**S2S Extremes Teleconference**

5 October 2016 16:00 UTC

Were present: Charles Jones, Joanne Robbins, Hai Lin, Christophe Lavaysse, Brian Golding, Yuhei Takaya, Laura Ferranti, Christopher Castro, Frédéric Vitart

1. **Extreme Forecast Index for S2S models**

Laura presented a few slides showing Extreme Forecast Index (EFI) maps of a several S2S models. EFI maps are computed once a week (every Thursday) from six S2S models (BoM, CMA, ECMWF, JMA, NCEP, UKMO). More S2S models will be added in the future. The EFIs are calibrated using the model climatology. The plots are displayed in the ECMWF product website (<http://www.ecmwf.int/en/research/projects/s2s/charts/s2s/>) with a 3-week delay. Laura also presented an EFI skill assessment based on ROC area from the ECMWF model and plans to extend this verification to the other S2S models. Currently the EFIs are produced only for weekly average 2-metre temperature, but can be extended to precipitation and other time average periods.

Joanne mentioned that she has also been doing some work on heatwaves and coldwaves, although she has been focussing on a shorter time scale (the 1-7 day period). Heat weaves and coldwaves are detected globally using the Excess Heat (EHF) and Excess Cold (ECF) indices which were designed at BoM. Work is ongoing at BoM to look at the EHF and ECF in the S2S database to review specific cases for the extended-time range.

**2. Updates on tropical cycle sub-seasonal prediction (Frédéric)**

Frédéric showed a few slides on the case study of typhoon Nepartak (Butchoy) 2-10 July 2016 which caused considerable damage over Taiwan and Fujian province in Chine. The ECMWF weekly mean tropical cyclones strike probabilities showed higher risk of landfall up to 3 weeks in advance. The S2S multi-model plots show a higher risk than normal over the sea, but no increased risk of landfall.

Frédéric mentioned that a NOAA/MAPP project is currently looking at tropical storm prediction and predictability in S2S models and that work is also ongoing to look at the modulation by the Madden Julian Oscillation of tropical storm recurvature over the western North Pacific and of the subsequent Rossby waves.

The question was raised of what kind of predictability we could expect at this time range. At the sub-seasonal time range, the tropical cyclone activity is strongly modulated by large-scale conditions (MJO/ENSO/SST anomalies) which should make it possible to predict enhanced or reduced risk of tropical cyclone activity over certain areas. Previous studies using the ECMWF re-forecasts showed some skill up to week 3 and 4 over the Southern Hemisphere, and up to week 2 or 3 depending on the basin over the northern Hemisphere. Work is ongoing to assess this skill in the S2S models.

**3. Project on drought prediction over the ACRE region**

Christopher showed a few slides on CEMADEN, which was created in 2011, and which aims to develop, test and implement a system for predicting the occurrence of natural disasters in vulnerable areas throughout Brazil. He described a new project over the ACRE region (south-west of Brazil) which has been affected by extreme droughts in 1998/1999, 2005, 2010 and 2015/2016, with the 2005 and 2010 droughts having the intensity of a one-in-a century drought. During the 2012, 2014 and 2015 rainy seasons, important floods damaged more than 20 towns. He proposed to use the S2S re-forecasts to assess their skill to predict these extreme events in collaboration with CPTEC and Christophe Lavaysse (JRC). The project will be strongly user-oriented with forecasts tailored for various type of applications. For example, for fishery, it is important to be able to predict three consecutive cold days.

**4. Modulation of extreme events in the US by the MJO**

Charles is currently working on assessing the skill if two S2S models (NCEP and ECMWF) to predict weekly mean precipitation over the Continental US. He is focussing on the period November to March. He is planning to include other S2S models. He mentioned that the Nov-March 2015/16 was not as wet over California as expected from the strong El-Nino event. He is interested to see how the models performed during that specific season.

**5. Chapter on extreme weather for S2S book**

Frédéric mentioned that he is co-editing with Andrew Robertson a book on S2S to be published by Elsevier, to be called "THE GAP BETWEEN WEATHER AND CLIMATE FORECASTING: SUB- SEASONAL TO SEASONAL PREDICTION”. This book will contain about 20 chapters, one of them on extreme weather. Half of the chapters have to be ready by April, the others by December 2017. Frédéric will send an email to the group showing the general structure of the book, a first draft of the structure of the chapter on extremes and asking for volunteers to participate to the writing of this chapter.