of maize, wheat and soya. Since the 1970s, deforestation in Brazil has been carried out in order to obtain more space for intensive livestock farming, but in recent years the phenomenon has increased.

Figura 7 - Corumbà, Mato Grosso do Sul (Brazil). 05.08.2019. Pre - fire image - atmospheric penetration visualization

The data are worrying: it is necessary to work as quickly as possible on the burnt areas to ensure these do not become other land used for profit, it is essential to re-forest the deforested areas in order to reserve biodiversity.

Figure 8 - Corumbà, Mato Grosso do Sul (Brazil). 28.08.2019. Post - fire image - atmospheric penetration visualization

7. The Instituto Nacional de Pesquisas Espaciais (INPE) has expressed interest to be an Associated Partner of SERV_FORFIRE project

INPE (Instituto Nacional de Pesquisas Espaciais, Brazilian National Institute for Space Research) has recently expressed the interest to the SERV_FORFIRE project, by joining the project as Associated Partner. In particular, the LABAC (Laboratório Associado para Computação e Matemática Aplicada, the Associated Laboratory for Applied Computing and Mathematics) will be involved.

INPE is an institution of the Brazilian federal government, which is controlled by the Ministry of Science, Technology, Innovation and Communications, created in the 1960's with the mission to produce science and technology related to space and terrestrial environments and offer products and unique services for the benefit of Brazil. As part of its mission, INPE also collaborate with several different countries, either by joint research and development programs or by sharing technologies, missions and data.

INPE is involved in research and development in several different areas: space and atmospheric sciences, weather forecast and climate studies, space engineering and technology, earth observation, earth system sciences, satellite tracking and control, etc., including also applied research in any area related to these fields, such as computer science, engineering, physics and mathematics, geotechnologies, etc.

INPE maintains several associated laboratories to support research of its centers and other departments. One of those is LABAC (Laboratório Associado para Computação e Matemática Aplicada, the Associated Laboratory for Applied Computing and Mathematics). Created in 1986, LABAC's mission is to develop basic and applied research in applied computer science and mathematics for space science, technology and applications, such as meteorology, remote sensing, space geophysics, image processing, astrophysics and aerospace engineering.

Part of the core skills of the laboratory are related to applied artificial intelligence and to several related fields: data science, data mining, time series forecasting, mathematical models' creation and evaluation, image processing, etc. Those skills are complemented by other applied computer science and mathematics fields such as software engineering, high-performance computing, simulation, etc.

LABAC collaborates with other research centers and laboratories at INPE, helping develop models and data analysis solutions for remote sensing, space and solar geophysics, meteorology, astrophysics and aerospace engineering applications. Many of those models and solutions employ one or more methods of artificial intelligence or machine learning.

8.Invitation to the Special Issue "Remote Sensing of Forest Fire: Data, Science and Operational Applications"

A special issue of Remote Sensing (ISSN 2072-4292) has been created and the invitation to submit contributions has been just opened. This special issue belongs to the section "Environmental Remote Sensing". The article may be either a full paper or a communication based on your own research in this area, or may be a focused review article on some aspect of the subject. Remote Sensing is an open access journal, receiving its 6th Impact Factor, 4.118 (2018); 5-Year Impact Factor: 4.740 (2018). As a feature paper author, you will not be required to pay the usual publication fee (Article Processing Charge). All submissions, including featured articles will be subject to peer review.

If you plan to submit a review article please provide the editor with a title and brief description at your earliest convenience, in order to avoid multiple reviews covering the same material.

For more information about this Special Issue, please see:

https://www.mdpi.com/journal/remotesensing/special_issues/fire_rs

The Special Issue Editor is Rosa Lasaponara: rosa.lasaponara@cnr.it

For information on manuscript preparation and related matters, please see the instructions for authors:

http://www.mdpi.com/journal/remotesensing/instructions

Although the deadline for submission of manuscripts to the Special Issue is 30 June 2020, it would be appreciable to provide information to the editor in the next few weeks whether you would be willing to submit a contribution.