Delivering Better Forecasts

Co-developing Hydrological Status and Outlooks Systems for increased water security

Katie Facer-Childs, Lucy Barker, Luis Roberto Silva Vara, Sulagna Mishra, Andy Wood, Gemma Nash, Harry Dixon, Jamie Hannaford, Simon Dadson, Eleanor Blyth

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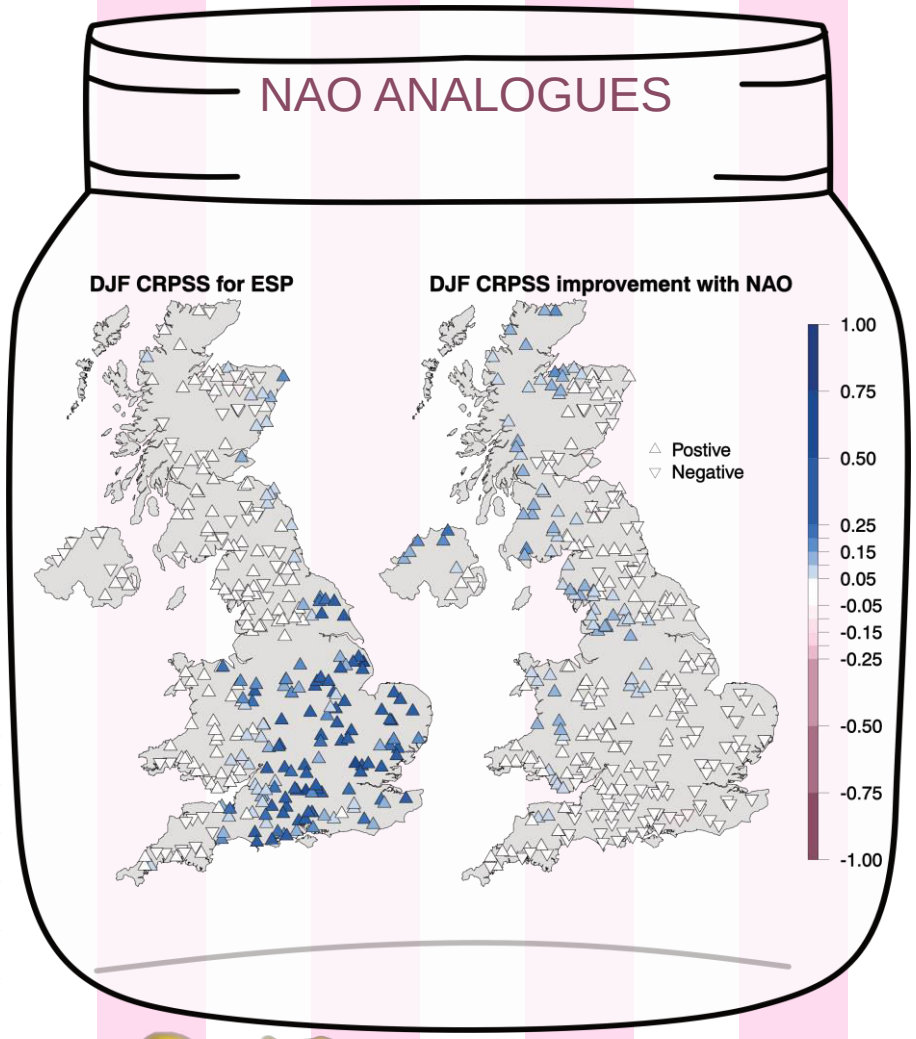
Making Better Forecasts, and Delivering Better Forecasts

Thank you for visiting my poster!

We can make better forecasts by Pick N Mix-ing new scientific methods

But simply MAKING better forecasts isn't enough

We need to DELIVER them effectively



Presentation Structure

Lessons from EDgE and ULYSSES

UK Hydrological Outlooks Portal

International HydroSOS

Image: Carl Spencer - Flickr

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Lessons from EDgE

European Multi-Model Forecasts

Now **ULYSSES** / Copernicus Global Forecasting System

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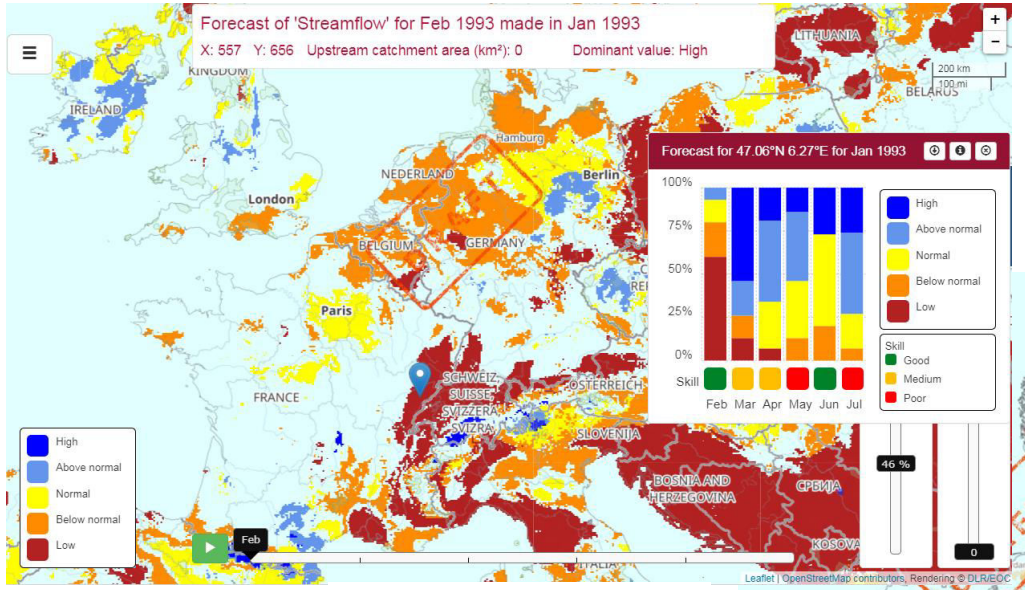
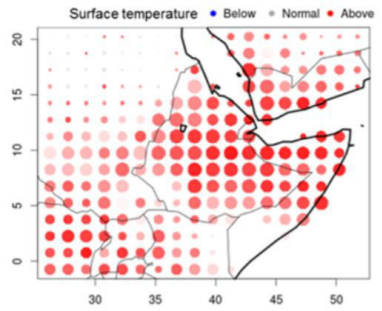
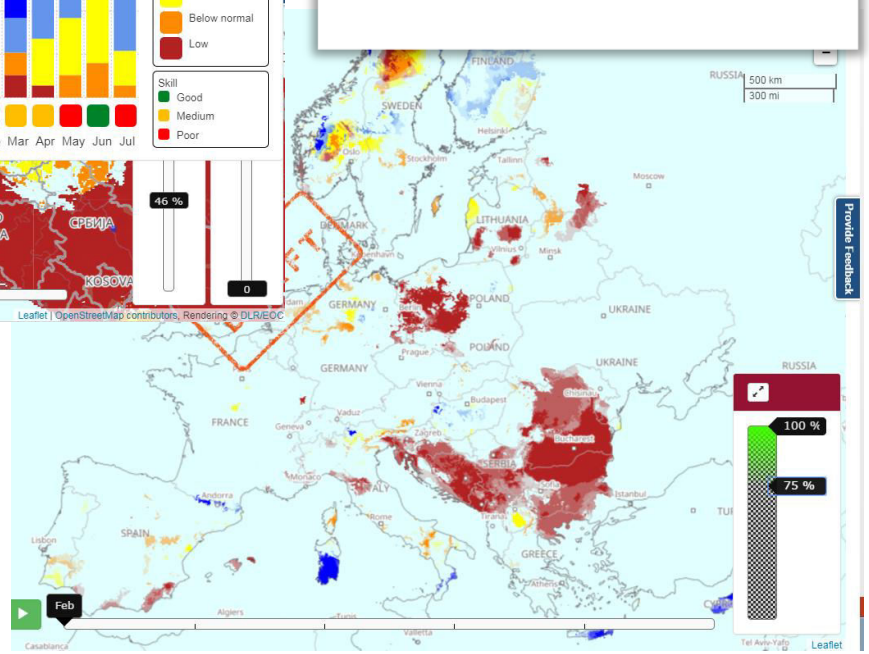
Lessons from EDgE
Representing Skill and Uncertainty

Developing intuitive representation of both skill and uncertainty

- Skill – are the models any good?
- Uncertainty – do the models agree with each other?







EDgE Workshop

ULYSSES Use Case Studies

mULti-model hYdrological ULYSSES SeaSonal prEdictions System

3 local/national case studies:

- Rio Grande River
- La Plata Basin
- UK

→ Can't rely on raw model outputs.

→ Local information, bias correction and weighted blending are needed to get good results around the world.

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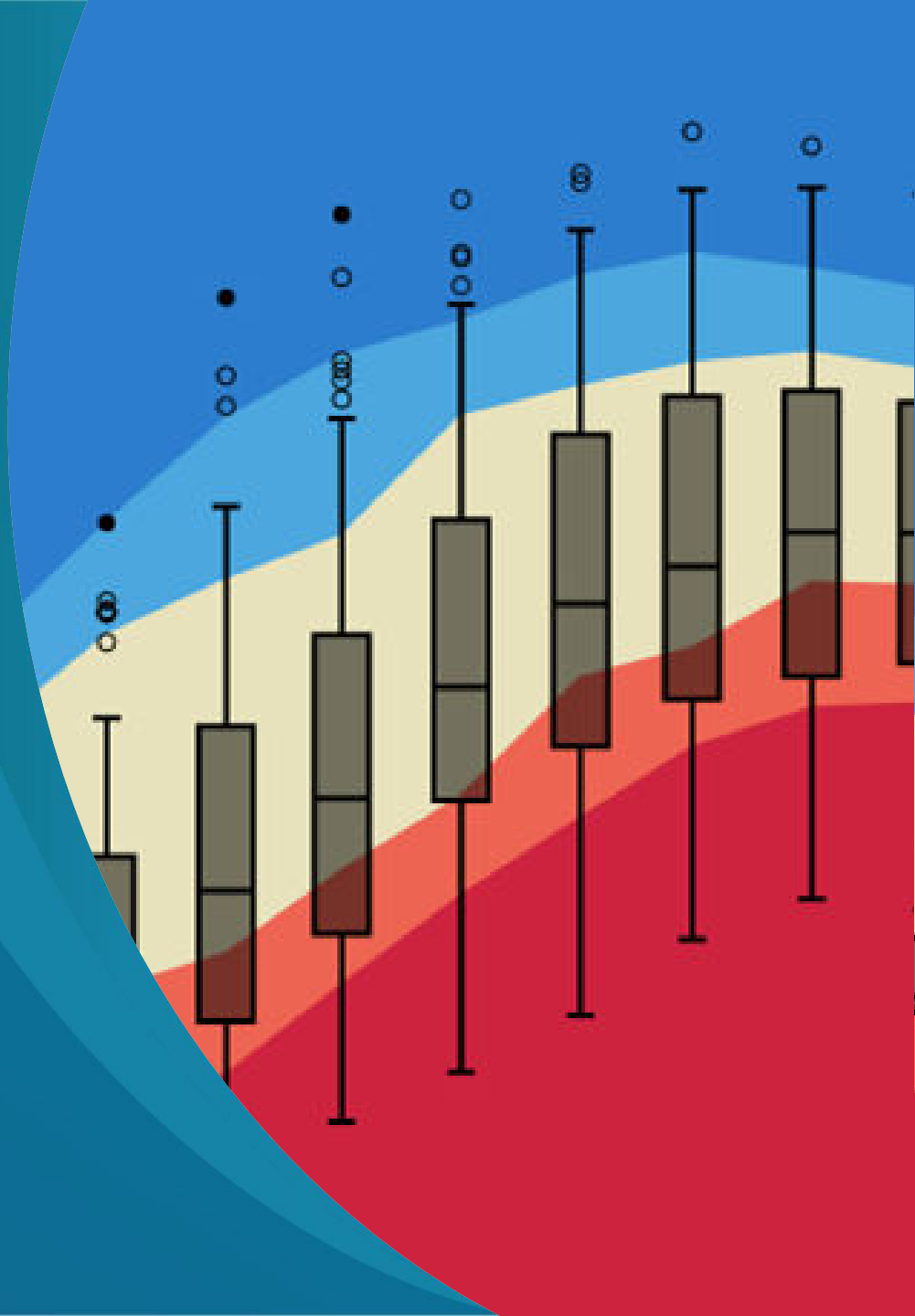
Climate Change Service
climate.copernicus.eu

Delivering UK-based Hydrological Forecasts

UK Hydrological Outlooks Portal



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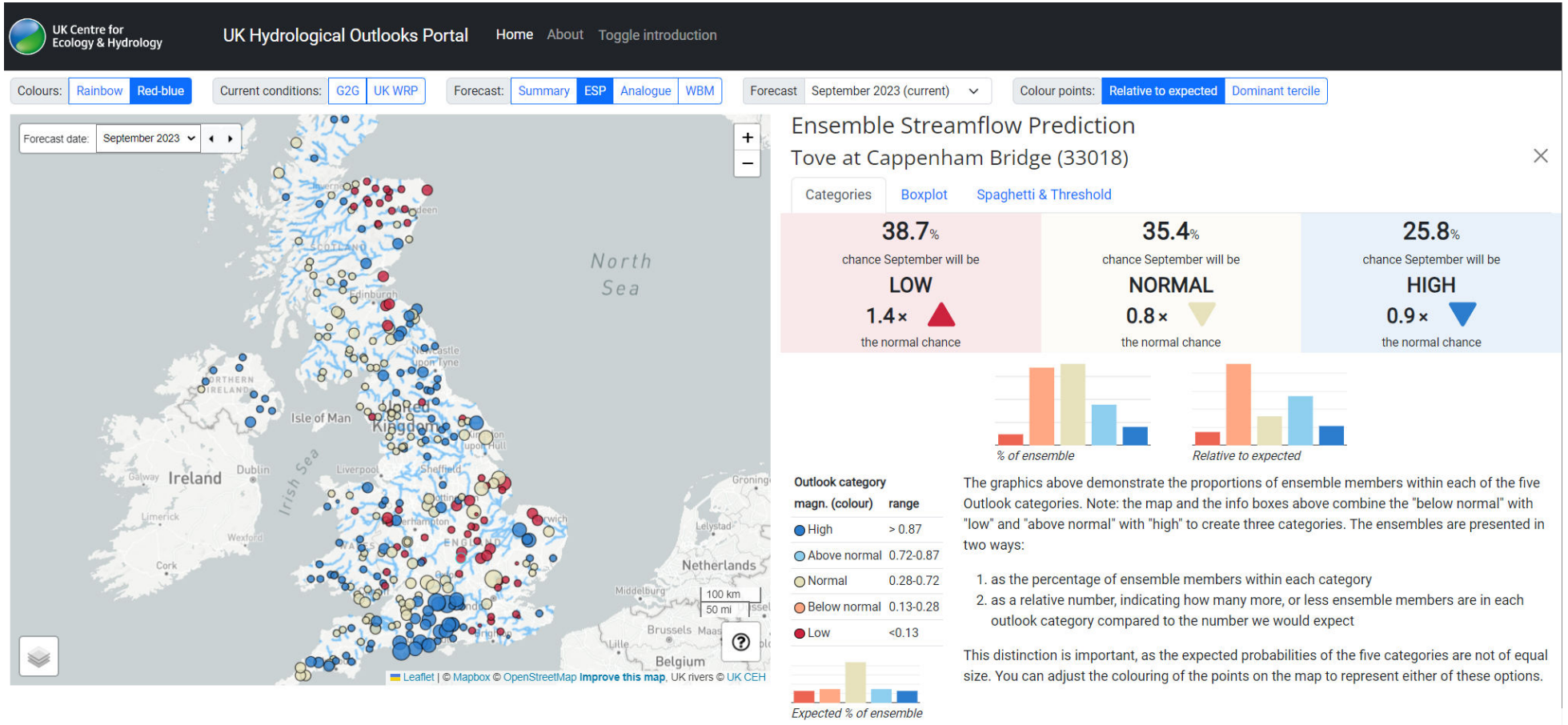
UK Based Delivery
Hydrological Outlooks Portal – GR4J ESP

eip.ceh.ac.uk/hydrology/outlooks

- Tercile dots sized by CRPSS
- Category boxes in line with Met Office formatting



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Hydro-JULES

UK-SCAPE
UK Status, Change and Projections of the Environment

UK Based Delivery
Hydrological Outlooks Portal – GR4J ESP

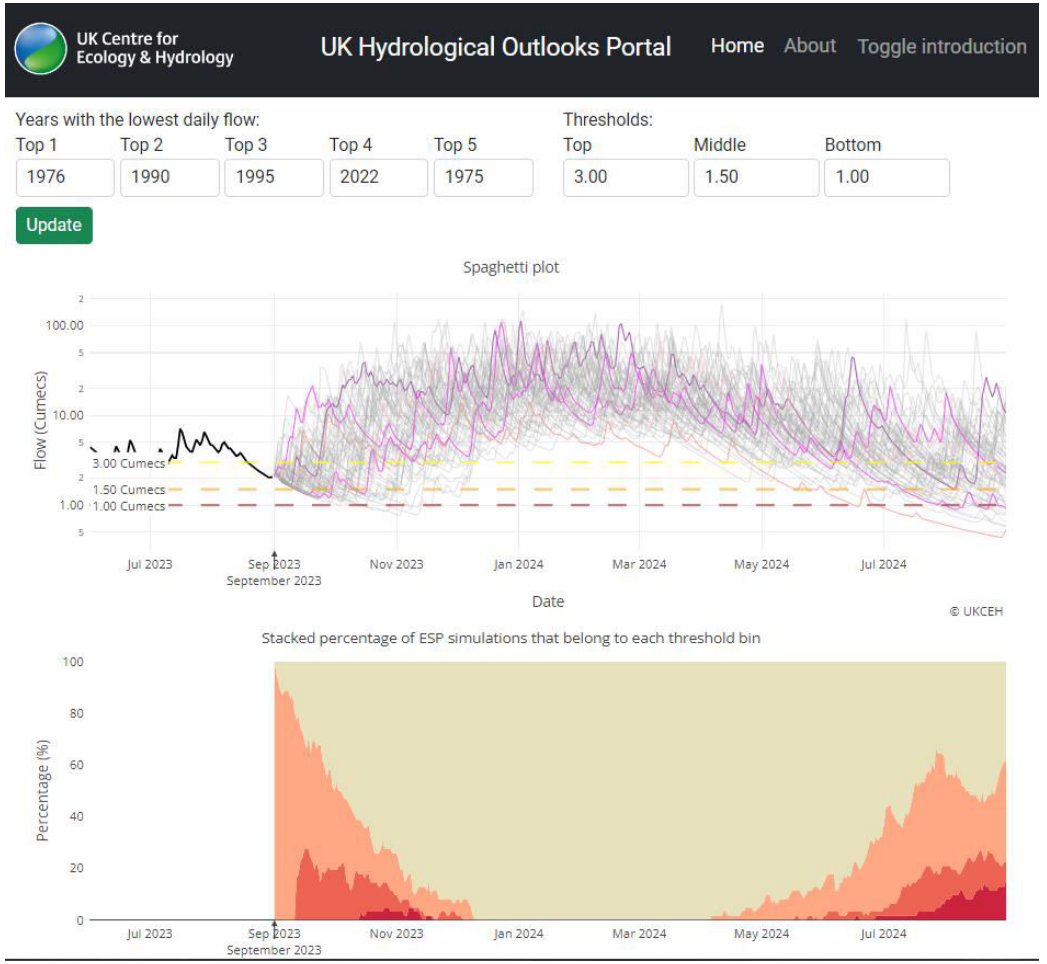
eip.ceh.ac.uk/hydrology/outlooks

Engagement as part of the Drought and Water Scarcity programme.

Water managers needed information on likelihoods of flows falling below certain thresholds

About Drought Stands

About Drought Data Clinics



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UK Based Delivery
Hydrological Outlooks Portal – Next Steps

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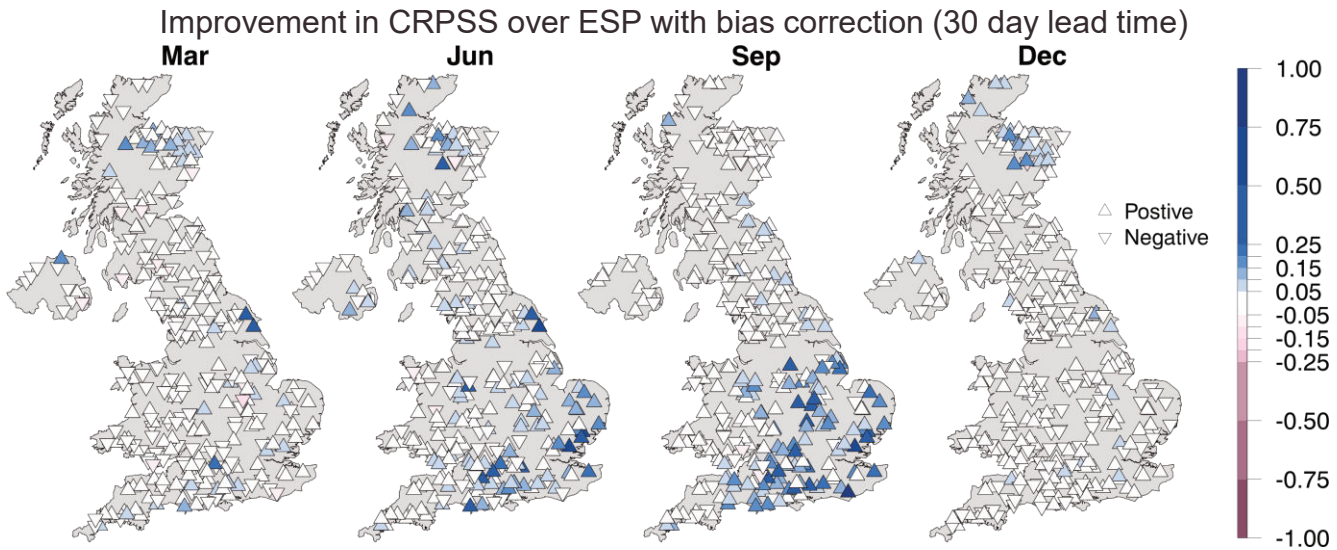
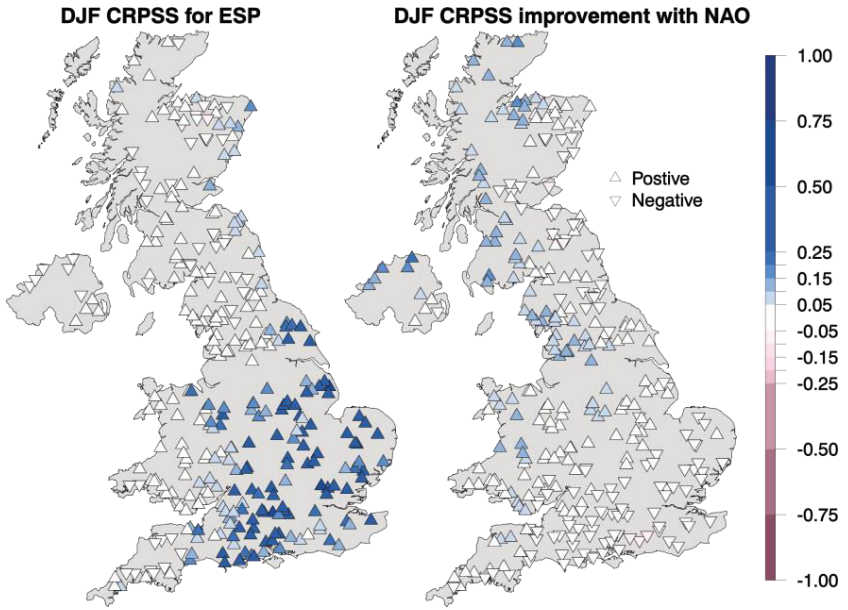
Integrating NAO forecasting method with ESP and WBM

Exploring model blending

Stakeholder engagement on the visualisation of outputs (large ensemble, discrete timesteps)





Bias correcting GR model results (NAO and ESP forecasts)

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Hydro-JULES

UK-SCAPE
UK Status, Change and Projections of the Environment

Delivering International Hydrological Forecasts

Hydrological Status and Outlooks System (HydroSOS)

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International Delivery HydroSOS – WHAT?

The World Meteorological Organization's Hydrological Status and Outlooks System (HydroSOS) bridges the gap between data collection and decision making

Co-producing and delivering information products that help water resources management

HydroSOS
Technical Team 2019

HydroSOS
Technical Team 2023

An overview of the current global hydrological status

including groundwater, river flow and soil moisture

An appraisal of where the current status is significantly different from 'normal'

For example indicating drought and flood susceptibility

An assessment of whether this is likely to get better or worse

over coming weeks and months

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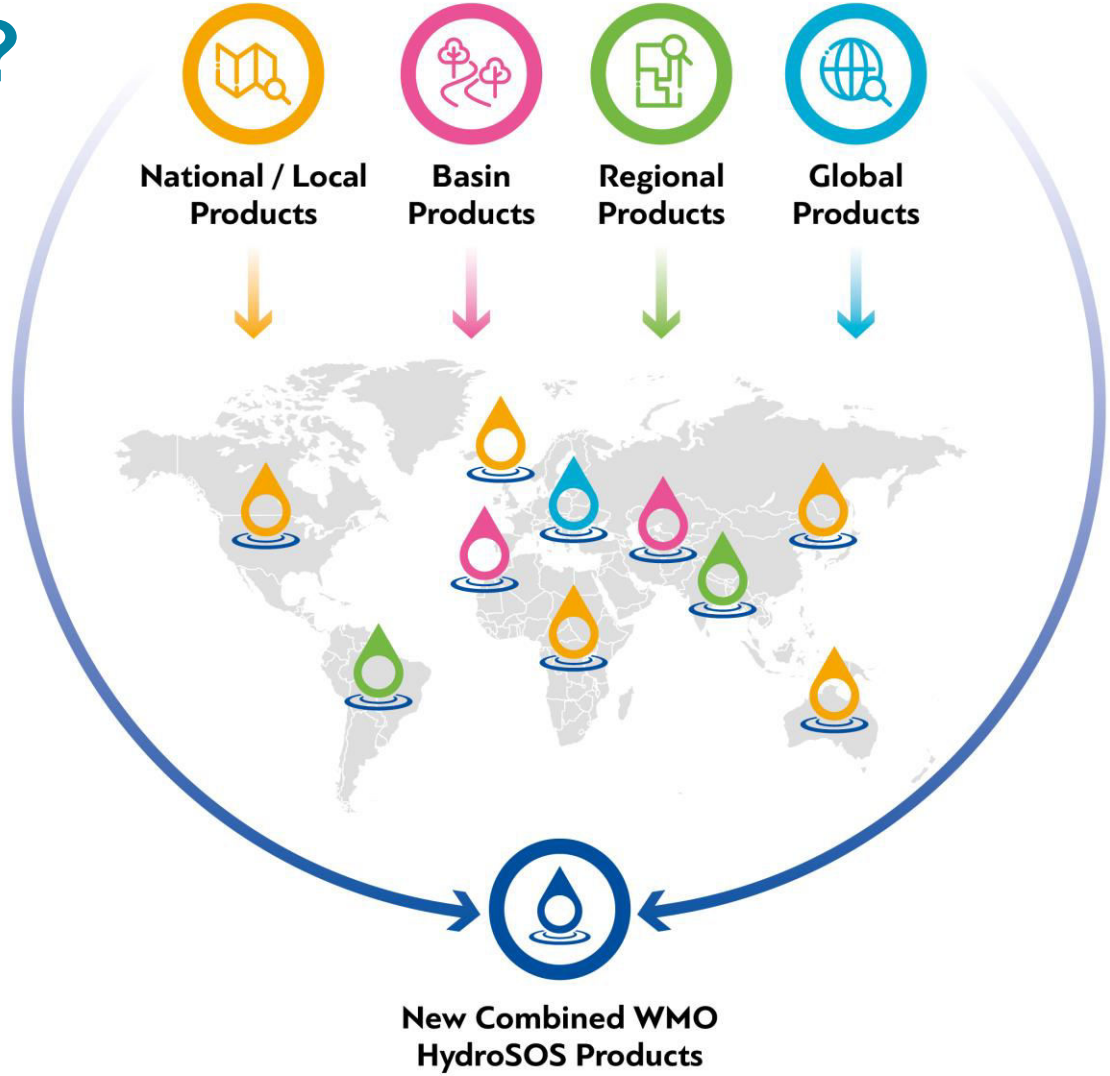
NATIONAL CAPABILITY FOR GLOBAL CHALLENGES
International science for net zero plus

International Delivery HydroSOS – WHERE?

HydroSOS will unite hydrological information products across scales using local knowledge and global technical expertise

Local and regional implementation projects are underway.



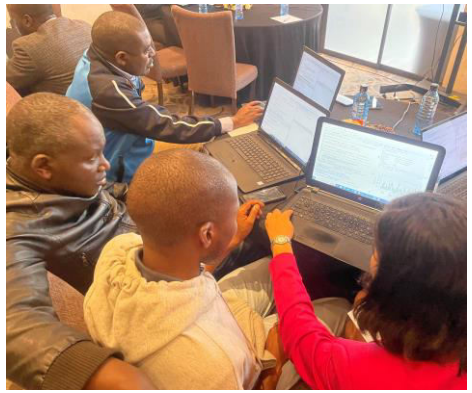
International Delivery
HydroSOS – Lake Victoria Basin Workshop

eip.ceh.ac.uk/hydrology/HydroSOS/case-studies/lvb.html

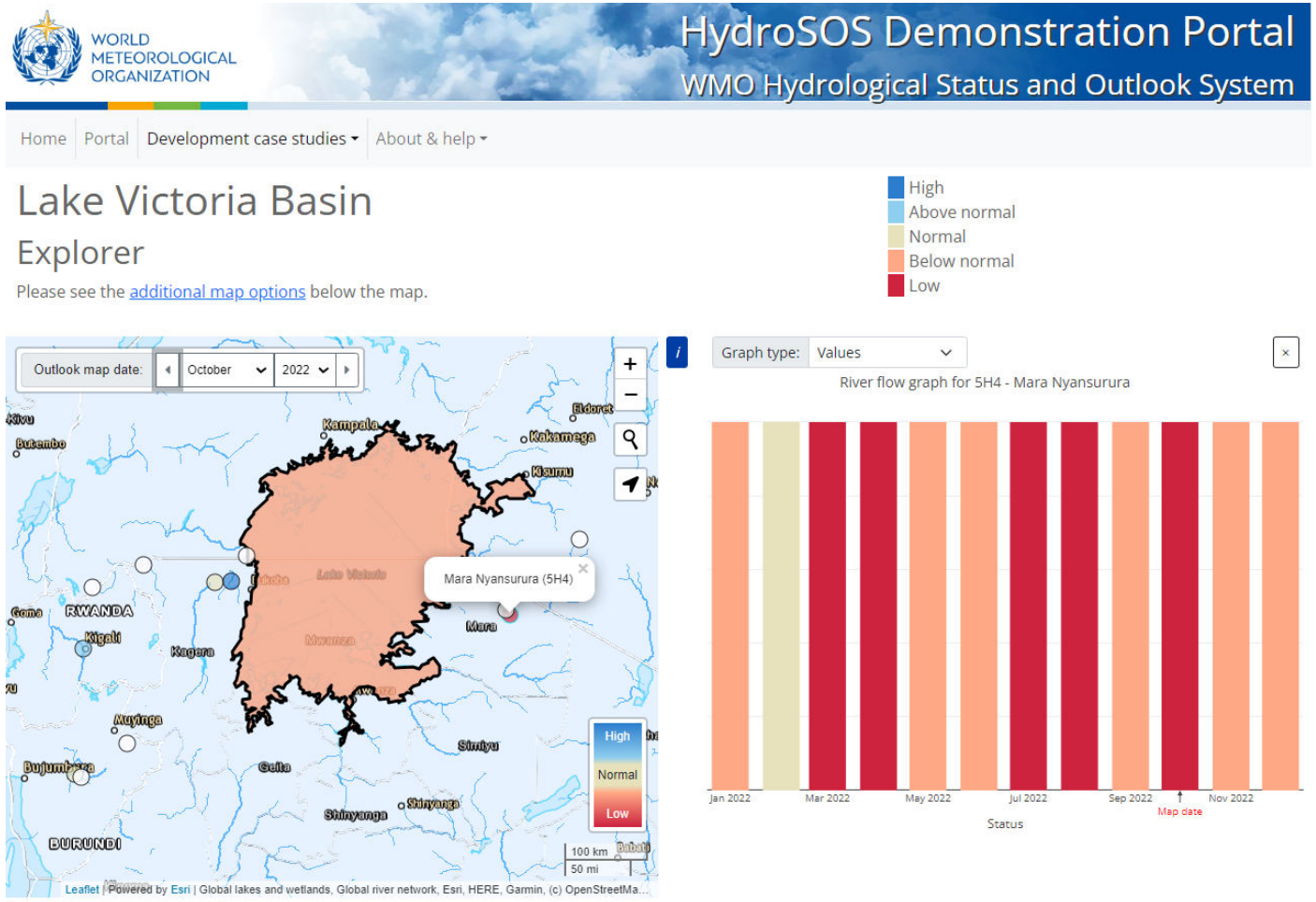
Nairobi - August 2023

Participants used code developed by the Technical Team to calculate hydrological status

HydroSOS Nairobi Workshop



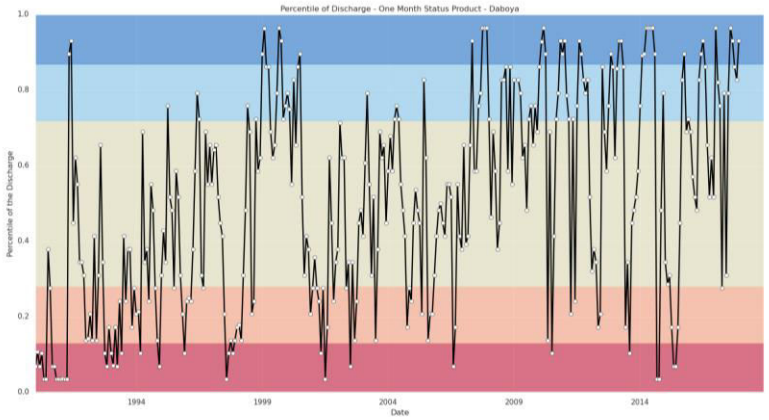
HydroSOS Nairobi Workshop

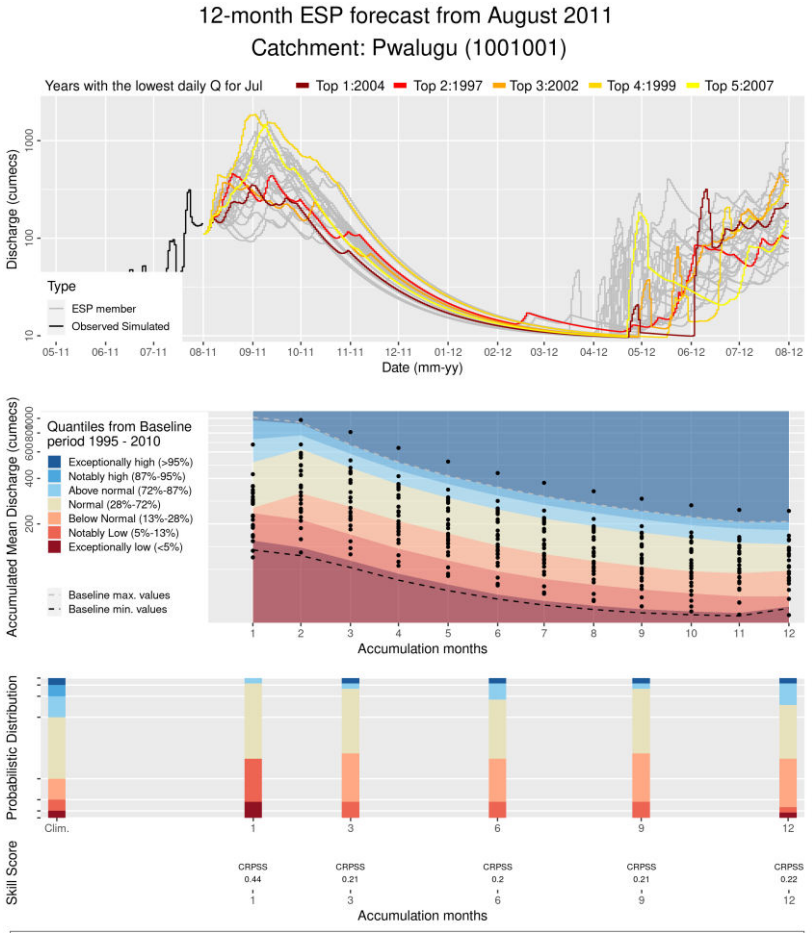


International Delivery
HydroSOS – Ghana Workshop

Wallingford - March 2023

Participants co-developed code to quantify hydrological status, and to run ESP for stations in Ghana, and produce visualisations





HydroSOS Ghana Workshop

HydroSOS Ghana Workshop

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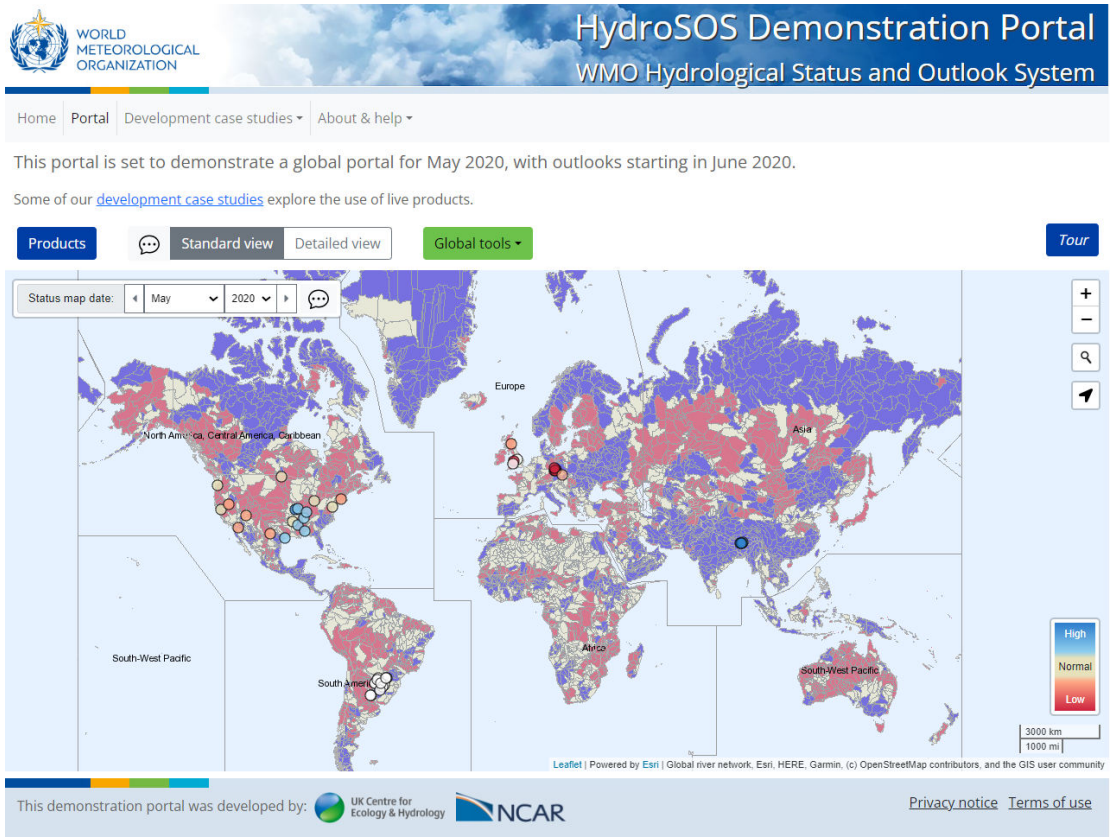
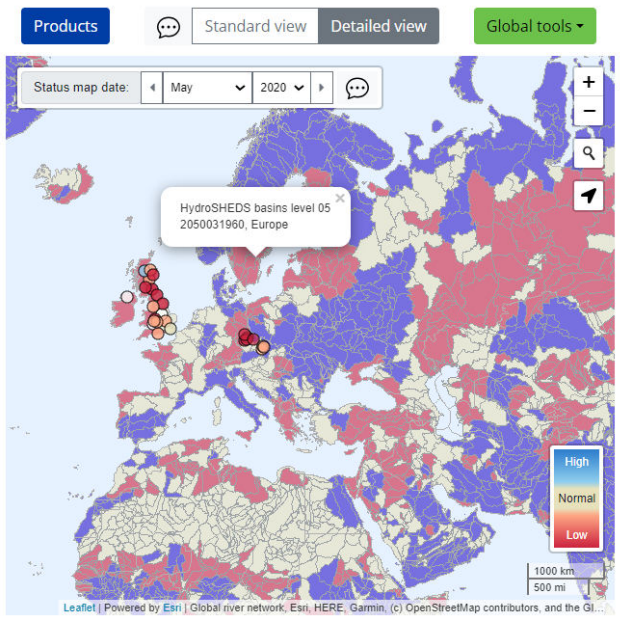
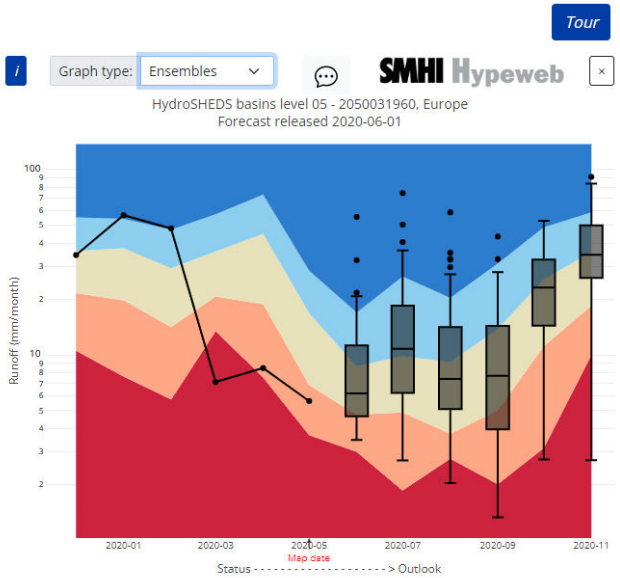
International Delivery
HydroSOS – Global Pilot

eip.ceh.ac.uk/hydrology/HydroSOS/

SMHI Global forecasts aggregated over catchment or administrative boundaries







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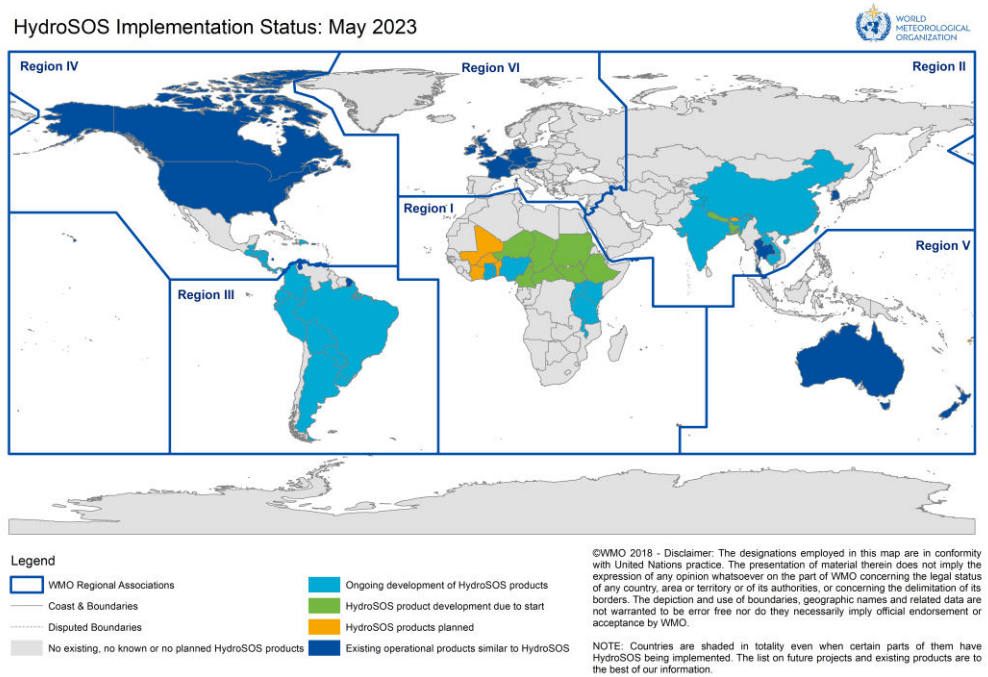
International Delivery HydroSOS – Next Steps

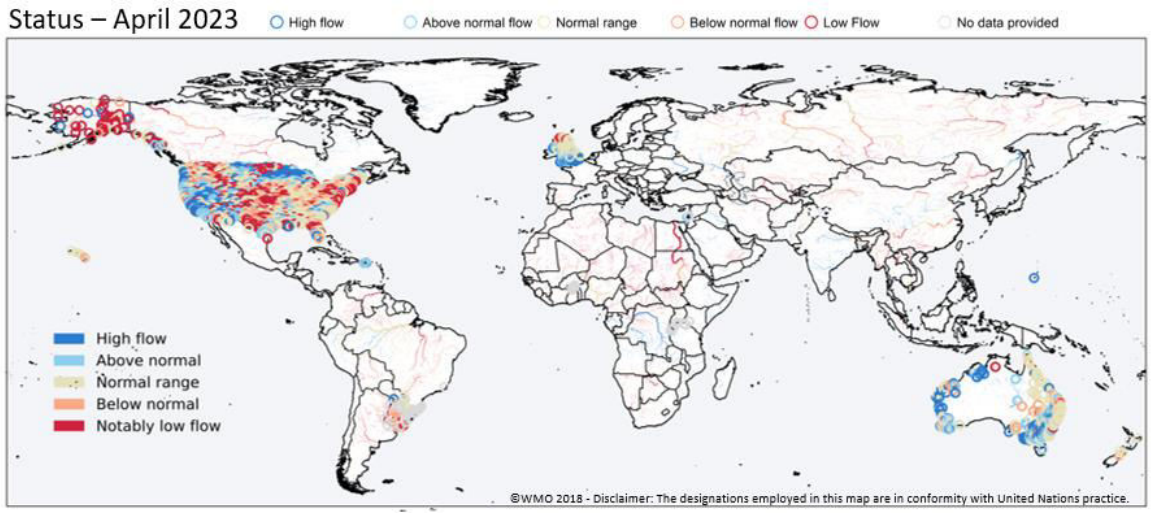
More local and regional implementation

- Caribbean initialisation
- LVB forecasting

Integrating ULYSSES outputs using model blending, with other global status and outlooks systems

- SMHI
- GloFAS
- Today's Earth





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Presentation Summary

Simplify ensemble outputs

Correct global outputs for local application

Tailor model outputs for interactive decision making

Collaborate to produce consistent products globally

Image: Carl Spencer - Flickr

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Thank you

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