



# **GNSS meteorology - Ireland National report**

3rd ES1206 Workshop GNSS4SWEC - Advanced Global Navigation Satellite Systems tropospheric products for monitoring severe weather events and climate

**Reykjavik, 28<sup>th</sup> Jan 2016**

**Dr. Eamon McKeogh**

**Igor Kerin**

# National meteorological service in Ireland

- Met Éireann, „Met of Ireland” is part of the Department of the Environment, Community and Local Government. It is founder member of both the European Centre for Medium Range Weather Forecasts (ECMWF) and the European Meteorological Satellite Organisation (EUMETSAT)
- (1860) the first 'real time' weather observation was transmitted from Valentia Island in Co. Kerry. Valentia Observatory was one of part of a network of weather stations around the Irish and British coastlines, by the naval authorities in London, to enable storm warnings to be provided for ships at sea.
- (1936) establishment of an Irish Meteorological Service to provide accurate weather information for transatlantic aviation and the first Director appointed Austen H. Nagle
- (1937) the administration of the existing observing network was taken over from the British Authorities; it comprised 4 telegraphic stations (at Malin Head, Blacksod Point, Roches Point and Birr), 18 climatological stations, 172 rainfall stations, Valentia Observatory, (the only station at the time to be manned by official personnel).
- (6 June 1944) Did you know? The D Day - weather reports from Met Éireann were used to plan the D-Day landings ([https://en.wikipedia.org/wiki/Wikipedia:Recent\\_additions/2007/January#2\\_January\\_2007](https://en.wikipedia.org/wiki/Wikipedia:Recent_additions/2007/January#2_January_2007))
- (1948) first time assumed responsibility for the weather forecasts broadcast by Radio Éireann

## **National meteorological service in Ireland**

- (1960) Met Éireann forecasters of the weather on TV Teilifís Éireann and the reception of satellite images began in the late 1960's at Shannon Airport
- (1989) member of HIRLAM, a co-operative venture between the Scandinavian countries and several other European Meteorological Services for the development of a numerical model for short-range forecasting.
- (1990) high resolution weather radar systems were installed at Dublin Airport
- (1996) the Meteorological Service adopted the new title Met Éireann (60 years of operation)
- (early 2000's), TUCSON, a programme of automating of the synoptic weather stations commenced. As of 2010, 18 such stations have been installed, greatly supplementing the availability of real-time quality weather observation data from around the country.
- (2001) Met Éireann launched its web site ([www.met.ie](http://www.met.ie))
- (2005) the Aviation Services Division was awarded an ISO 9001:2000 quality certification which it has retained since then
- (2007) agreement signed with the Irish Centre for High-End Computing (ICHEC) for the operational running of our short-range numerical weather prediction model, HIRLAM

# National meteorological service in Ireland -Satellite data

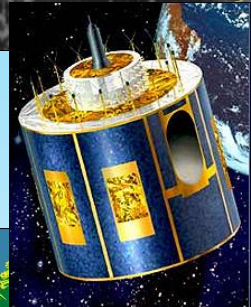
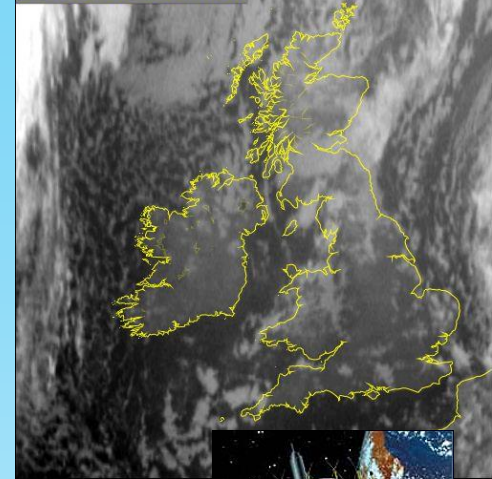
## ☐ Infra red Satellite

The infra red satellite image measures the temperature or radiance of the ground and clouds. Light shades represent low temperatures and dark shades high temperatures. The Earth is scanned every 15 minutes by the new METEOSAT-8 operated by **EUMETSAT** (*European Organisation for the Exploitation of **M**eteorological **S**atellites*) and ESA geostationary satellite which is located over the Equator at 0 degrees W. Images are available here at 0000, 0600, 1200 and 1800.

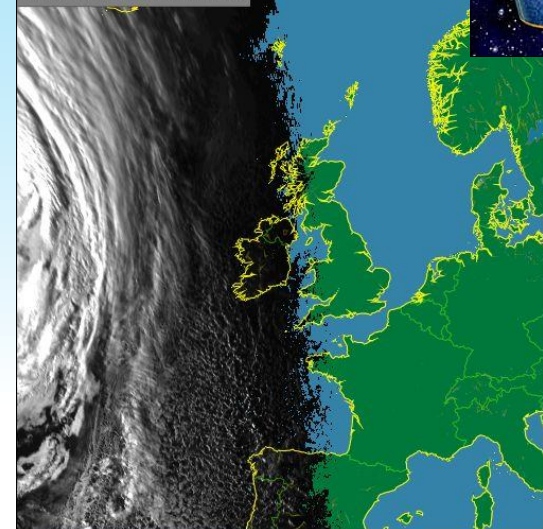
## ☐ Visible Satellite

The visible satellite image measures the sunlight reflected by the Earth's surface and clouds. Clouds and snow reflect a lot of light and are bright; the oceans absorb almost all incoming light and are dark; thin or low clouds and land have variable reflectivities or albedos and are varying shades of grey. The Earth is scanned every 15 minutes by the new METEOSAT-8 geostationary satellite which is located over the Equator at 0 degrees W. Images are available here at 1200 all year round and also at 0600 and 1800 from Spring to Autumn.

5-Mar-2016 21:00 Infra Red



5-Mar-2016 18:00 Visible



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***Beaufort Bulding, HQ of MaREI in Cork, Ireland***





***IMERC Campus, UCC, CIT and Irish Naval Service***





# GNSS for severe weather and new products (ToK)

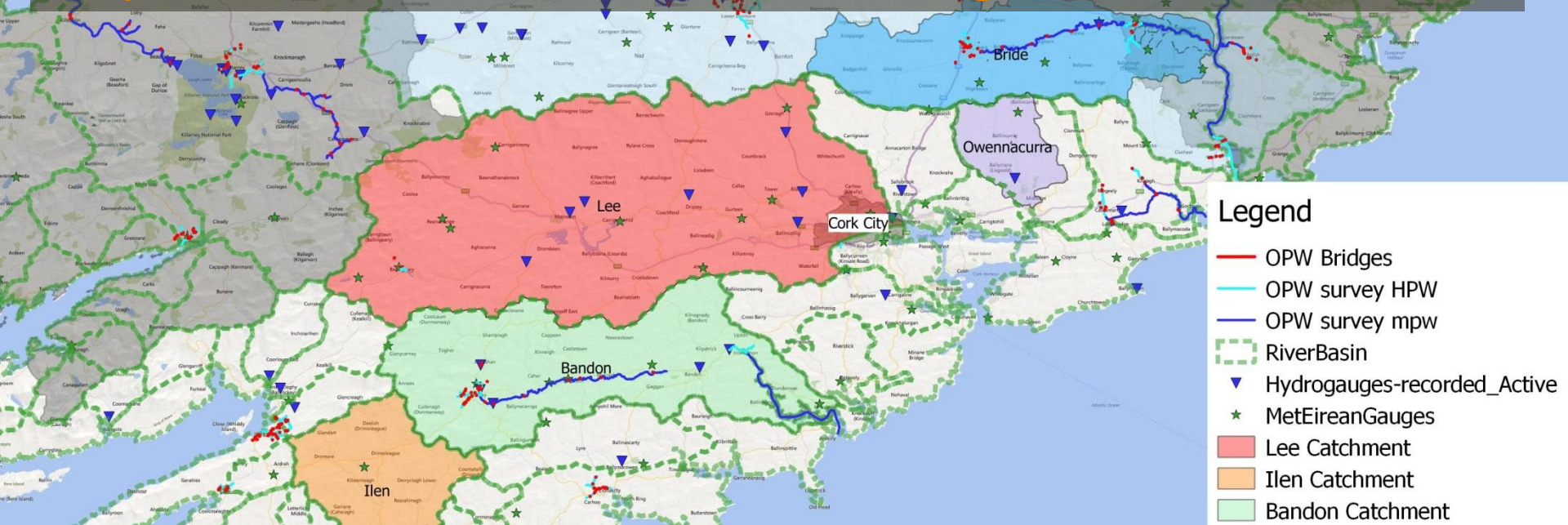
## MaREI / Bridge SMS

SMAP L2 Radiometer Half-Orbit 36 km EASE-Grid Soil Moisture

<http://nsidc.org/>

ESA

<http://www.esa-soilmoisture-csi.org/>



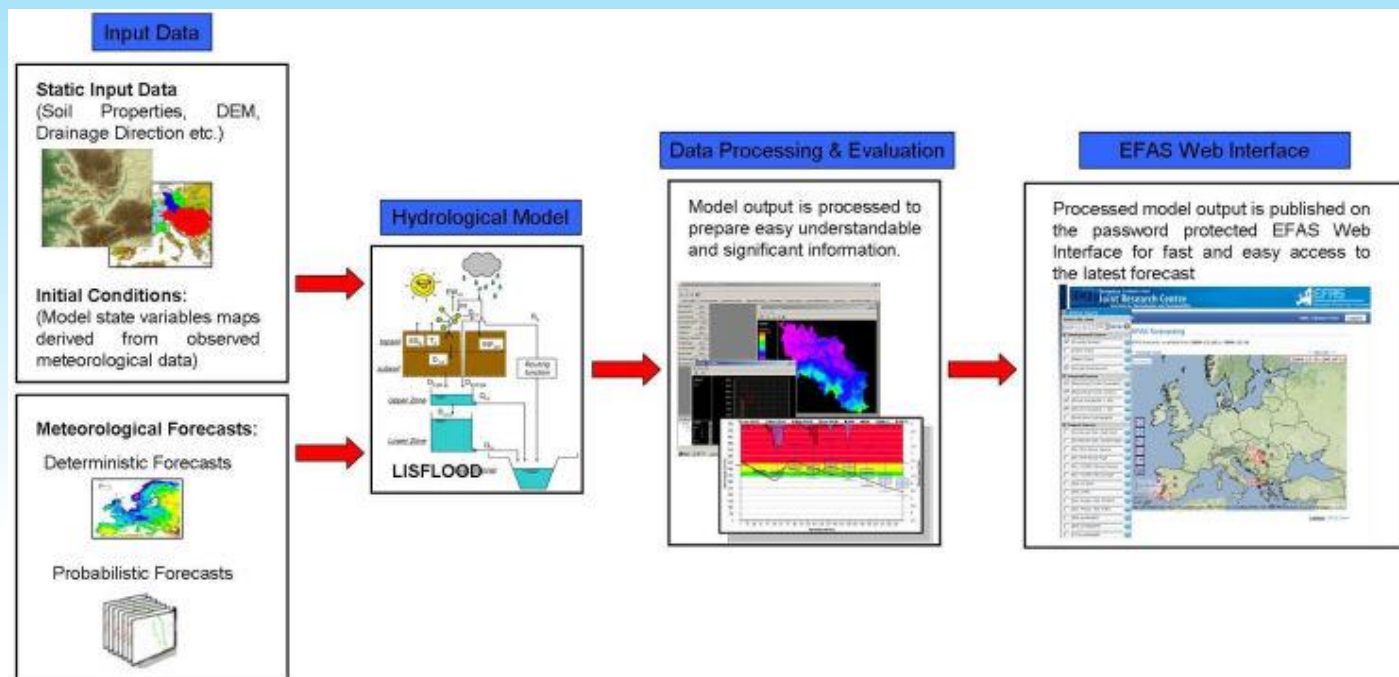


# European Flood Awareness System (EFAS)

The European Flood Awareness System (EFAS) is the first operational European system monitoring and forecasting floods across Europe. It provides probabilistic, flood early warning information up to 10 days in advance to its partners: the National Hydrological Services and the European Response and Coordination Centre (ERCC).

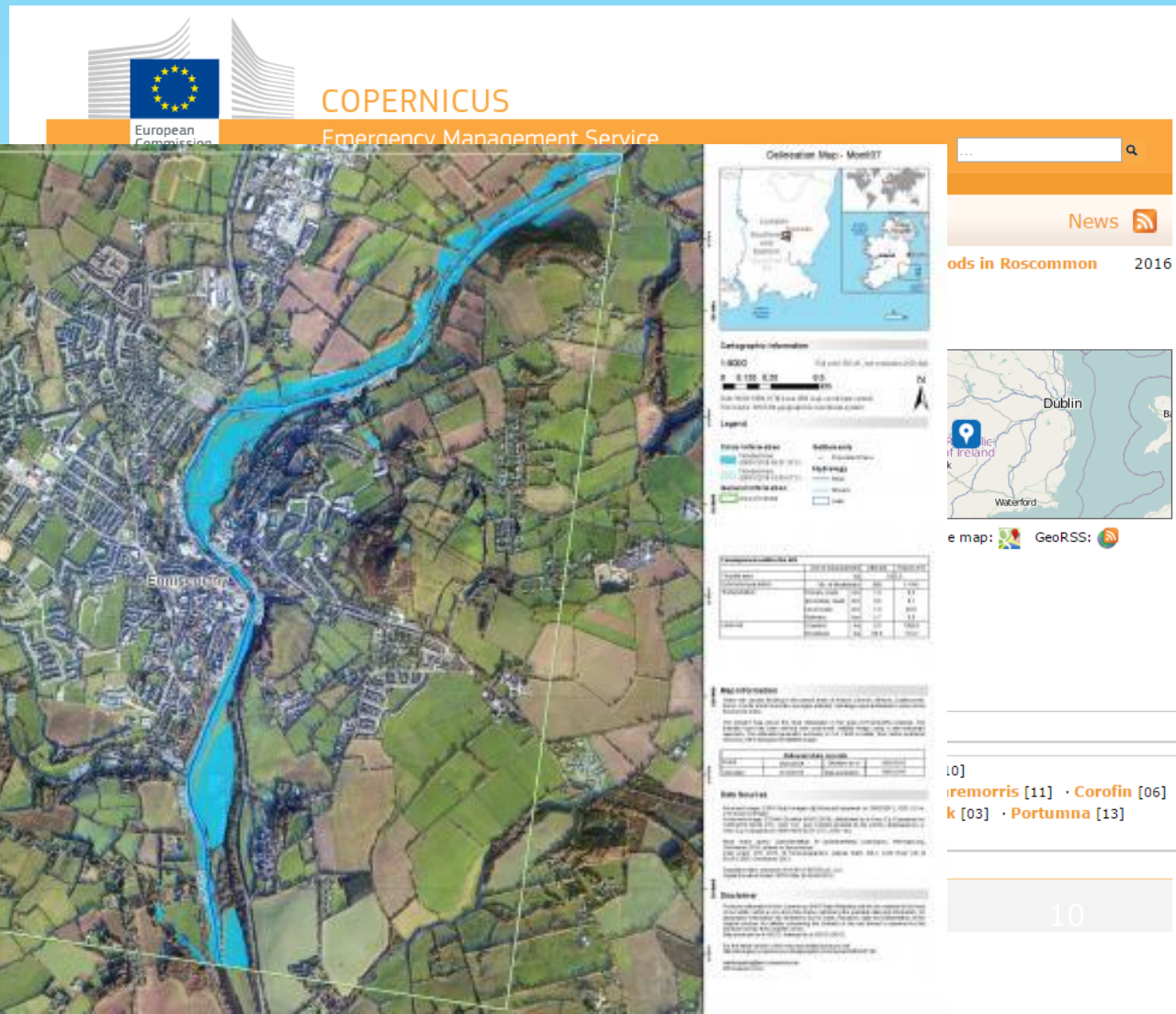
EFAS uses multiple weather forecasts and EPS as input. Its forecasts are based on two deterministic, medium-range forecasts from the European Centre for Medium-Range Weather Forecasts (ECMWF) and the German Weather Service (DWD), (and thus different models) and on two sets of EPS: One from ECMWF which covers the medium-range up to 15 days globally (with a spatial resolution of  $\sim 30$  km and 51 members, and one from the Consortium for Small-scale Modeling (COSMO), a limited area model EPS covering most of Europe with a shorter range up to 5 days (with a spatial resolution of 7 km and 16 members)

<https://www.efas.eu/about-efas.html>



# Flood aftermath

<http://emergency.copernicus.eu/mapping/list-of-components/EMSR149>





# Environmental change within lake systems



## Assessing the utility of geospatial technologies to investigate environmental change within lake systems

Eirini Politi \*, John S. Rowan, Mark E.J. Cutler

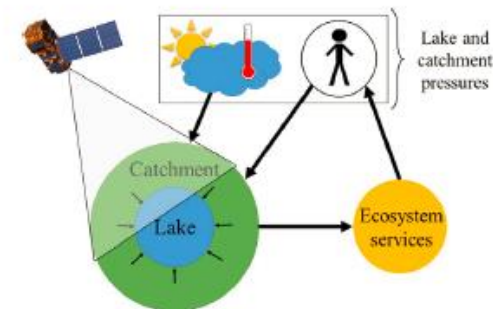
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### HIGHLIGHTS

- Lakes and their catchments provide important ecosystem services
- Multi-scale observations required to understand the response of lakes to climate and anthropogenic pressures
- Remote sensing is an important geospatial technology for deriving information about lakes systems
- We review the applicability of remote sensing in linking lake-catchment processes to assess lake response to environmental change

### GRAPHICAL ABSTRACT



### ARTICLE INFO

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### ABSTRACT

Over 50% of the world's population live within 3 km of rivers and lakes highlighting the on-going importance of freshwater resources to human health and societal well-being. Whilst covering c. 3.5% of the Earth's non-glaciated land mass, trends in the environmental quality of the world's standing waters (natural lakes and reservoirs) are poorly understood, at least in comparison with rivers, and so evaluation of their current condition and sensitivity to change are global priorities. Here it is argued that a geospatial approach harnessing existing global datasets, along with new generation remote sensing products, offers the basis to characterise trajectories of change in lake properties e.g. water quality, physical structure, hydrological regime and ecological behaviour. This approach furthermore provides the evidence base to understand the relative importance of climatic forcing and/or changing catchment processes, e.g. land cover and soil moisture data, which coupled with climate data provide the basis to model regional water balance and runoff estimates over time. Using examples derived primarily from the Danube Basin but also other parts of the World, we demonstrate the power of the approach and its utility to assess the sensitivity of lake systems to environmental change, and hence better manage these key resources in the future.

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[https://www.researchgate.net/profile/Eirini\\_Politi/publications](https://www.researchgate.net/profile/Eirini_Politi/publications)



# Wind Forecast



# leanwind

<http://www.leanwind.eu/>

## A study of stability effects in forested terrain

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**Abstract.** Data from four well instrumented met masts located in heavily forested European sites in different locations and terrain types are examined. Seven stability metrics are applied to the data sets and a novel method is used to identify the metric which most consistently identifies stability events of importance for wind energy generation. It was found that the Obukhov length, as calculated by fast response sonic anemometer, provides the most reliable results in these highly complex sites. It was also found that non-neutral stabilities can be expected a significant portion of the time for wind speeds of less than 10 m/s at the considered sites.

## Seal tagging




Seal Track  
Seal Tagging Project

<http://sealtrack.ucc.ie/>



Thank you for your attention

A photograph of a green chalkboard with white text. The text is written in a serif font and is arranged in two lines. The first line reads "I'm not Irish..." and the second line reads "But I hope to get lucky!". The chalkboard has a slightly textured appearance and some faint horizontal lines.

*I'm not Irish...*  
*But I hope to get lucky!*