

# Progress in e-hype and OPERR

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IBI-ROOS ANNUAL MEETING, PASAIA 14-16 FEBRUARY 2012

## Objectives

Turn a pan-European river discharge model into an operational discharge model delivering real-time and forecast data to shelf sea models. The discharge model will thereby act as a downstream service based on the currently developed GMES core information service, water.

The project addresses the pressing need for reasonable estimates of real-time river discharges to seas for driving the shelf-sea models.

## Partners OPERR

[SMHI \(Swedish Meteorological and Hydrological Institute\)](#)

[IMR \(institute for Marine Research, Bergen Norway\)](#)

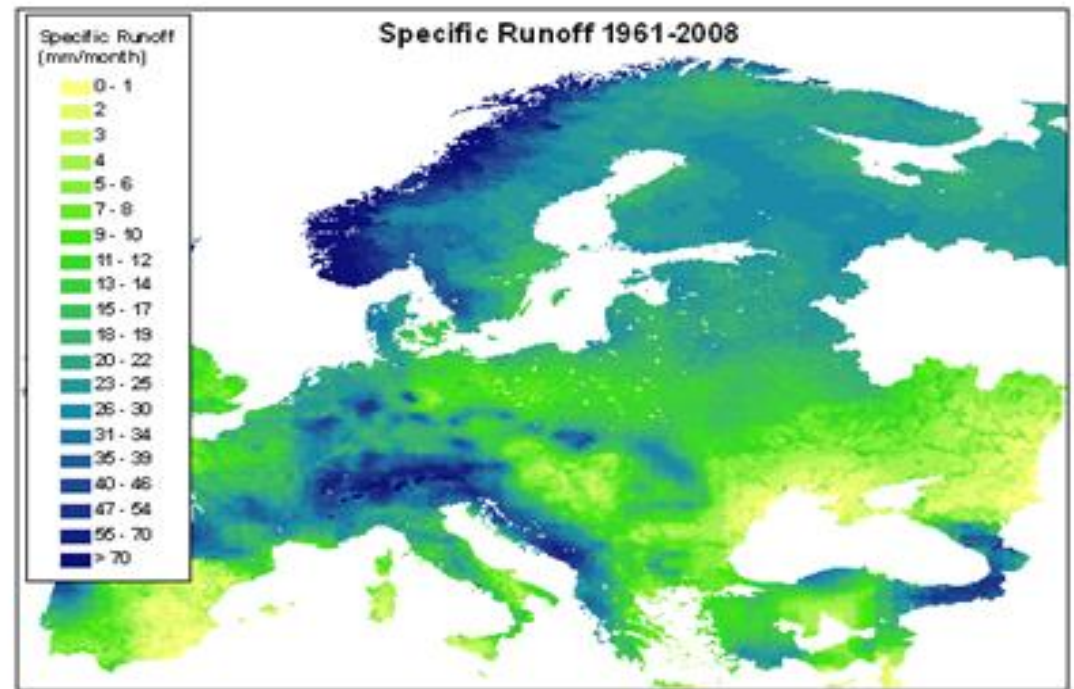
[met.no \(Norwegian Meteorological Institute, Oslo, Norway\)](#)

[AZTI-Technalia \(Spain\)](#)

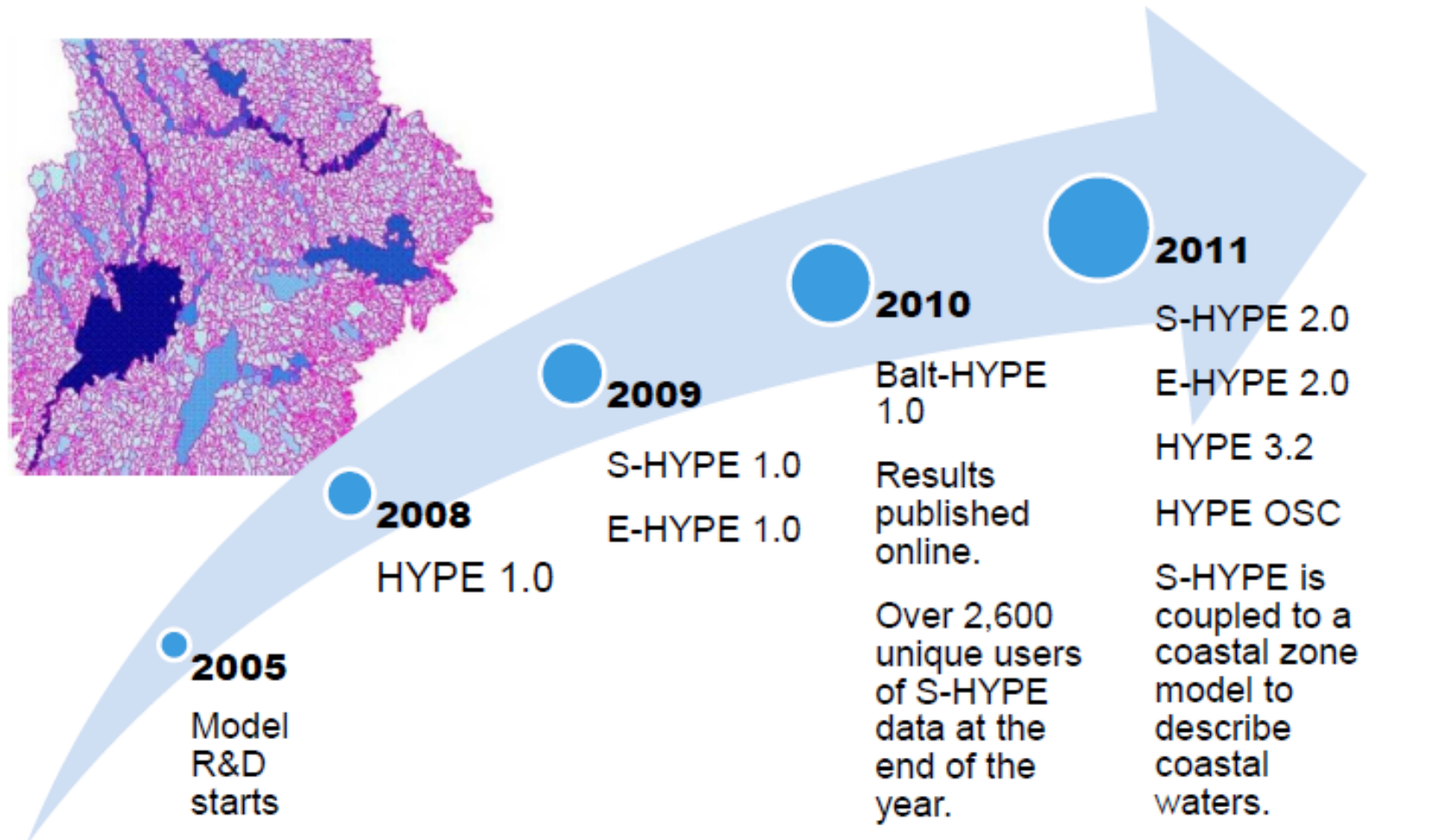
[MHI \(Marine Hydrographic Institute, Ukraine\)](#)

## Hydrological model HYPE (SMHI)

- HYPE model (Hydrological Predictions for the Environment)
- E - Europe
- Based on readily available global and regional data sets
- High-resolution, large-scale hydrological modelling
- Stream flow (and soon nutrients) + other interesting variables



## HYPE Timeline



Atlantic HYPE¿?

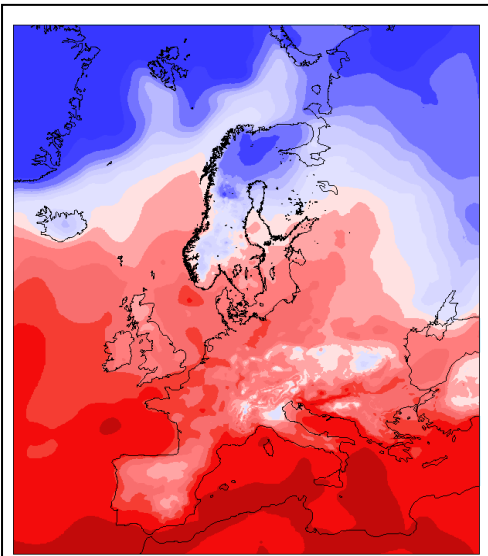
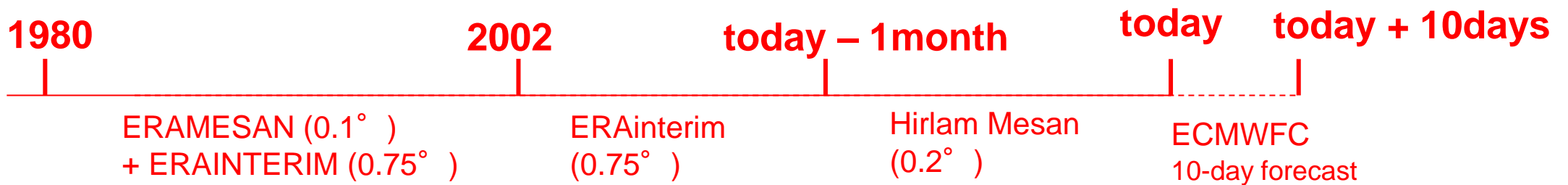
# Hydrological model HYPE (SMHI)

- E-HYPE v1.0: (Current operational version, data currently available in E-HYPE web) : This version is based on HYDRO1K for subbasins and is **uncalibrated**.



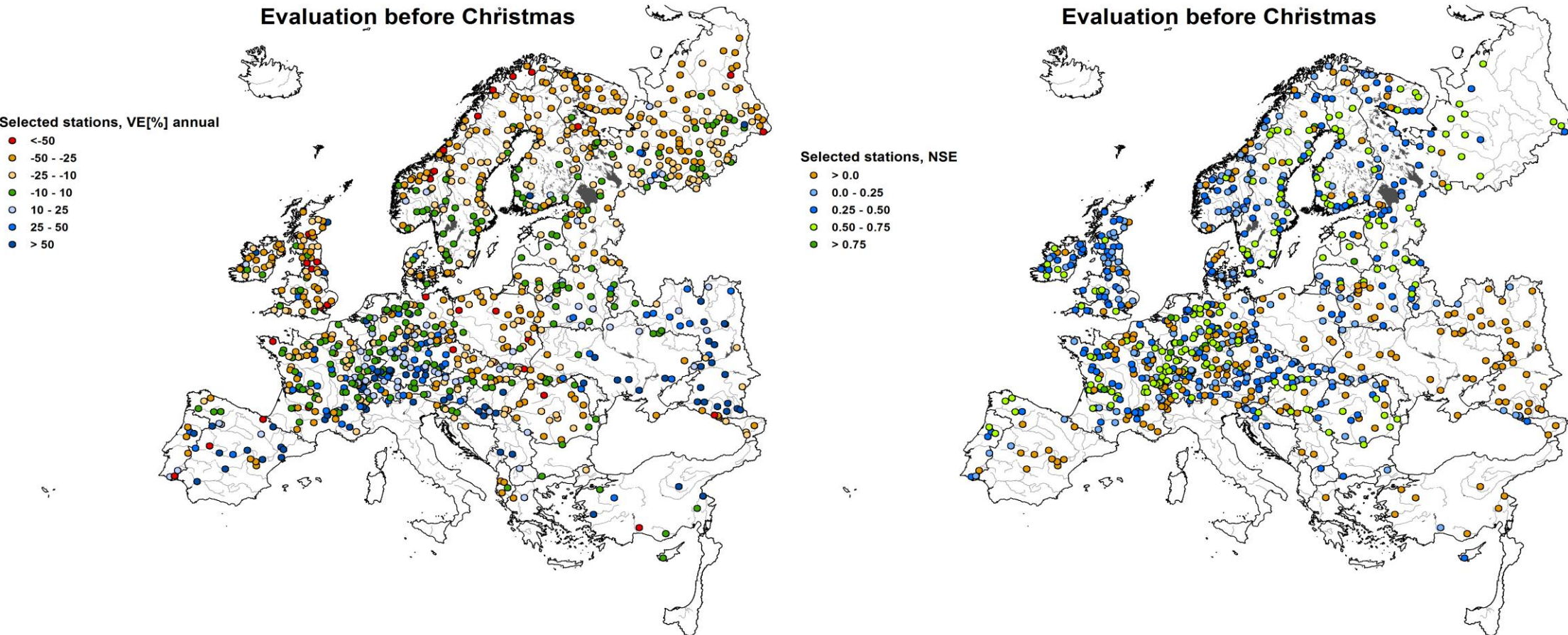
- E-HYPE v2.0: (Hindcast data currently available from FoUu): Uses Hydrosheds and HYDRo1K for subbasins, much manual correction made, improved links to lakes and observation stations, use of evapotranspiration measurements to improve evapotranspiration simulation, **some calibration**
- E-HYPE v2.1 (To be made operational Autumn 2012): Addition of water quality data to v2.0. **Calibration and validation** of both water and water quality

# Operalisationisation of E-HYPE model



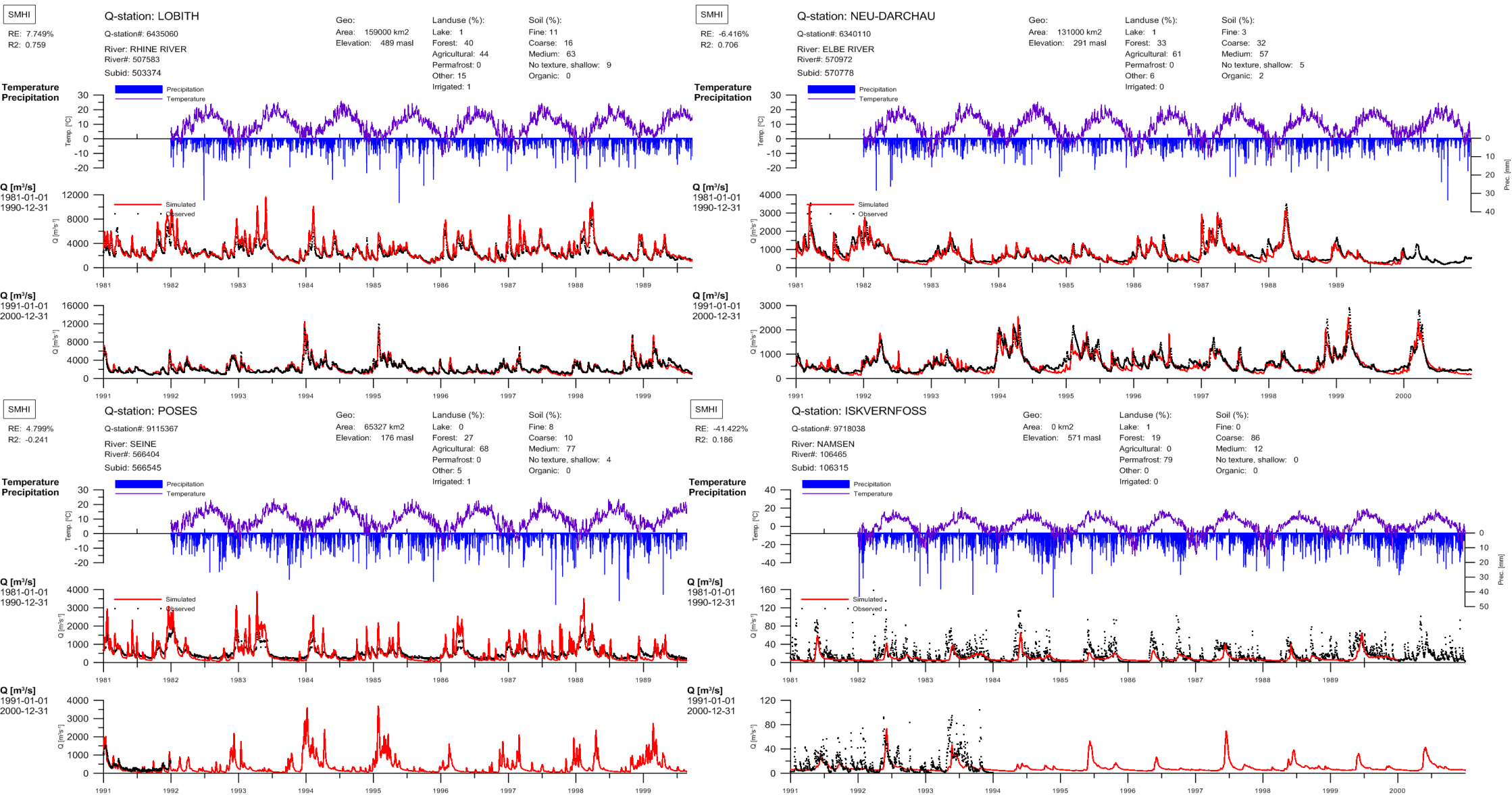


# E-HYPE2.0. Evaluation all Independent stations



- Regional problems with simulated discharge volume (probably P, but also irrigation in regions where irrigation is significant – looking at new P data, fix evapotranspiration and irrigation routines.
- R2 values mostly reasonable, but also some regions (eastern europe, spain) where simulated daily discharge is poor – see fixes mentioned above, also more calibration

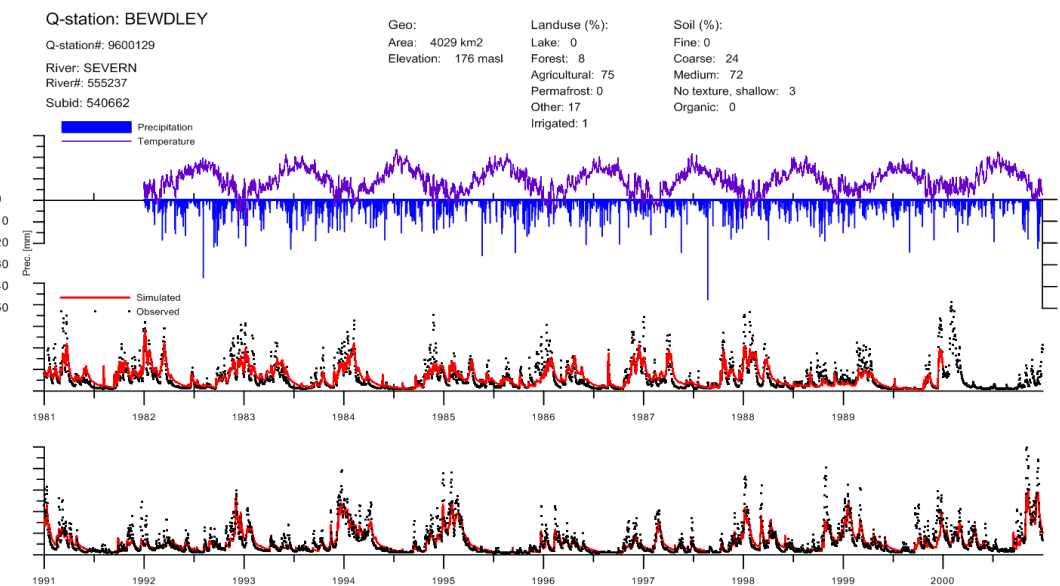
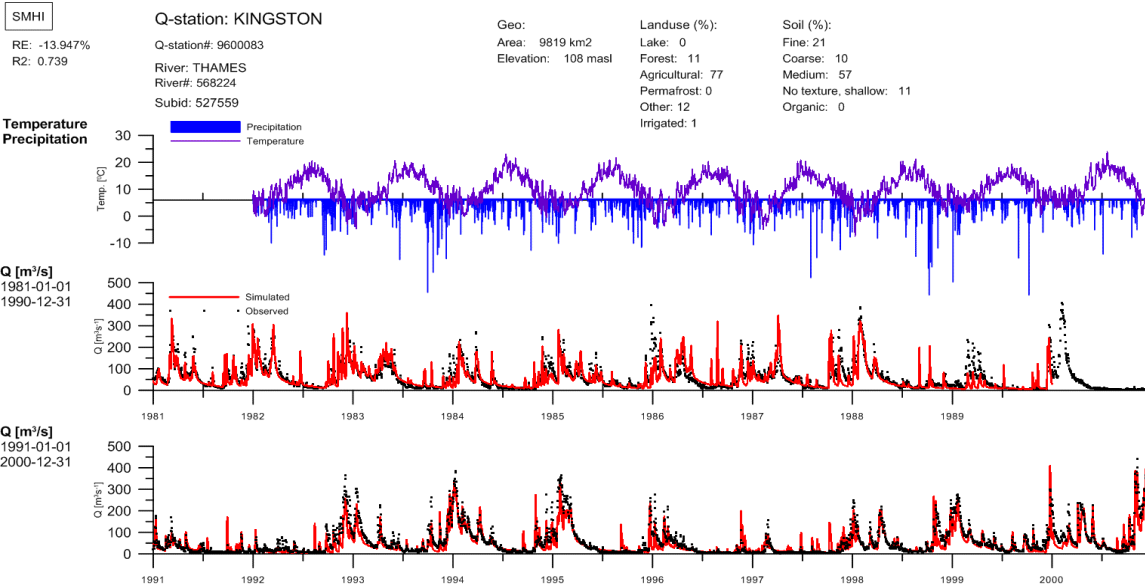
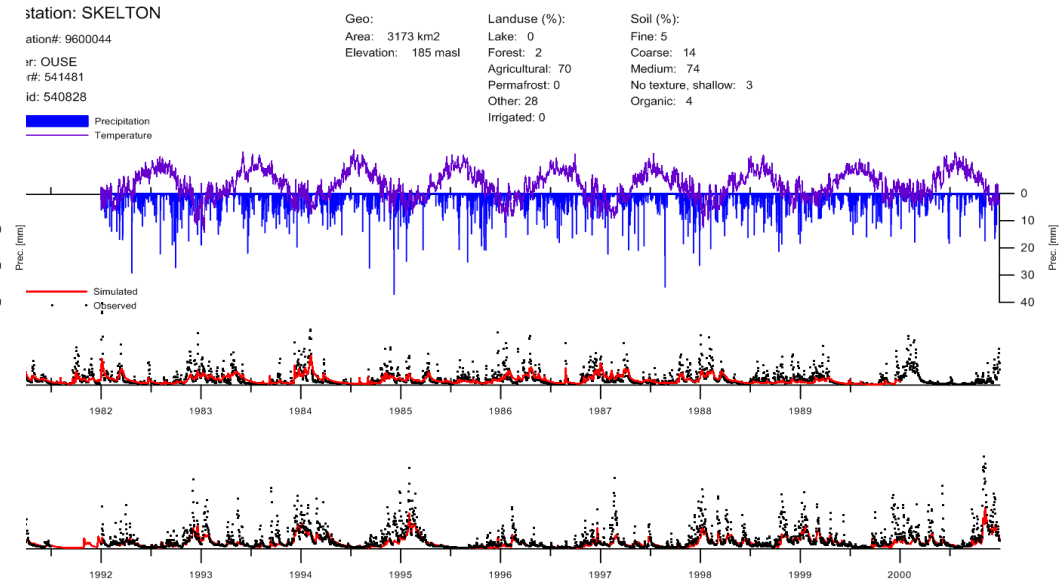
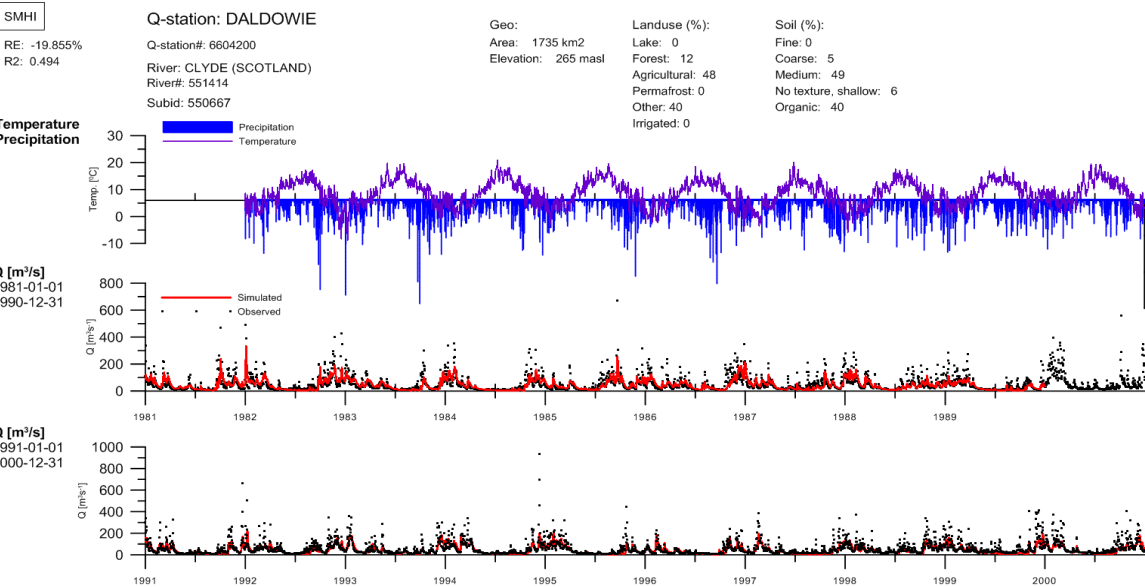
# Evaluation – River Mouths Atlantic Coast



Good results around Atlantic Coast, both volume and daily variability, except Norway where volume underestimated



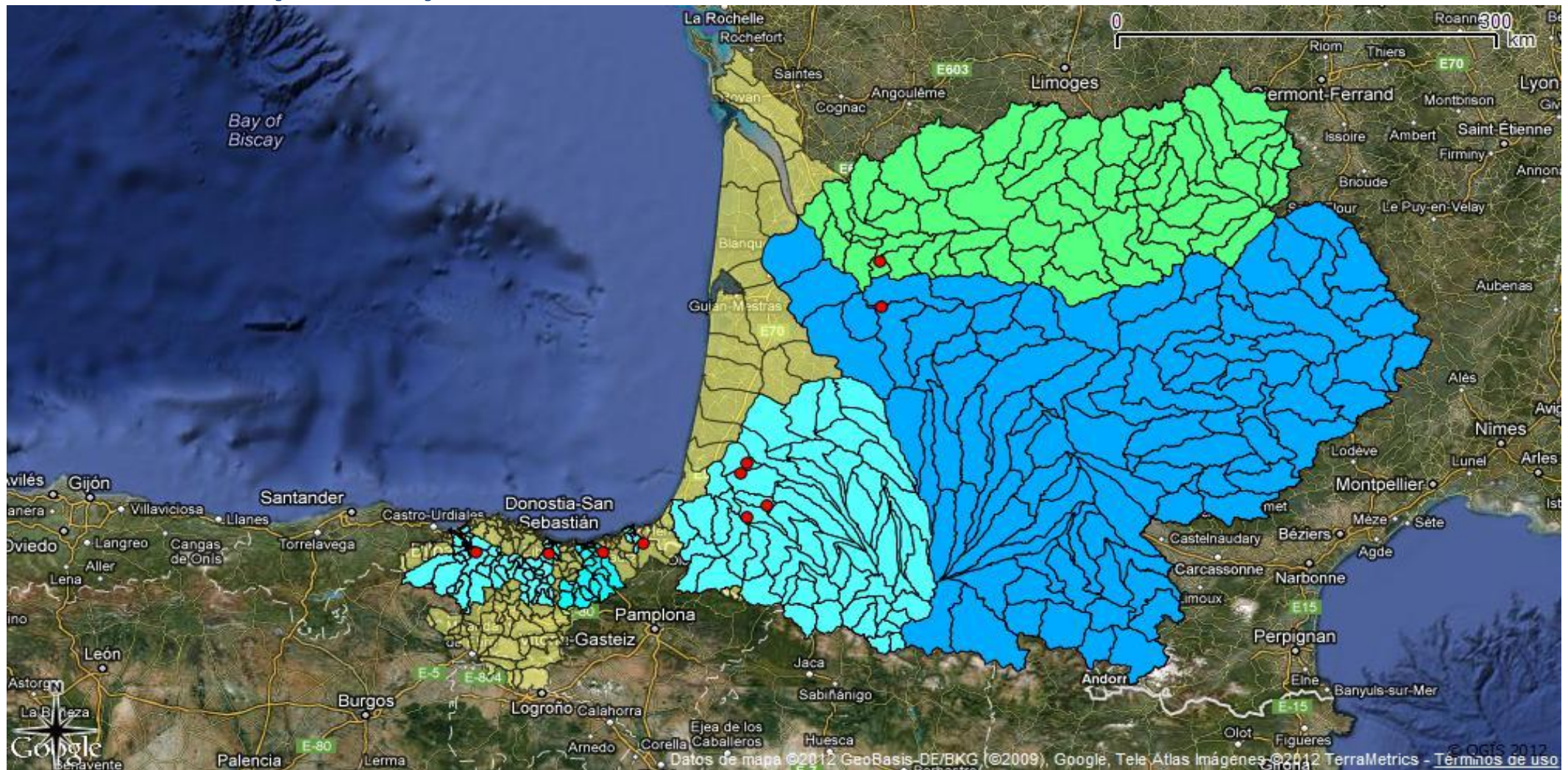
# Evaluation – River Mouths, UK



Daily variation of discharge is good, but problems with reaching flood peaks. General problem with underestimation of volume over UK, but better in South

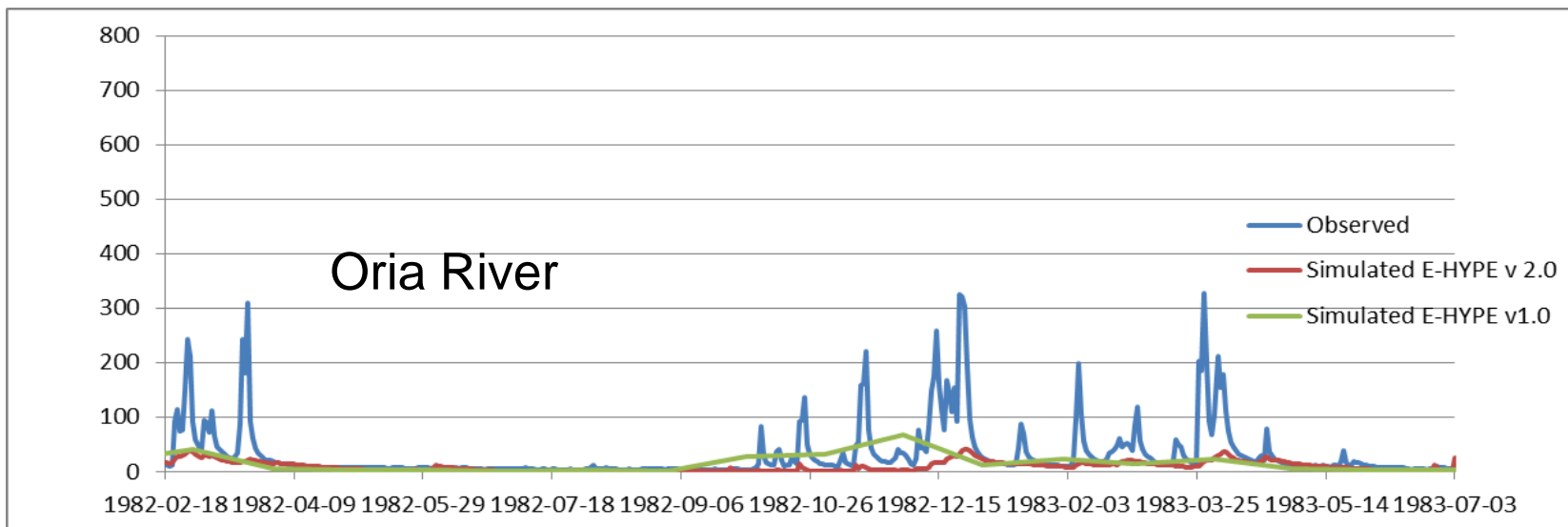
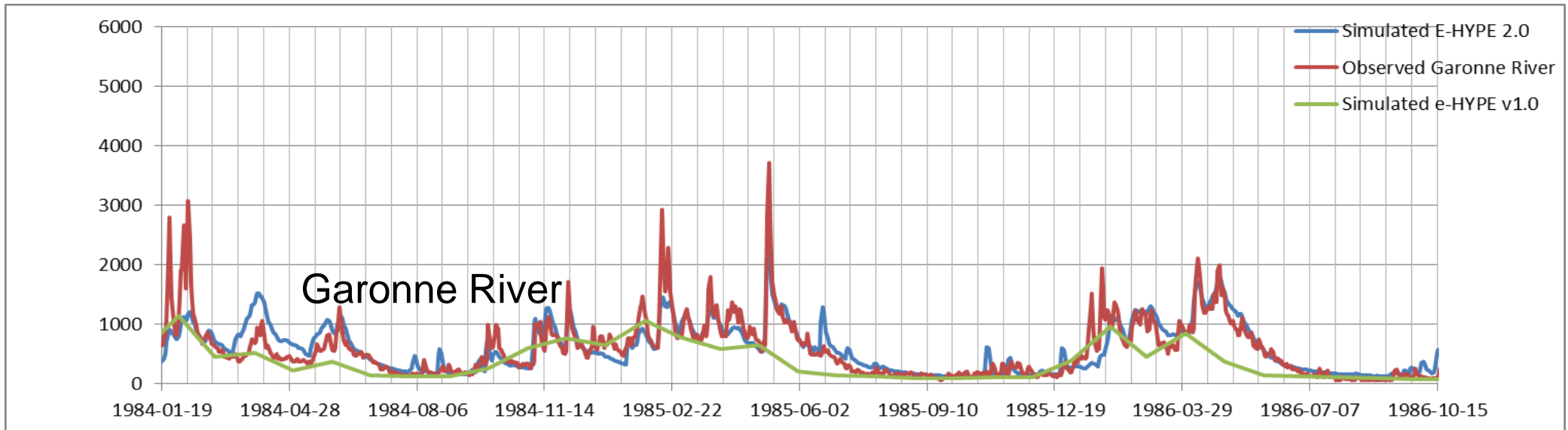


# Data from Small Cantabrian Rivers: Final Data collection (runoff)



	Basin Code in Hydrosheds	Basin Area (KM2)	Al Mean Disch	Historical data available	Source for Aknowledge
Nerbioi	99332	1824	21	1995-2009	Diputación Foral Bizkaia
Deba	99593	541	9.8	1995-2009	Diputación Foral Gipuzkoa
Oria	99084	894	20	2000-2009	Diputación Foral Gipuzkoa
Bidasoa	99084	714	24	1969-2009	Confederación hidrográfica del Norte
Adour	97116	16856	295	1967-2009	Banque Hydro
Garonne	87592	87592	588	1952-2010	Autorité portuaire Bordeaux
Dordogne	87370	87370	323	1952-2010	Autorité portuaire Bordeaux

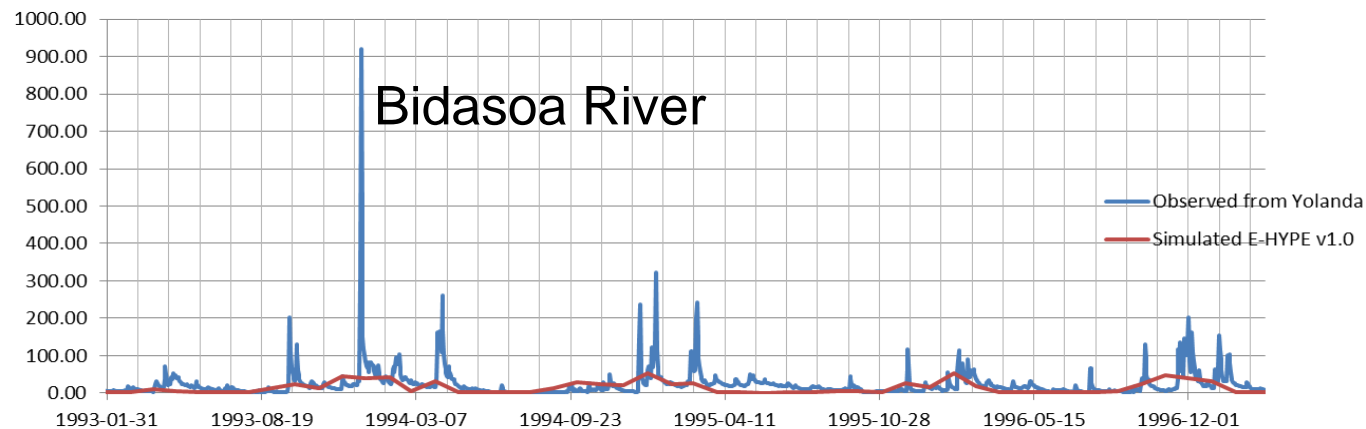
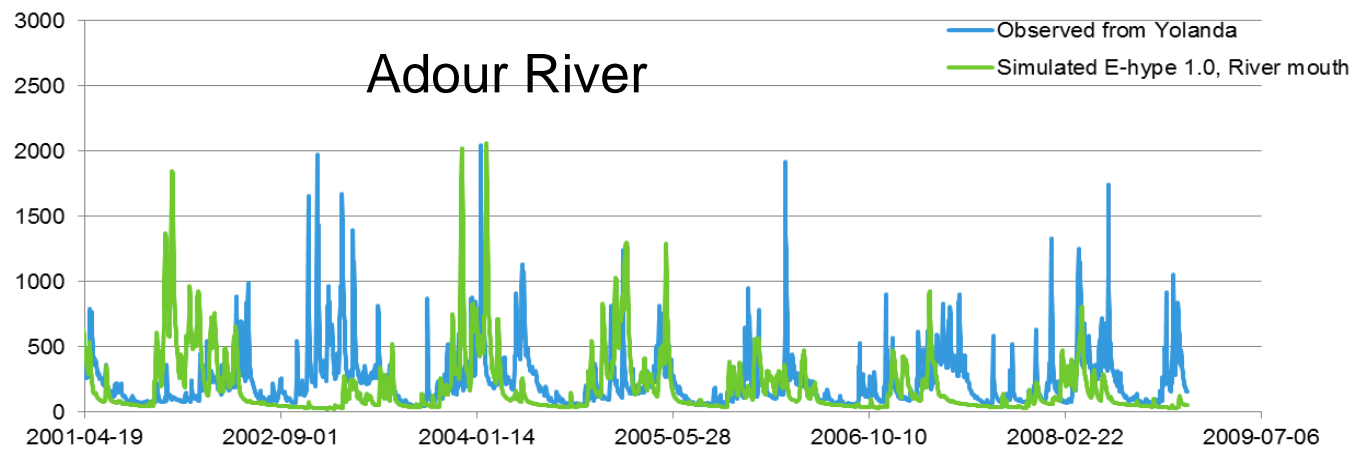
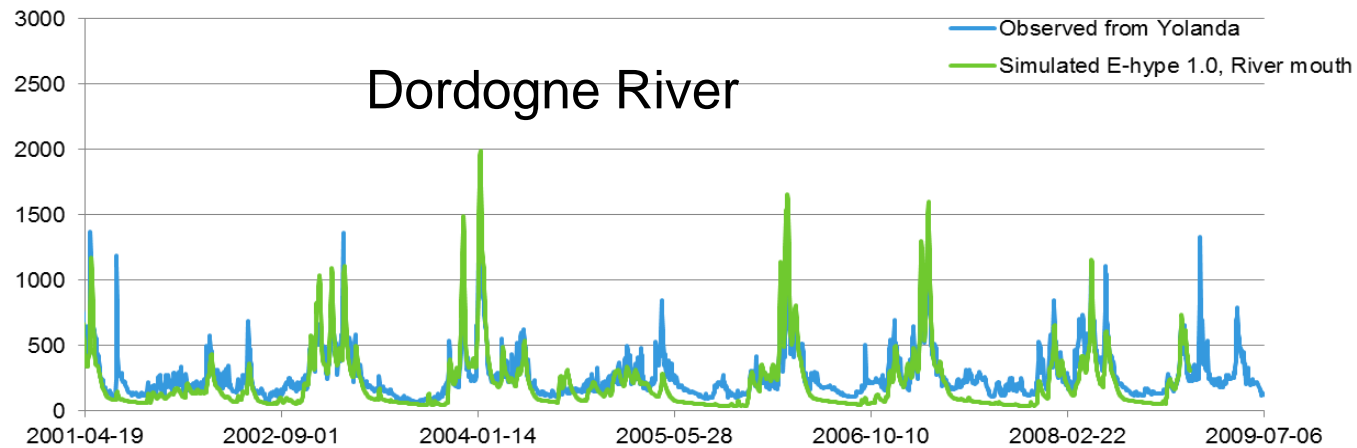
# Hydrographs – AZTI's data



Comparisons against E-HYPE v1.0 and 2.0. Problems with smaller rivers, but Garonne gives good results. Note improvement in v2.0!



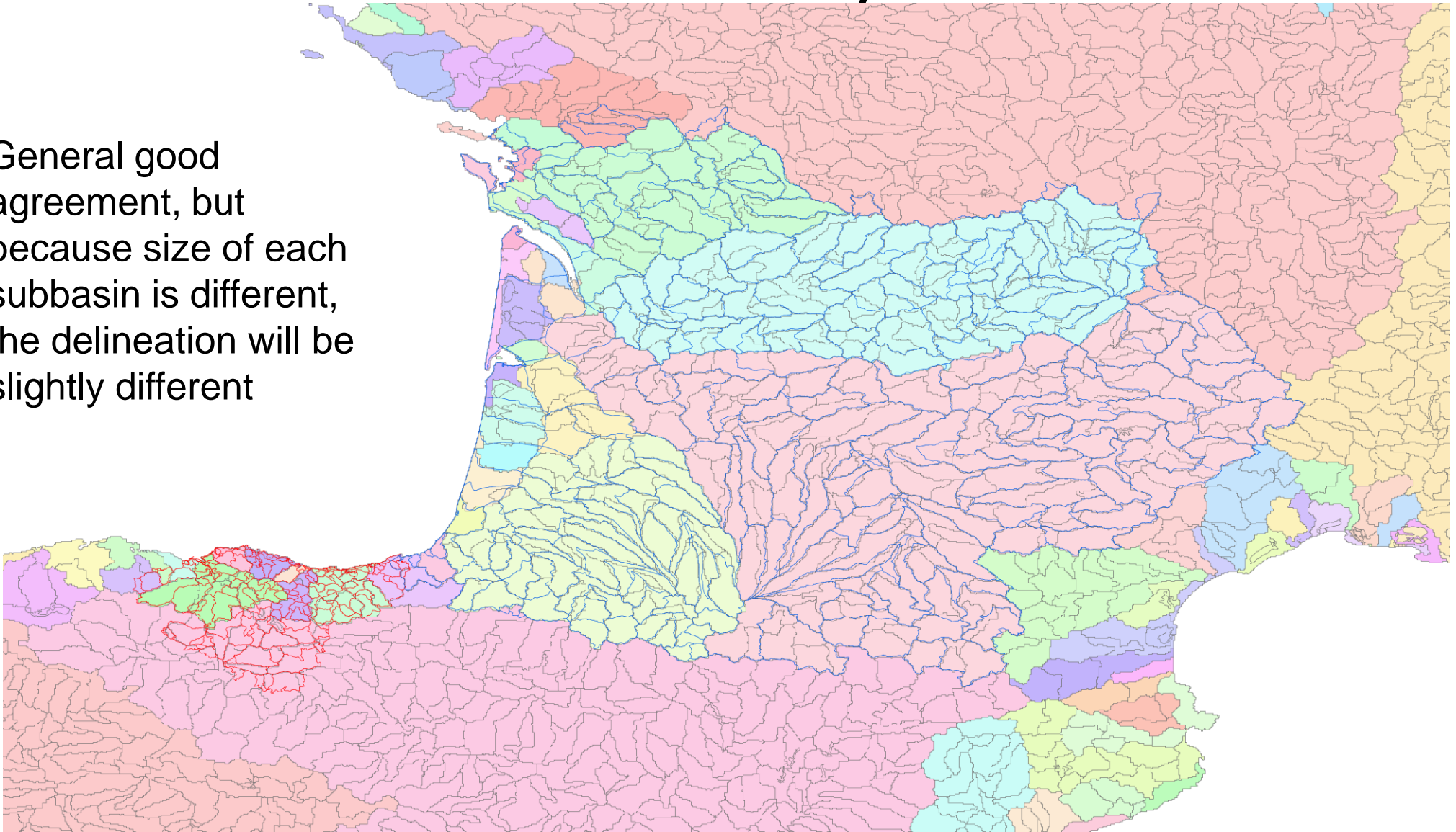
# Hydrographs – AZTI's data



Comparisons against E-HYPE v1.0 only (data not yet extracted from v2.0). Dordogne good, but seems to be a serious problem with rainfall data for the Adour and possibly Bidasoa Rivers. Yolanda to help collect some local precipitation data we can compare with our data.

# Comparison of Subbasins E-HYPE (Grey), Sous (blue lines), Azti (red lines)

General good  
agreement, but  
because size of each  
subbasin is different,  
the delineation will be  
slightly different





Firefox Tony Bennett - The Way You Look To... HYPE - HYdrological Predictions for t... hype.sourceforge.net HYPE OSC

## HYdrological Predictions for the Environment (HYPE)

HYdrological Simulation System (HYSS)

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### News

Download the presentations from the HYPE Open Source Community International Workshop and kick-off  
[Click here to download all presentations in a zip file \(20.8Mb\)](#)  
[Click here to go to the download page for separate downloads](#)

### Join the project!

Do you want to take part in the development of HYPE?  
[Register](#) a user at SourceForge and [contact](#) one of the project administrators.

### Documentation

## SMHI

Swedish Meteorological and Hydrological Institute

### HYPE Open Source Community (OSC)

HYPE OSC is an open source initiative under the [Lesser GNU Public License](#) taken by [SMHI](#) to strengthen international collaboration in hydrological modelling and hydrological data production. The hypothesis is that more brains and more testing will result in better models and better code.

The code will be transparent and can be changed and learnt from. It lies in the nature of an open source project to be highly modularized, which allows for parallel development of independent components. New versions of the main code will be delivered frequently.

The main objective of HYPE OSC is to provide public access to a state-of-the-art operational hydrological model while encouraging hydrologic expertise from different parts of the world to contribute to model improvement.

### Who should join?

HYPE OSC is open to everyone interested in hydrology, hydrological modelling and code development – e.g. scientists, authorities, consultancies.

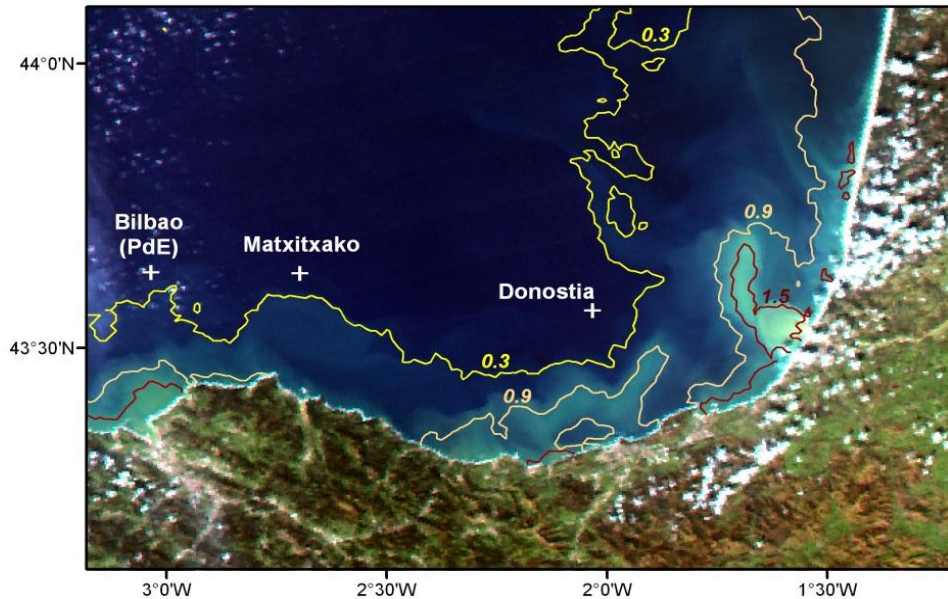
### What's in it for you?

Sharing in a movement of modern hydrological programming, to provide tools for water assessments of the future. HYPE OSC offers the present HYPE model source code to start with. This will be a platform for international cooperation, networking, knowledge exchange and collective source code development.

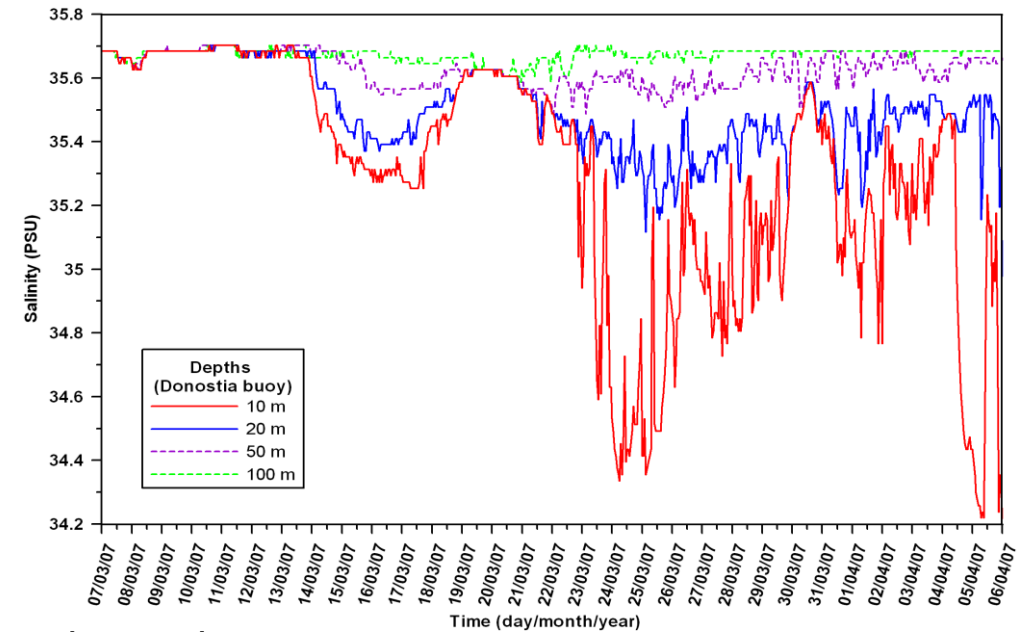
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# Coastal Impact of Small Cantabrian Rivers

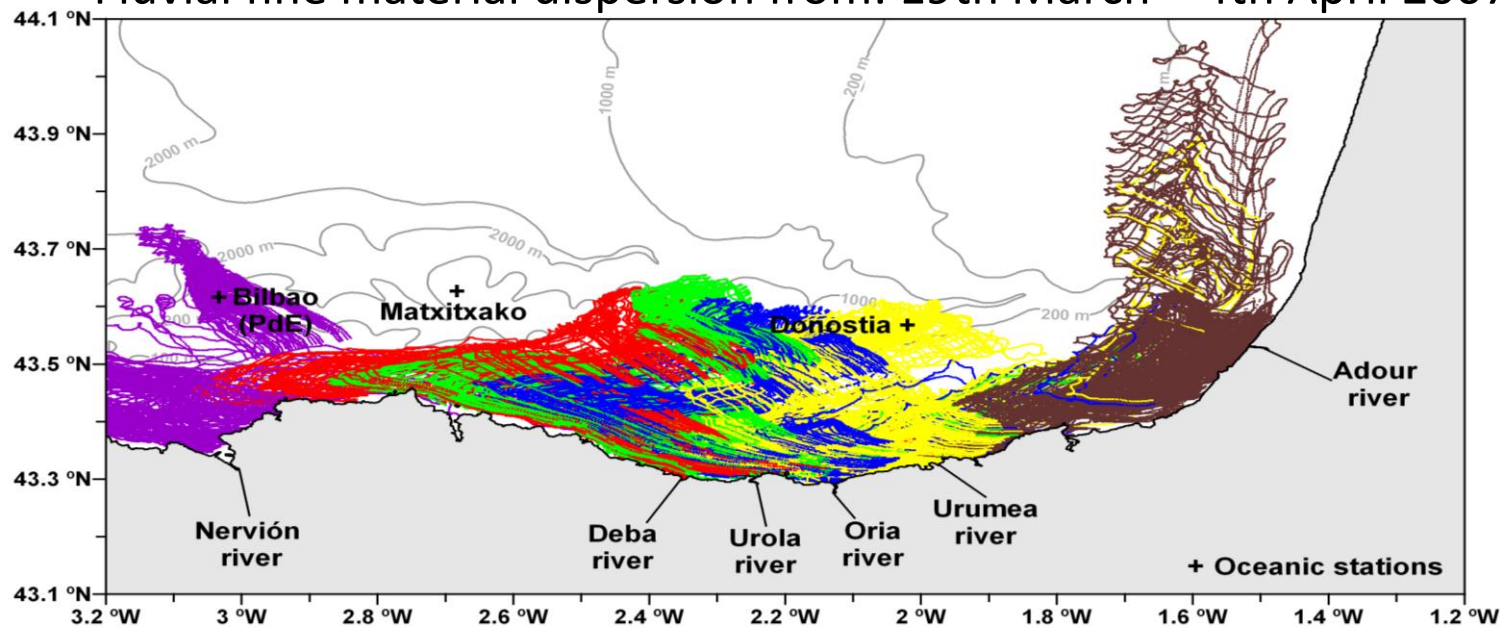
TSM conc. 10/03 2007, from MODIS



Salinity at Donostia Buoy: 07/03 - 06/04



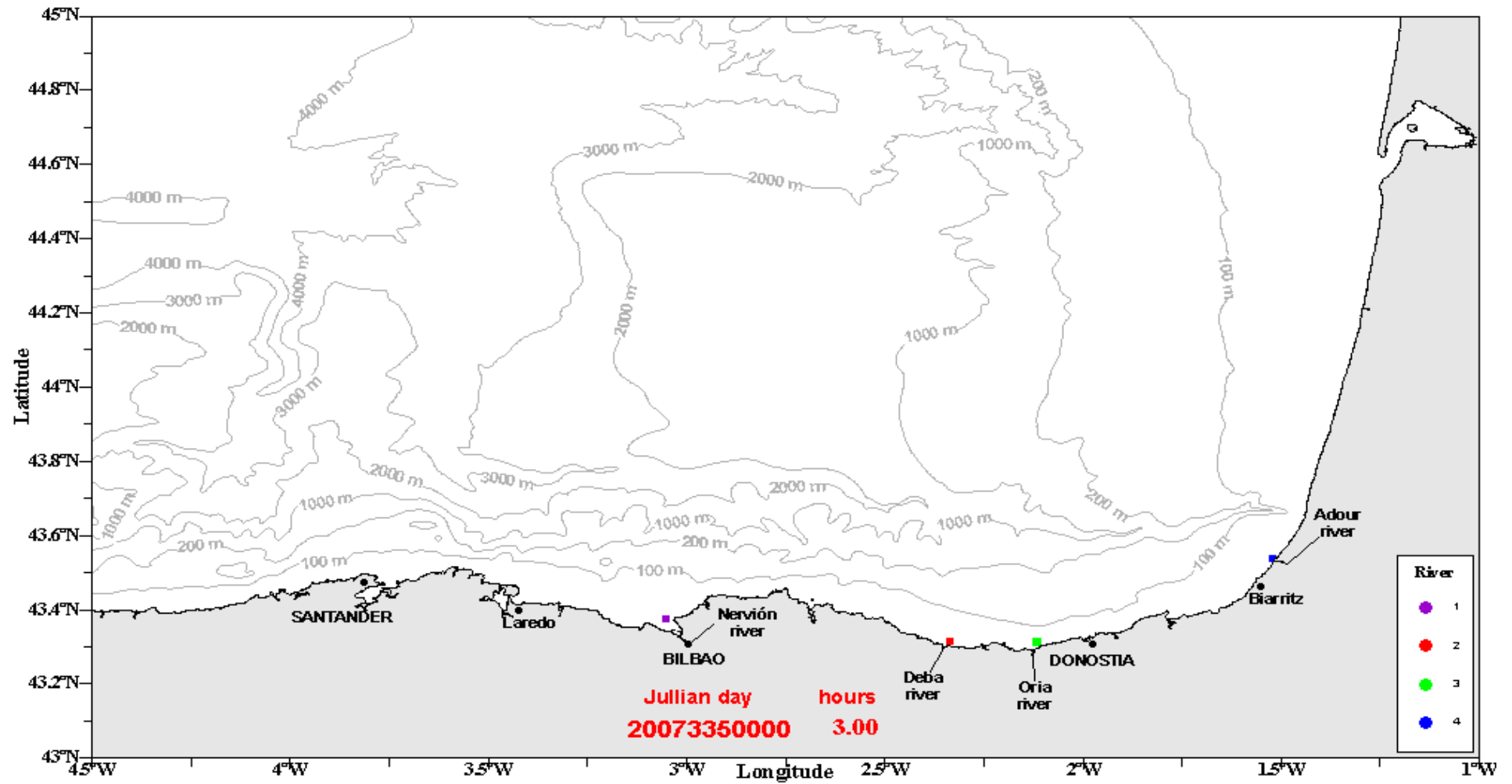
Fluvial fine material dispersion from: 19th March – 4th April 2007



Deep sea buoys



## WP4: preparing ROMS model for river runoff data assimilation and coastal dispersion simulation



## Summary

- Presently e-hype 2.0:  
achieved important improvements from v1.0 , but still irregular results: Worst results in small rivers and irrigation areas
- Operational e-hype 2.1 due to Autumn 2012:  
will include quality parameters (nitrates & phosphates)
- Work to couple shelf models to river data in course.





[www.azti.es](http://www.azti.es) | [www.alimentatec.com](http://www.alimentatec.com) | [www.itsasnet.com](http://www.itsasnet.com)

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