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Applications of subseasonal-to-seasonal (S2S) predictions

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While long-range seasonal outlooks have been operational for many years, until recently the extended-range timescale - referred to as 'subseasonal-to-seasonal' (S2S) and which sits between the medium- to long-range forecasting timescales - has received relatively little attention. The S2S timescale has long been seen as a 'predictability desert', yet a new generation of S2S predictions are starting to bridge the gap between weather forecasts and longer-range prediction. Decisions in a range of sectors are made in this extended-range lead time, therefore there is a strong demand for this new generation of predictions.

At least ten international weather centres now have some capability for issuing experimental or operational S2S predictions, including the European Centre for Medium-Range Weather Forecasting (ECMWF) and the National Oceanic and Atmospheric Administration (NOAA). International efforts are now underway to identify key sources of predictability, improve forecast skill and operationalise aspects of S2S forecasts, however challenges remain in advancing this new frontier. If S2S predictions are to be used effectively, it is important that along with scientific advances, we learn how to develop, communicate and apply these forecasts.

In this presentation, we present the potential of the emerging operational S2S forecasts to the wider weather and climate applications community. We undertake the first comprehensive review of sectoral applications of S2S predictions, including public health, disaster preparedness, water management, energy and agriculture. We explore the value of applications-relevant S2S predictions, and highlight the opportunities and challenges facing their uptake. We show how social sciences can be integrated with S2S development - from communication to decision-making and valuation of forecasts - to enhance the benefits of 'climate services' approaches for extended-range forecasting. We highlight the availability of data repositories of near real-time S2S forecasts and hindcasts, including the WWRP-WCRP (http://apps.ecmwf.int/datasets/data/s2s) and North American Multimodel Ensemble (NMME; http://www.cpc.ncep.noaa.gov/products/NMME/data.html) repositories, and discuss how they are promoting the use (and aiding the development) of S2S predictions.

While S2S forecasting is at a relatively early stage of development, we conclude that it presents a significant new window of opportunity that can be explored for application-ready capabilities that could allow many sectors the opportunity to systematically plan on a new time horizon.