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

J.Verkade, **M.-A. Boucher**, R. Emerton, F. Pappenberger, I. Pechlivanidis, C. Prudhomme, M.-H. Ramos, Q. Wang, F. Wetterhall, and A. Wood

EMS Annual Meeting, Lyngby, Sept. 13 2019

About

- **H**ydrologic **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

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."

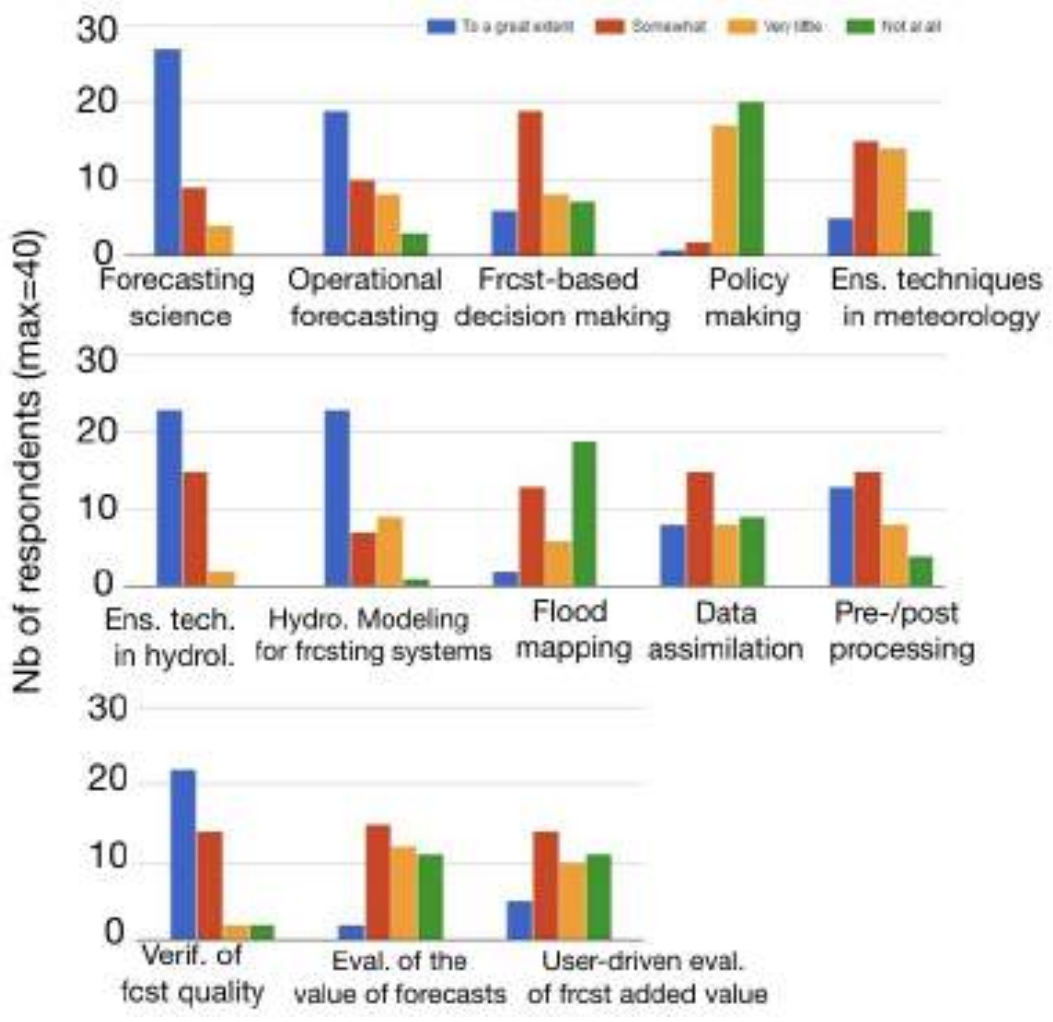
Six major themes

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


Nb of respondents (max=40)
30
20
10
0
Forecasting science
Operational forecasting
Frcst-based decision making
Policy making
Ens. techniques in meteorology
Ens. tech. in hydrol.
Hydro. Modeling for frcsting systems
Flood mapping
Data assimilation
Pre-/post processing
Verif. of fcst quality
Eval. of the value of forecasts
User-driven eval. of frcst added value

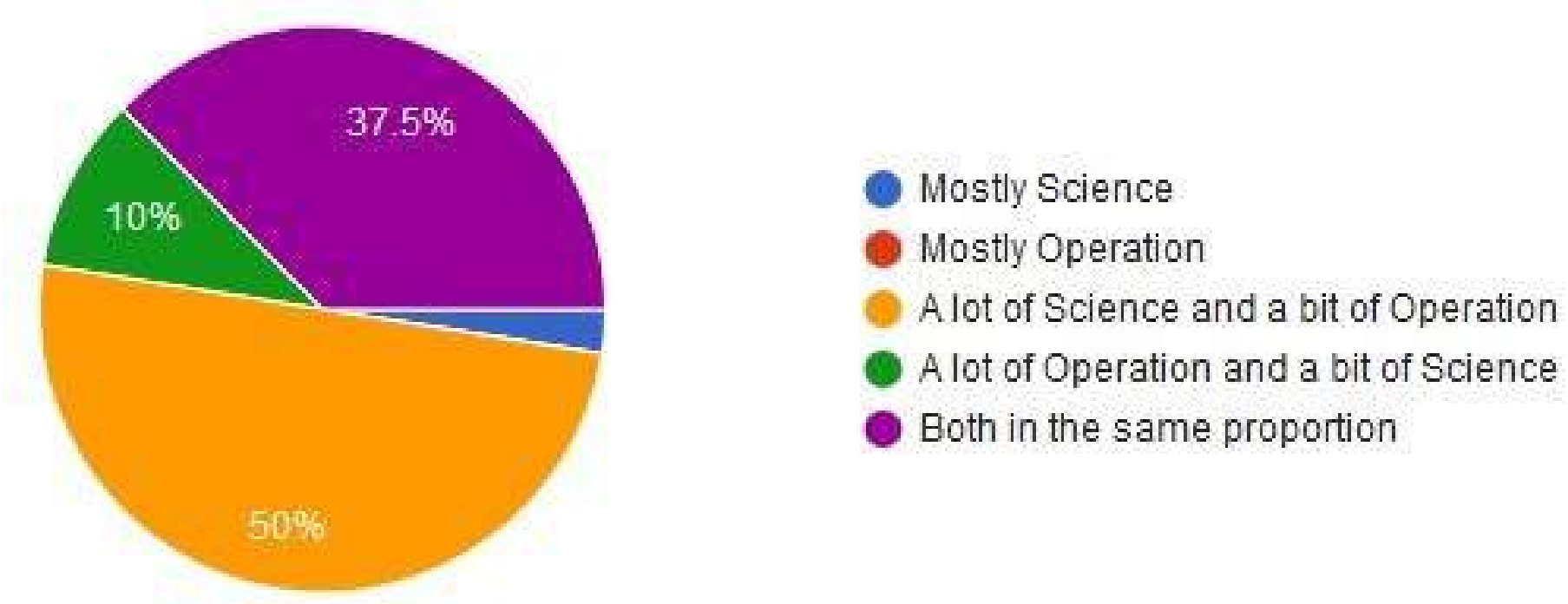
Who we are

Participants of the HEPEX workshop in Stressa, Italy, 2007

Who we are

Participants of the HEPEX workshop in Melbourne, Australia, 2018

"Today, Hydrological Ensemble Prediction is..."



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)

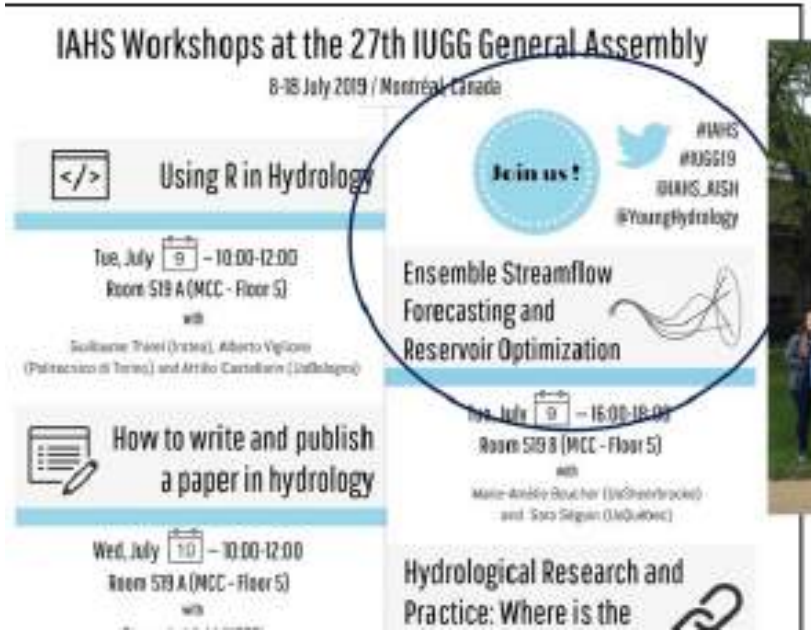
- **Science (continued)**
  - "New research is toward **extending the application** of the forecast into estuary models, inundation maps, hydropower, infrastructure safety, etc."
- **Communication and new synergies**
  - "A **rosy** one, provided there are sufficient links between research advances and 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

Source: PPT Scottish Flood Forecasting Centre

Education, communication and dissemination



Education. communication and dissemination

(*Photos from Ilias Pechlivanidis, SMHI)

Education, communication and dissemination

SpringerLink

Springer Reference
LIVE
Handbook of Hydrometeorological Ensemble Forecasting

Handbook of Hydrometeorological Ensemble Forecasting

Editors (view affiliations)

Qingyun Duan, Florian Pappenberger, Andy Wood, Hannah L. Cloke, John C. Schaake

Living reference work

16 Citations | 8 Mentions | 170 Readers | 8.3k Downloads

Join and Contact

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

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