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HEPEX: a community of practice for the advancement of hydrologic ensemble predictions

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EMS Annual Meeting, Lyngby, Sept. 13 2019



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About

- Hydrologic **E**nsemble **P**rediction **EX**periment
- Global community of researchers and practitioners in hydrological ensemble prediction
- Unfunded/volunteer effort since its creation in 2004
- "Advancing the science and practice of hydrological ensemble prediction and its use in impact- and risk-based decision making"
- Activities:
 - Workshops
 - Special sessions at larger conferences (e.g. AGU, EGU...)
 - Blog portal (chief editor Rebecca Emerton, Univ. of Reading)
 - Mailing list (542 subscribers)
 - Online resources: webinars, games, lectures

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Mission

To demonstrate the added value of hydrological ensemble prediction for operational water resources management, risk assessment and emergency management to make decisions that have important consequences for economy, environment, and public health and safety."



Six major themes

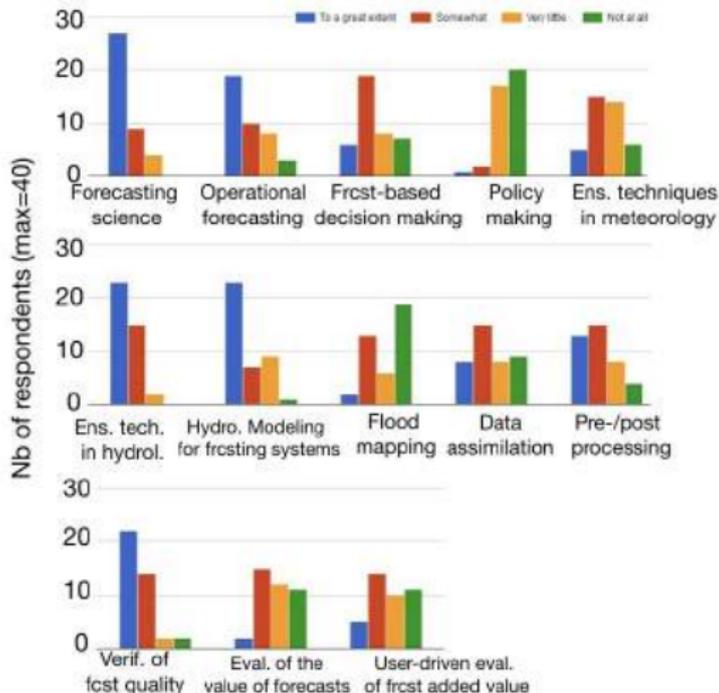
1. Hydrological model inputs and pre-processing or downscaling of forecasts
2. Ensemble techniques and hydrologic modelling strategies
3. Hydrologic and hydraulic model data assimilation
4. Forecast post-processing and multi-modelling approaches
5. Verification of forecast quality and user-driven evaluation of forecast value
6. Identification of user needs, forecast communication, visualisation and use in decision making

Who we are



Location of people who answered the online survey in 2018

Who we are



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Who we are



Participants of the HEPEX workshop in Stressa, Italy, 2007

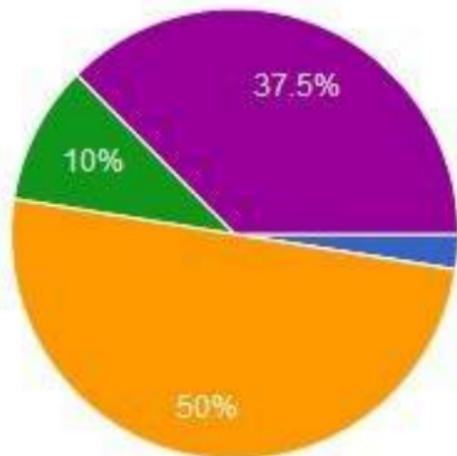
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Who we are



Participants of the HEPEX workshop in Melbourne, Australia, 2018

"Today, Hydrological Ensemble Prediction is..."



- Mostly Science
- Mostly Operation
- A lot of Science and a bit of Operation
- A lot of Operation and a bit of Science
- Both in the same proportion

The future of hydrological forecasting (1/2)

- **Techniques**

- "Ensemble forecasts that **seamlessly integrate over space** (from sub-catchments to continents) **and through lead-times** (hours to years)"
- "Based on multi-model / **multi-system forecasting**, and impact-based forecasting"

- **Science**

- "On the one hand proposing scientific innovations that **make sense for operations** (not unrealistic/disconnected from operational constraints) and gradually including hydrological forecasting in a **much broader perspective, or system approach**, of integrated water resources management"

The future of hydrological forecasting (2/2)

- **Science (continued)**
 - "New research is toward **extending the application** of the forecast into estuary models, inundation maps, hydropower, infrastructure safety, etc."
- **Communication and new synergies**
 - "A **rosy** one, provided there are sufficient links between research advances and operational services and applications to improve water management"
 - "**Clouded** because there is no clear leadership for the direction needed. The science is there, but policy needs to be established."

Discussions at the Melbourne Workshop (2018)

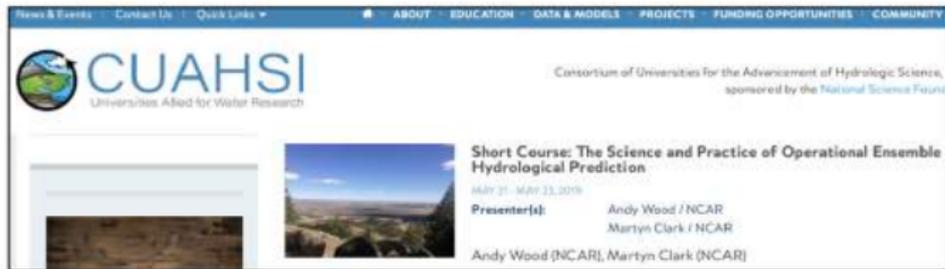
- Need to **shift our focus** towards the **wider use and impact** of hydrological ensemble forecasts
- Education, communication and dissemination



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Source: PPT Scottish Flood Forecasting Centre

Education, communication and dissemination



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CUAHSI
Universities Allied for Water Research

Consortium of Universities for the Advancement of Hydrologic Science, Inc.
sponsored by the National Science Foundation

Short Course: The Science and Practice of Operational Ensemble Hydrological Prediction
July 21 - July 23, 2019

Presenter(s): Andy Wood / NCAR
Martyn Clark / NCAR

Andy Wood (NCAR), Martyn Clark (NCAR)

IAHS Workshops at the 27th IUGG General Assembly
8-18 July 2019 / Montreal, Canada

Using R in Hydrology
Tue, July 9 - 10:00-12:00
Room 519 A (MCC - Floor 5)
with
Sulbhanne Threl (Yates), Alberta Vigione (Patricsson di Torino) and Ariño Castellón (Salzburg)

Ensemble Streamflow Forecasting and Reservoir Optimization
Tue, July 9 - 15:00-18:00
Room 519 B (MCC - Floor 5)
with
Marko Anđelić (Zagreb) and Sara Regina (Ottawa)

How to write and publish a paper in hydrology
Wed, July 10 - 10:00-12:00
Room 519 A (MCC - Floor 5)

Hydrological Research and Practice: Where is the

#IAHS #IUGG19 @IAHS_IAHS @YoungHydrology

Join us!

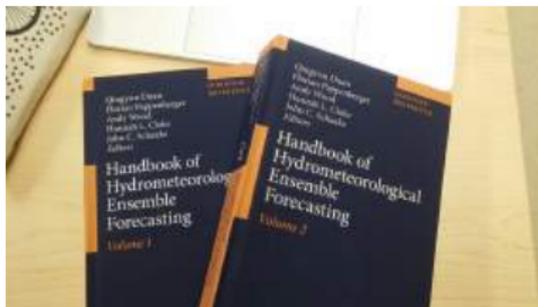


Education. communication and dissemination



(*Photos from Ilias Pechlivanidis, SMHI)

Education, communication and dissemination



 Springer Link

Springer Reference

LIVE 

Handbook of
Hydrometeorological
Ensemble Forecasting



Handbook of Hydrometeorological Ensemble Forecasting

Editors ([view affiliations](#))
Qingsun Duan, Florian Pappenberger, Andy Wood, Hannah L. Cloke, John C. Schaake

Living reference work

 16 Citations	 8 Mentions	 170 Readers	 8.3k Downloads
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Join and Contact

- Subscribe to the mailing list:
 - Send an email to hepex+subscribe@googlegroups.com

The screenshot shows the HEPEX website homepage. At the top, there is a navigation bar with links for 'HEPEX', 'ABOUT US', 'CONTACT', 'SOURCES', and 'MEMBERS'. Below this is a large green banner with the HEPEX logo and the tagline 'A Global Community in Hydrological Ensemble Prediction'. The main content area features an article titled 'DATA DROUGHT AND DATA FLOOD' by Mark Trigg, dated July 27, 2017. The article text discusses the cycle of drought and flood, mentioning 'The cycle seems to repeat every 20 years and the response is nearly the same, every time - we start by searching and we find "old" more lowlands and get in the pump and generator', 'sustainable', 'to matter the soil'. A small image of a cow is visible. On the right side, there is a circular HEPEX logo and a search bar.

The screenshot shows the HEPEX Twitter profile page. The profile name is 'HEPEX' with 2,488 tweets. The profile picture is a circular logo with the text 'hepex.' inside. The bio reads: 'A global community of researchers & practitioners in hydrological ensemble prediction & its use in decision-making. Find out more on our blog'. Below the bio, it says 'hepex.org' and 'A rejoint Twitter en mai 2013'. At the bottom, it shows '390 abonnements' and '984 abonnés'. The page includes standard Twitter navigation icons on the left and a blue 'Abonné' button on the right.

Upcoming events

- "Satellite inspired hydrology in an uncertain future: an H SAF and HEPEX workshop" : ECMWF, 25-28 November 2019
<https://events.ecmwf.int/event/130/>
- Sessions at AGU and EGU
- HEPEX 8th International Workshop on Hydrological Ensemble Prediction: Paris 2020