WILDFIRE MANAGEMENT ON THE CROATIAN TERRITORY

Wildfire management is one of the essential tasks for local authorities, especially those wich are in high-risk areas. Copernicus free spatial data can help manage and solve this task.

The challenge

Every year, an area of 350 mill. hectares is occupied by fire, of which 90% are forest fires. In Europe, due to climatic conditions, the most endangered is the Mediterranean area. Croatia is one of the countries with a high risk of forest fires (47% of the land surface consists of forest). In 2017, 104 forest fires were recorded in Croatia causing economic damage of around € 60 million. Two large forest fires in June last year hit the area of the Makarska Riviera in only two days, covering an area of 325 hectares. Local authorities have been shown that free access to Copernicus satellite missions data and EFFIS systems (European Forest Fire Information System) can contribute to predicting fire hazards, mapping wildfires and improving wildfire management which contributes to the economic aspect as well as the human protection.

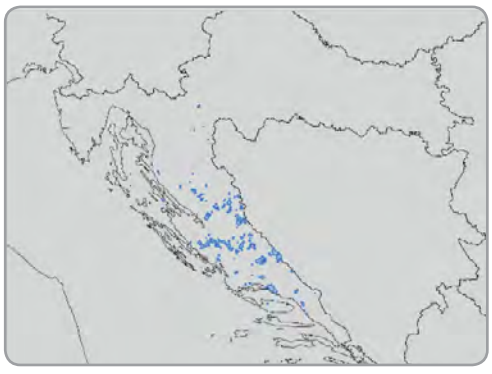
The space based solution

Free and open data Copernicus solutions which can improve wildfire management and achieve more efficiently, reliably and quickly detecting of wildfires and analysing of affected areas are presented to local authorities. The solution is based on the use of Sentinel-2 imagery and EFFIS to identify areas of land affected by wildfire scarring. The obtained data were processed using SNAP and QGIS software (open source). EFFIS was used to roughly locate the location, time, and area of the wildfire. After locating the fire, images of the area before and after the wildfire event were downloaded from the Sentinel Scientific Hub (Sentinel-2 level C – 1 products) and used for detailed analysis. Initial processing, such as, resampling, band merging and subset export was carried out in SNAP followed by the Normalized Burn Ration (NBR) technique which was applied on images to highlight the areas covered by fire. RGB true colour imaging was also used for a better view of the environment. The final product includes wildfire maps of the affected areas which can be used for better understanding, analysing and preventing fire events, as well as for improving post-fire operations.

Benefits to Citizens

Remote sensing methods play a significant role in all aspects of wildfire management. Copernicus provides free spatial data, and its images can be used for making significant maps for better risk assessment of the affected areas and the environment.

Such maps can provide a wealth of information, especially for firefighters and other units that need to bring a fire under control as soon as possible. They can enable analysis after the fire event and can be applied to strategies and policies for prevention, forecasting, mitigation and management of wildfire events. Besides that, the obtained data can contribute to monitoring of the environment recovery, which is extremely important for fields such as agronomy and forestry. All of this is aimed at improving the life and safety of citizens during wildfire events and for the faster recovery of the affected areas and the environment.



Fire affected areas (blue) in 2017 on Croatian territory based on EFFIS data.
Credit: Contains data downloaded from EFFIS for 2017

Thematic Area: CIVIL PROTECTION

Region of Application: ADRIATIC CROATIA - COUNTY OF SPLIT DALMATIA

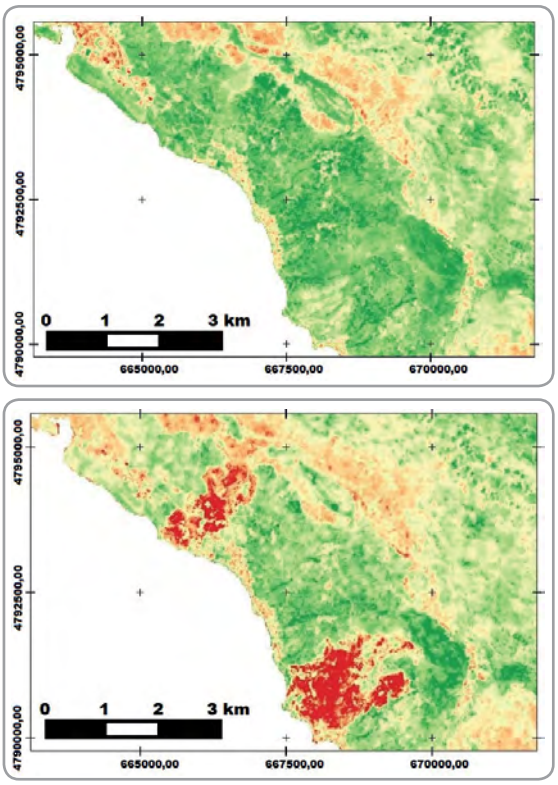
Sentinel mission used: S2

Copernicus Service used: CEMS

Usage Maturity Level: 1

Outlook to the future

Products obtained using these methods can benefit both GIS and other, non-GIS users. They enable overlapping with other data depending on the interest in use. Besides fire management institutions and local authorities, these methods can also contribute to the improvement of work in other institutions such as police administration, environmental protection agencies, civil protection, agricultural and forestry agencies, national parks, insurance companies and many others.



Overview of processed images of wildfire in the area of the Makarska Riviera before (a) and after (b) fire, based on NBR technique and defining steps (c) towards final product of wildfire maps" should be shortened to: "Overview of processed images of wildfire in the area of the Makarska Riviera before (a) and after (b) fire, based on NBR technique.
Credit: Contains Sentinel data [2017]

> "The application of this method will greatly accelerate the fire extinguishing time and facilitate the movement of firefighters within the affected area."
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> ***Fire Department of the Split-Dalmatia county***

Acknowledgements

The Croatian territory is affected with more than 100 wildfires every year and these methods will improve prevention and fire protection as well as enabling a faster and better response in areas affected by fires for local authorities.

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ABOUT COPERNICUS4REGIONS

This Copernicus User Story is extracted from the publication "**The Ever Growing use of Copernicus across Europe's Regions: a selection of 99 user stories by local and regional authorities**", 2018, Edited by NEREUS, the European Space Agency and the European Commission.
The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains.
The views expressed in the Copernicus User Stories are those of the Authors and can in no way be taken to reflect the official opinion of the European Space Agency or of the European Commission.
Funded by the European Union, in collaboration with NEREUS. Paging, printing and distribution funded by the European Space Agency.