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Recent advances in the application and utility of subseasonal-to-seasonal predictions

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Subseasonal-to-seasonal (S2S) forecasts are bridging the gap between weather forecasts and long-range predictions. Decisions in various sectors are made in this forecast timescale, therefore there is a strong demand for this new generation of predictions. While much of the focus in recent years has been on improving forecast skill, if S2S predictions are to be used effectively, it is important that along with scientific advances, we also learn how best to develop, communicate and apply these forecasts.

In this presentation, we present recent progress in the applications of S2S forecasts. We summarise case studies from a recently-published applications community review paper in the Bulletin of the American Meteorological Society (BAMS), covering sectoral applications of S2S predictions from around the world, including public health, disaster preparedness, water management, telecommunications, energy and agriculture. Involving over 60 authors and drawing from the recent advances and experience of researchers and users working with S2S forecasts globally, we explore the value of applications-relevant S2S predictions through a series of sectoral

cases where uptake is starting to occur.

From across 12 case studies, we show that:

- The S2S forecasting timescale is a new concept for many users. While the additional value of S2S forecasts for decision-making is increasingly gaining interest among users, incorporating probabilistic ensemble S2S forecasts into existing operations is not trivial.
- Barriers to widespread adoption of S2S forecasts include lack of access to the forecasts and the co-production to tailor forecasts to user needs, as well as varying 'in house' expertise in how to interpret and effectively apply them. This can create a 'knowledge-value' gap in some instances.
- S2S forecasts do not produce a 'go/no go' answer of how a user should respond to a potential hazard; instead they provide additional, supplementary 'situational awareness' information that can be used to support decision-making on S2S timescales.

While S2S forecasting is still a maturing discipline globally, this publication marks a significant step forward in moving from *potential* to *actual* S2S forecasting applications – a collective body of evidence demonstrating both skill and utility across sectors that places user needs and applications at the forefront of S2S forecast development.

Our paper, 'Advances in the application and utility of subseasonal-to-seasonal predictions', is available from BAMS as an open access publication: https://doi.org/10.1175/BAMS-D-20-0224.1.