

COPERNICUS FOR LYS BASIN WATER MANAGEMENT

The June 2016 satellite images acquired over Northern France flooding provide unprecedented information concerning the Lys basin, its hydraulic mechanisms and actions to be implemented.

The challenge

The Lys basin in the North of France has had to cope with an increasing number of flood phenomena over the last few years. With 180,000 persons exposed the Mixed Water Management Syndicate of the Lys Basin (Symsagel) needs knowledge concerning these events to implement its Local Strategy for Flood Risk Management (SLGRI) in relation to the European Floods Directive.

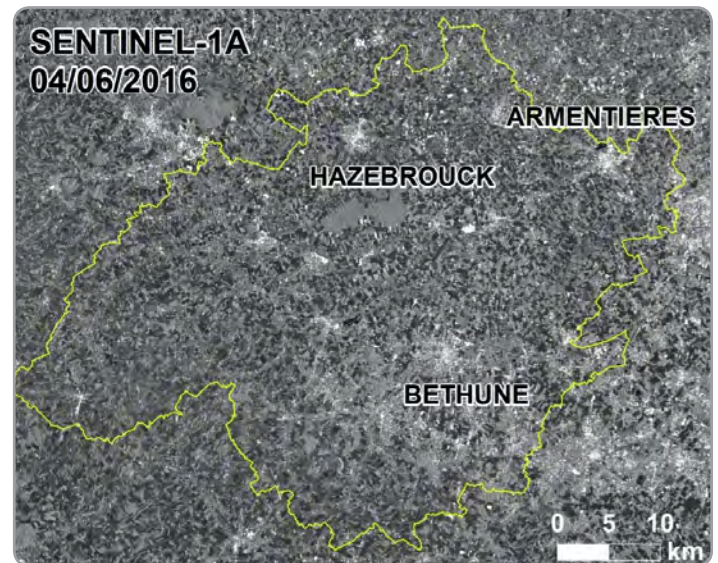
Terrain surveys are practised during events but only punctually (in time and space) and essentially on urban areas. Rural areas are only poorly or not monitored at all whereas they strongly contribute to hydraulics mechanisms potentially responsible for increasing impacts. Large-scale data is necessary to cover this fairly large basin (1800 km²) and river segment at a length of 195 km. Cloud cover in this territory often prevents aerial acquisitions during flood events. Alternative solutions are necessary to obtain information at the basin scale to understand hydraulic mechanisms and propose planning actions in the context of PAPI (Action Plan and Flood Prevention), part of the SLGRI.

The space based solution

In May-June 2016, a large-scale flood event occurred in Northern France. Over the Lys Basin, very high precipitations occurred between 30 and 31 May 2016 causing rapid flooding of the Lys River and its tributaries, followed on the 6 and 7 of June 2016 by a second less intense rainfall episode, which also raised the water level, flooding the plain (favoured by soil saturation) causing over 27,000,000 euro of direct damage. Three Copernicus images covered the Lys Basin: Sentinel-1A images acquired on 31 May, and 4 and 7 June; a Landsat-8 image acquired on 9 June completing the dataset. Those images covered the entire basin.

Cerema (a French Public Establishment with a Department in charge of Space applications for public policies), extracted information on flooded areas from those images.

The maps produced presenting satellite-based analysis report all observed flooded areas of the basin, a result which has never been produced at this scale in this area. This exhaustivity placed emphasis on unexpected flooded areas out of the "potential flooded area". This large-scale analysis enabled the most exposed areas of flooding (overflow runoff or rising water) to be targeted and where it would be appropriate to carry out complementary investigations to confirm or not their sensitivity to local practices.



Sentinel-1A image acquired on Lys Basin on 4 June 2016.

Benefits to Citizens

Terrain surveys are performed during a crisis but provide punctual information in time (in general during the crisis) and on few selected geographical areas (in general urban areas or few selected streams). Lots of other areas are generally not monitored. Space data is one of the unique tools used to cover the whole Lys Basin

Thematic Area



TERRITORIAL
MANAGEMENT AND
URBAN PLANNING

Region of Application



OCCITANIA
HAUTS DE
FRANCE

Sentinel mission used



S1

Copernicus Service used



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Usage Maturity Level



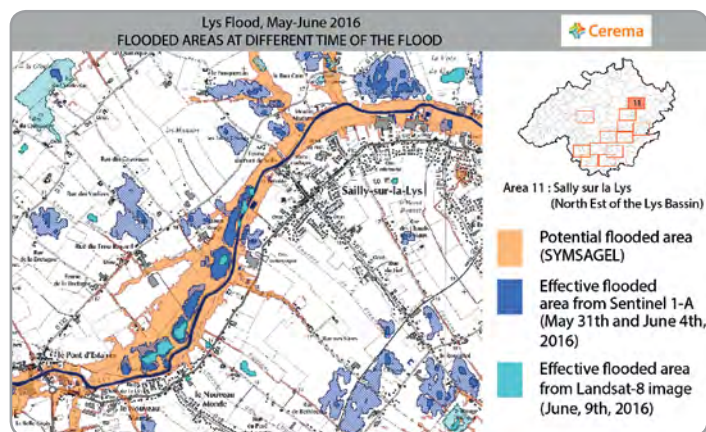
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and provide such information with repetitivity during and after the crisis. The images taken three days later raised the question of knowing how long it takes for water to recede.

Satellite-based maps are guidance documents to point out some areas to work with to reduce damages and the number of persons exposed. Symsagel uses this result as a starting point for scientific exchanges about hydraulics mechanisms involved during floods and causing damages.

Outlook to the future

In the Lys Basin, agricultural drainage is singled out as a contributing factor to flooding. Cerema and SERTIT (Regional Service of Remote sensing and Image Processing, operator of the Copernicus Emergency Management Service), will work together with Symsagel in order to exploit the results of space image analyses to enrich the hydraulic knowledge of the Lys plain and assess the impact of agricultural drainage on floods. Symsagel will exploit this information to add actions at the halfway stage of its flood prevention plan.



Map of flooded areas extracted from satellite images (Sentinel-1A and Landsat-8) acquired during Lys floods. Lys Plain, Sally-sur-la-Lys area, Hauts de France, France.

“These maps provide us with reliable data on rural areas, which in time will allow us to focus the manpower to help with crisis management and feedback.”

*Sarah Duverney,
Flood Plan Project Manager, Symsagel*

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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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