S2S – Project achievements and Future Plans

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Mission Statement

• “To improve forecast skill and understanding on the sub-seasonal to seasonal timescale with special emphasis on high-impact weather events”

• “To promote the initiative’s uptake by operational centres and exploitation by the applications community”

• “To capitalize on the expertise of the weather and climate research communities to address issues of importance to the Global Framework for Climate Services”
• 5-year WWRP/WCRP project (2014-2018) (S2S Phase 1)

• 5-year extension has been approved: S2S Phase 2 (2019-2023)

• Project office: KMA/NIMR hosts the project office

• Trust Fund: Contributions from Australia, Canada and UK
Sub-seasonal to Seasonal (S2S) Prediction Project

Research Issues
- Predictability
- Teleconnection
- O-A Coupling
- Scale interactions
- Physical processes

Modelling Issues
- Initialisation
- Ensemble generation
- Resolution
- O-A Coupling
- Systematic errors
- Multi-model combination

Needs & Applications
Liaison with SERA (Working Group on Societal and Economic Research Applications)
• Daily 3-week behind real-time forecasts + re-forecasts up to day 60

• 11 models currently available

• Same grid (1.5 degree) / format

• More than 80 variables available

Use of S2S database:

• ~ 1000 registered users from 92 countries
• >300 TBs downloaded
• ~ 40 peer-reviewed publications on S2S database
S2S database

- Data provider (11)
- Archiving centre (2)
S2S database near-real time products

- ECMWF: http://www.ecmwf.int/en/research/projects/s2s/charts/s2s/
- “S2S Museum” at University of Tsukuba, Japan (Mio Matsueda)
  http://gpvjma.ccs.hpcc.jp/S2S/S2S_SICmap.html

NAO Index – 8 Feb 2018 start date
- Large subset of the S2S database available from the IRI Data library
- Online map-room for visualization of weekly fields and anomalies

*Weekly precipitation anomalies (mm/day) for July 6-12 2015*
S2S Linkage with WMO CBS

**S2S Data Base**
(Near RT data + refcsts)

**Data Portals**
(3 weeks behind RT)

**WMO LC-LRFMME**
(Subset in near real-time)

- NMHSs
- RCCs
- RCOFs
- Institutes
- GPC
- GPC
- GPC
- GPC
- NMHS

**Research & Application Communities**

**S2S Producing Centres**

**WMO Users**
S2S Linkage with WMO CBS

- Prototype for real-time provision of MME S2S forecasts by WMO LC-LRFMME

- **Variables:** SST, T2m, precipitation, u200, v200, u850, and OLR

- **Participating Models:** ECMWF, UKMO, JMA, NCEP/CPC, KMA

- Needs to be formalized by CBS
Madden Julian Oscillation

- Predictive skill up to 5 weeks
- S2S models have a weaker and slower MJO than analyses
- MJO teleconnections too weak in the Euro-Atlantic sector

Vitart, 2017
Predictive skill up to about 3 weeks for NAO+ and NAO- and up to about 16 days for the other weather regimes.
Other activities

• 18 Workshops/Sessions at AGU/EGU/IUGG...

• 9 training Courses on S2S targeting developing countries met services and researchers

  ▪ Book on S2S prediction (Oct 2018)
The 2nd phase (2019-2013) will focus on

- **S2S Database enhancement**
  - Add more variables, including ocean variables
  - Additional models, more variables available 6-hourly
  - Include derived products (e.g. model climatology)

- **Research activities (incl. process oriented studies):**
  - MJO and Teleconnections
  - Ocean initialization and processes
  - Land initialization and processes
  - Aerosols
  - Ensemble generation
  - Stratosphere

- Enhancing operational infrastructure and user applications
Enhancing operational infrastructure and user Applications

- Research to Operations (R2O) and S2S Forecast and Verification Products Development
  - Pursue research for testing and developing methodologies for calibration, combination, verification and generation of forecast products
  - Coordination with the relevant WMO technical commissions to define the standards and protocols for operational implementation and exchange of S2S forecasts

- Real-time Pilot for S2S Applications research & demonstrations
  - Goal is to demonstrate the value of S2S forecasts to different GFCS sectors
  - Real time pilot: Make some derived variables available close to real-time for a limited period of time, such as 1 year.
  - Promote interdisciplinary research for the development of “Ready-Set-Go” – type S2S applications
WWW/WCRP Sub-seasonal to Seasonal Prediction Project (S2S) Phase I Final Report

(November 2013–December 2017)

WWW/WCRP Sub-seasonal to Seasonal Prediction Project (S2S) Phase II Proposal

(November 2018–December 2023)
First International conference on sub-seasonal to seasonal prediction (Feb. 2014, College Park) was a kick off of the S2 project.

Second International S2S conference on sub-seasonal to seasonal prediction (S2S) main goals are:

- Showcase results from Phase 1 (Themes 1 to 4)
- Provide inputs for Phase 2 (Themes 5 to 8) with discussion sessions on Tuesday, Wednesday and Thursday.

Looking forward to your inputs!