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MONITORING GROUNDWATER FLOODING IN IRELAND USING SENTINEL-1 SAR

>>> A few years later

Over the last few years, the Sentinel-1 flood mapping approach has been used to develop a national historic groundwater flood map. In addition, the approach was enhanced by using the full catalogue of SAR imagery to reconstruct historic flood patterns. This enabled the calculation of flood probabilities and the production of Ireland first predictive groundwater flood map.

Ted McCormack, Geological Survey Ireland | Joan Campanya, Institute of Technology Carlow | Owen Naughton, Institute of Technology Carlow



BENEFICIARIES	Geological Survey Ireland	Geological Survey Ireland; Local Authorities	Regional planning technical staff	Citizens and Society
SERVICES	TIER 1: SERVICE PROVIDER Sentinel-1	TIER 2 PRIMARY USER Groundwater flood maps; Track and monitoring of groundwater flood through time	TIER 3 SECONDARY USER Better understanding of this complex flood form; Identification of vulnerable areas and communities; Aid in regional planning and development; Limiting future flood vulnerability	TIER 4 END USER BENEFICIARIES Mitigation of property damage and/or disturbance to economic activities; Improvements in public awareness on risks of groundwater floods

Value chain definition following SeBS Methodology - <https://earsc.org/sebs>

The space-based solution

This Copernicus-based solution was developed by the Public Administration for other users companies, professionals, agencies, associations, single citizens.

The Usage Maturity Level

In the last few years, the solution has transition at the higher level (UML=5) and is now integrated in the workflow of the public administration.

Thematic Area



CLIMATE, WATER AND ENERGY

Region of Application



IRELAND

Sentinel mission used



S1

Copernicus Service used



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Usage Maturity Level



5

Overall benefits

ECONOMIC



Reduction of risk has been registered

ENVIRONMENTAL



Improved management of sensitive ecosystems such as Special Areas of Conservation (protected under the EU Habitats Directive), often affected by groundwater flooding

REGULATORY



The solution allowed to improve accountability of duty holders and/or regulators

INNOVATION



The solution has helped to introduce some innovation in the functioning of the public administration

SCIENCE



- The solution has helped to improve understanding about a specific topic of interest traditionally not related to Earth Observation (EO)
- There was an increase in technical/scientific expertise related to Copernicus/EO within the PA
- There was an increase in technical/scientific expertise related to Copernicus/EO at the service provider

SOCIETAL



There have been improvements in public awareness

Benefits classification following SeBS Methodology - <https://earsc.org/sebs>

Interesting facts...

From technical perspective, the mapping procedure has been near fully automated and additional information is now generated. The whole process, from download to a finished national map, requires the user to run just 3 python scripts with minimal input. The mapping process has been combined with topographic information to facilitate the automatic correction of flood extents which have been distorted due to vegetation. A hydrograph reconstruction tool has been developed which combines topographic information with sequences of SAR imagery in order to produce flood hydrographs at ungauged sites.

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Outlook to the future

For the future, the activities will focus on developing additional Sentinel-1 SAR based flood management products. These products include: 1) annual national maximum flood extent maps, 2) near real time flood level estimations ungauged sites and 3) flood forecasting and outlook tools.

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Contacts

Ted McCormack | ted.mccormack@gsi.ie

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