

ANALYSIS OF FOREST FIRES EFFECTS WITH SENTINEL

Sentinel images help us analyse forest fires and manage the subsequent works more efficiently.

The challenge

In Spain, approximately 100,000 hectares are burnt annually by forest fires, of which about 60% of the surface constitutes the northwest area, which includes the regions of Galicia, Asturias, and the provinces of León and Zamora in Castile y Leon. León, and specifically the region of El Bierzo, is an area in which there are numerous fires during the year. In 2017, the largest fire in Spain occurred in León, extending for almost 10,000 hectares. The management of extinction is required and it is fundamental to know what has burnt and how much has burnt for post-fire analysis. Sentinel data are used to calculate the surface and analyse the severity of it.

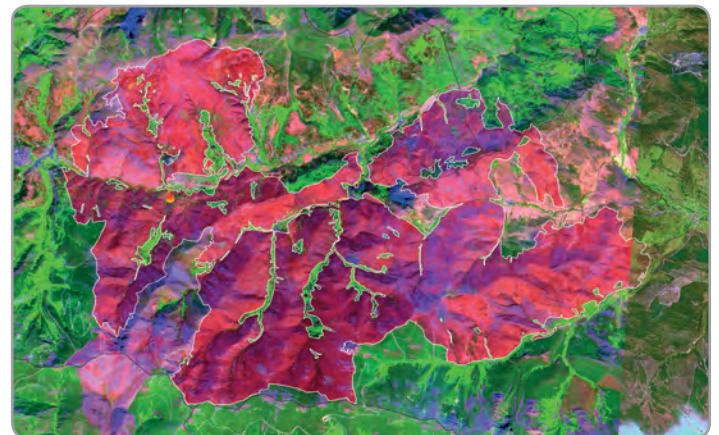
The space based solution

Sentinel data can help us identify and learn the extent of the burnt areas, as well as define the degree of severity produced by the forest fire on a very detailed scale, since Sentinel data reaches a resolution of 10 metres of information as a minimum unit. This is possible thanks to a combination of the 13 bands on board of the Sentinel-2 satellites.

The bands that perceive the reflection of the chlorophyll in vegetation help us identify burnt areas, since they do not reflect the wave of light. The most appropriate light bands are those of the near infrared because they show the photosynthetic activity of the vegetation. In turn, if we compare the photosynthetic activity of the vegetation, before and after the fire, we can graduate its severity; if there is a bigger difference, the severity will be greater.

Benefits to Citizens

There are many benefits: Being able to perform burnt surface analysis as well as a gravity one, with data that is freely available, and more importantly it helps to improve and make more effective management decisions. The public administrations in charge of restoring the burnt-out spaces, can prioritise the most urgent actions. The measures to be carried out can improve the filtration level of runoff water which reduces soil losses and fertility. If we are able to reduce the loss of soil we can improve water quality and conserve forests. We improve the biodiversity and the habitat of the species. The economic savings are substantial.



Map of scar burn in La Cabrera, Leon, Spain. It burned 10,000 hectares. Satellite Sentinel image Sensing in the shortwave infrared (SWIR).

Thematic Area



BIODIVERSITY AND ENVIRONMENTAL PROTECTION

Region of Application



CASTILLA LEON

Sentinel mission used



S2

Copernicus Service used



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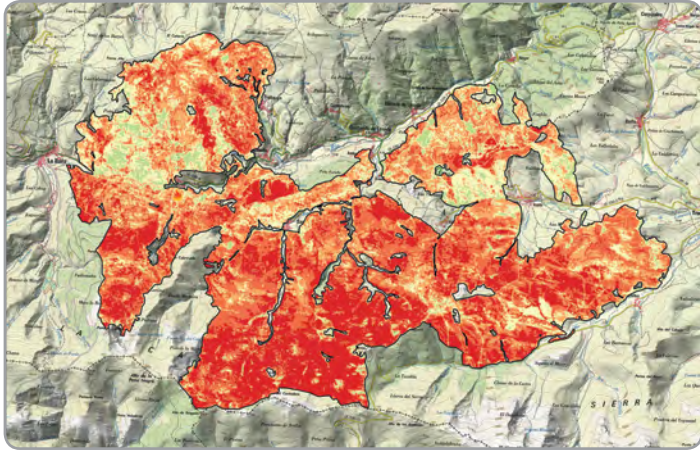
Usage Maturity Level



2

Outlook to the future

The fact of having images with a periodicity of less than 5 days would help managers to have updated information. This is very interesting for decision making during large forest fires and especially in the necessary work required after these fires. If we had a larger number of Sentinel-2 satellites, we could be more efficient in the decisions that need to be made during the extinction of forest fires.



Severity Map of Forest Fire in La Cabrera, Leon, Spain.

“This application of Copernicus Sentinels helps us to manage better and more efficiently actions against forest fires.”

Celso Coco, CIFP Almazcara

Acknowledgements

Thanks to all the forest firemen, pilots, forest rangers, technical team... without them it is possible that we would have been talking about an even bigger fire. Thanks to all the forestry engineers who do a great job for the environment.

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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.

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