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Linking science to stakeholder needs: can seasonal hydrological forecasts be used for local decision-making?

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Seasonal hydrological forecasts (SHF) provide an insight into rainfall, river flows and groundwater levels that might be expected over the coming months; this has the potential to benefit water service organisations. Currently, due to their uncertainty and regional focus, the inability for SHF to assist in local decision-making is recognised as a barrier to use.

Here we present findings from the 'West Thames Seasonal Hydrological Forecasting Stakeholder Focus Group' co-organised with the UK Environment Agency (EA) and undertaken as part of the EU Horizon 2020 IMPREX project [1].

Using progressively skilful and locally tailored 'hypothetical' SHF (for an extreme flood event with 3 months lead time), we asked participants to make informed decisions across the West Thames to capture how different water service users approach and act on SHF. Participants were provided with background context to the hydrological situation but were not informed whether the event was a high flow, low flow or a business-as-usual scenario. SHF included Hydrological Outlook UK [2], EFAS-Seasonal [3] and results from a West Thames hydro-meteorological study [4].

Participants increased their decision/action in response to more skilful flood forecasts. Local knowledge, risk appetite and experience of previous flood events were important. Flood forecasters and groundwater hydrologists were most likely to request further information about the situation, inform other organisations and implement actions for preparedness. Water resource managers focused on both risks and benefits and adopted a 'watch and wait' approach whilst communicating with other partners.

Combining output from operational systems and scientific research to create plausible SHF scenarios is an excellent way of highlighting SHF capabilities and limitations whilst exploring decision-making by users. Regular engagement with water service managers can also deliver impact. Based on findings from this focus group, the EA are striving for improved communication between UK water service partners and the production of non-technical user-tailored SHF guidance to ensure that collaborative and consistent messages are delivered. Stakeholders further wish to be kept better informed of research developments, particularly how forthcoming improvements to SHF [e.g. 3, 4] can translate into effective early-warning, decision-making and action at local scales.

1. IMPREX (2017) The Thames River Basin Case Study. http://www.imprex.eu/thames-river-basin
2. CEH (2017) Hydrological Outlook UK. http://www.hydoutuk.net/
3. Arnal et al. (2017) Skilful seasonal forecasts of streamflow over Europe? Hydrology and Earth System Science Discussions. https://doi.org/10.5194/hess-2017-610 (in review)
4. Neumann et al. (2017) The 2013/14 Thames basin floods: Do improved meteorological forecasts lead to more skilful hydrological forecasts at seasonal timescales? Journal of Hydrometeorology. (in review)