



S2S project

Examples of application of sub-seasonal forecast products



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Acknowledgements: S2S SG members, Dr. Munehiko Yamaguchi @ MRI, Dr. Mio Matsueda @ Tsukuba Univ.

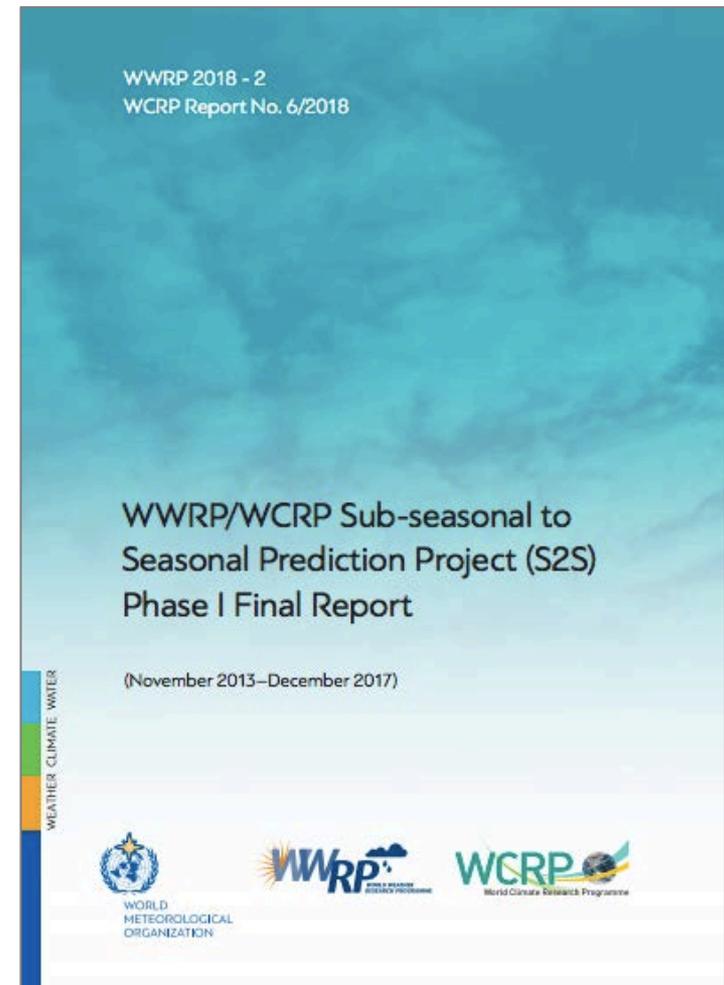
Outline

- Overview of S2S project, Phase 2 plan
- Examples of S2S application products
- Best practices of R2O linkages in a past research project
- Closing remarks
 - For strengthening R2O linkages -

S2S achievements in Phase 1 (2013-2017)

WWRP/WCRP Sub-seasonal to Seasonal Prediction Project (S2S) Phase I Final Report

- Establishment of a database containing near real-time and re-forecasts up to 60 days from 11 centres (10 GPCLRF)
 - ECMWF data portal
 - CMA data portal
 - IRI Data library
- **Collaboration with the WMO LC-LRFMME to build a pilot exchange of subseasonal forecasts**
- Successful S2S sub-projects



S2S Phase 2 plan (2018-2022)

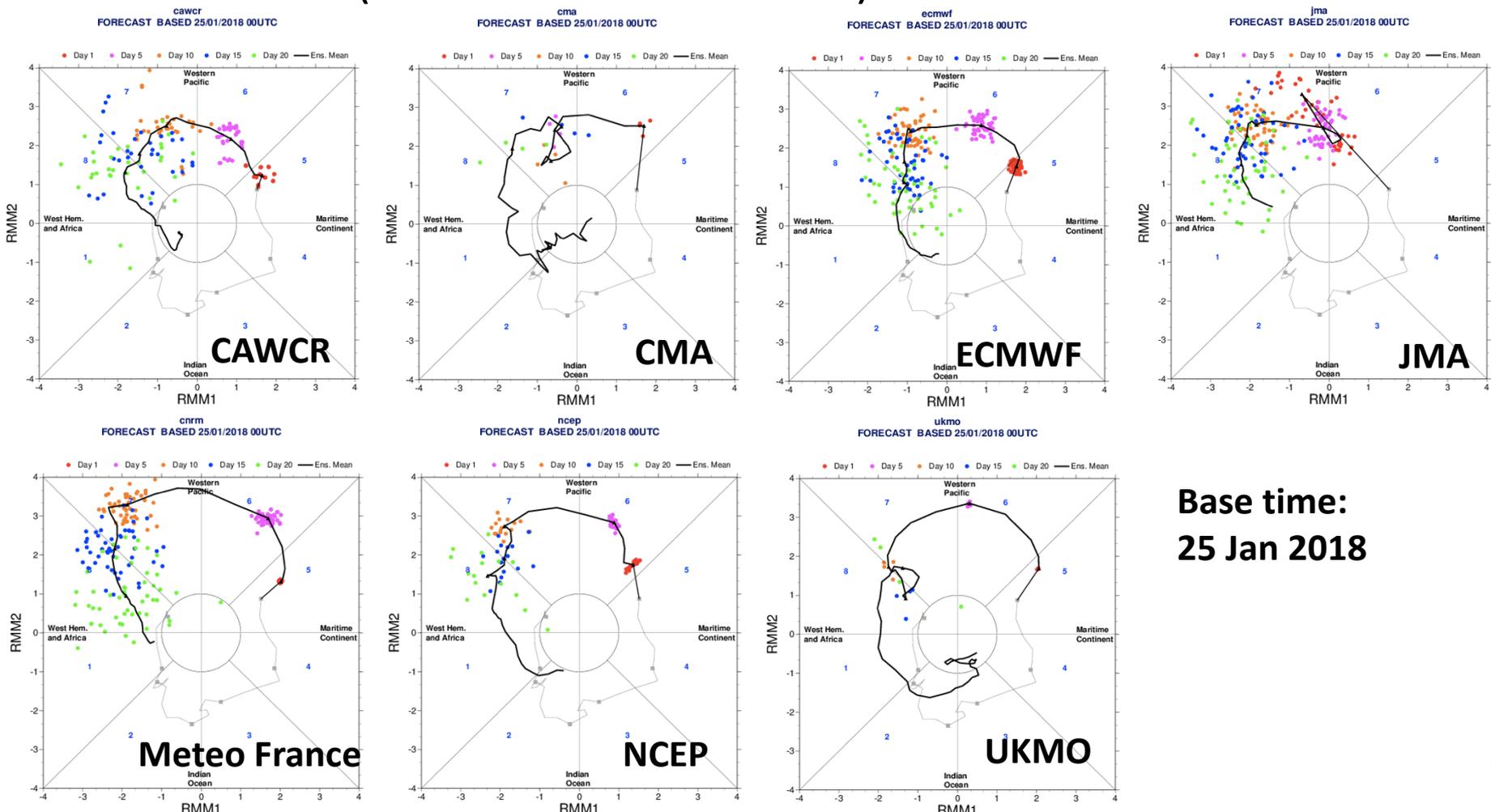
- **S2S Database enhancement**
 - Additional variables including ocean variables, new models
 - Verifications and products via IRI Data library
 - Considering increasing and time resolution
- **Research activities (new sub-projects)**
 - MJO prediction and Teleconnections
 - Land Initialization and configuration
 - Ocean and sea ice initialization and configuration
 - Ensemble generation
 - Atmospheric composition
- **Enhancing operational infrastructure and user Applications**
 - **Research to Operations (R2O) and S2S Forecast and Verification Products Development**
 - **Real-time Pilot for S2S Applications research & demonstrations**

Examples of S2S application products (1)

ECMWF Product page

<https://www.ecmwf.int/en/research/projects/s2s/charts/s2s/>

- MJO index (also available from FTP)



Examples of S2S application products (2)

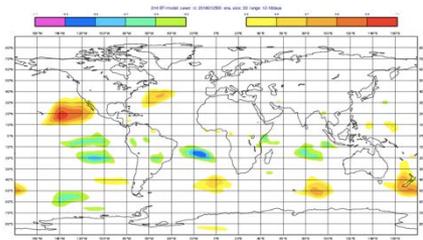
ECMWF Product page

<https://www.ecmwf.int/en/research/projects/s2s/charts/s2s/>

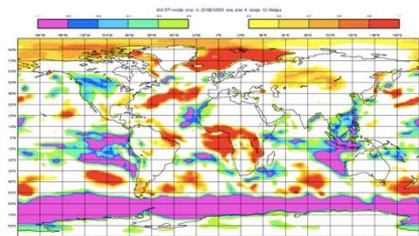
- Multi-model EFI maps (2mT)

Base time: 25 Jan., Days 12-18

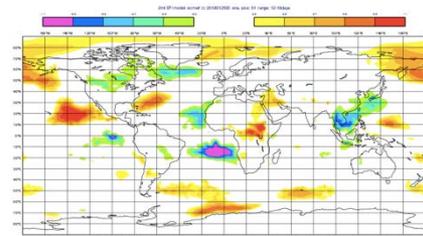
CAWCR



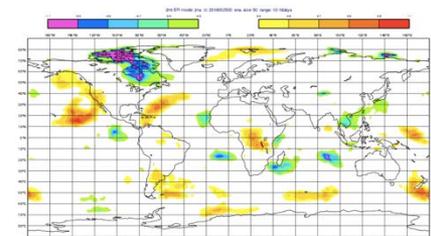
CMA



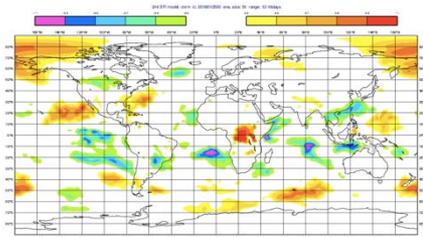
ECMWF



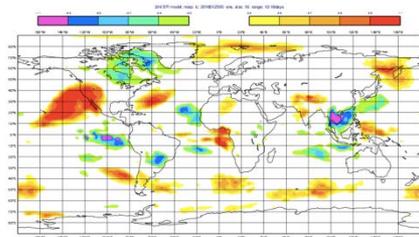
JMA



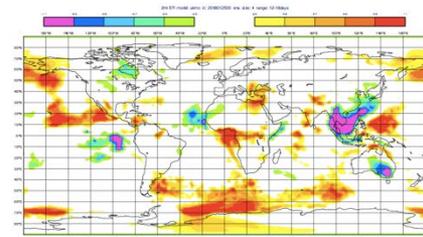
Meteo France



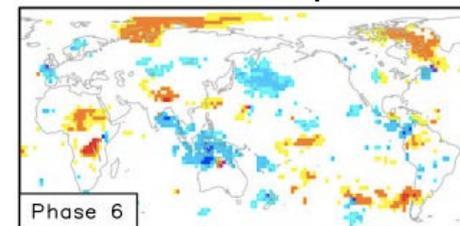
NCEP



UKMO



Occurrence frequency
of extreme temperature

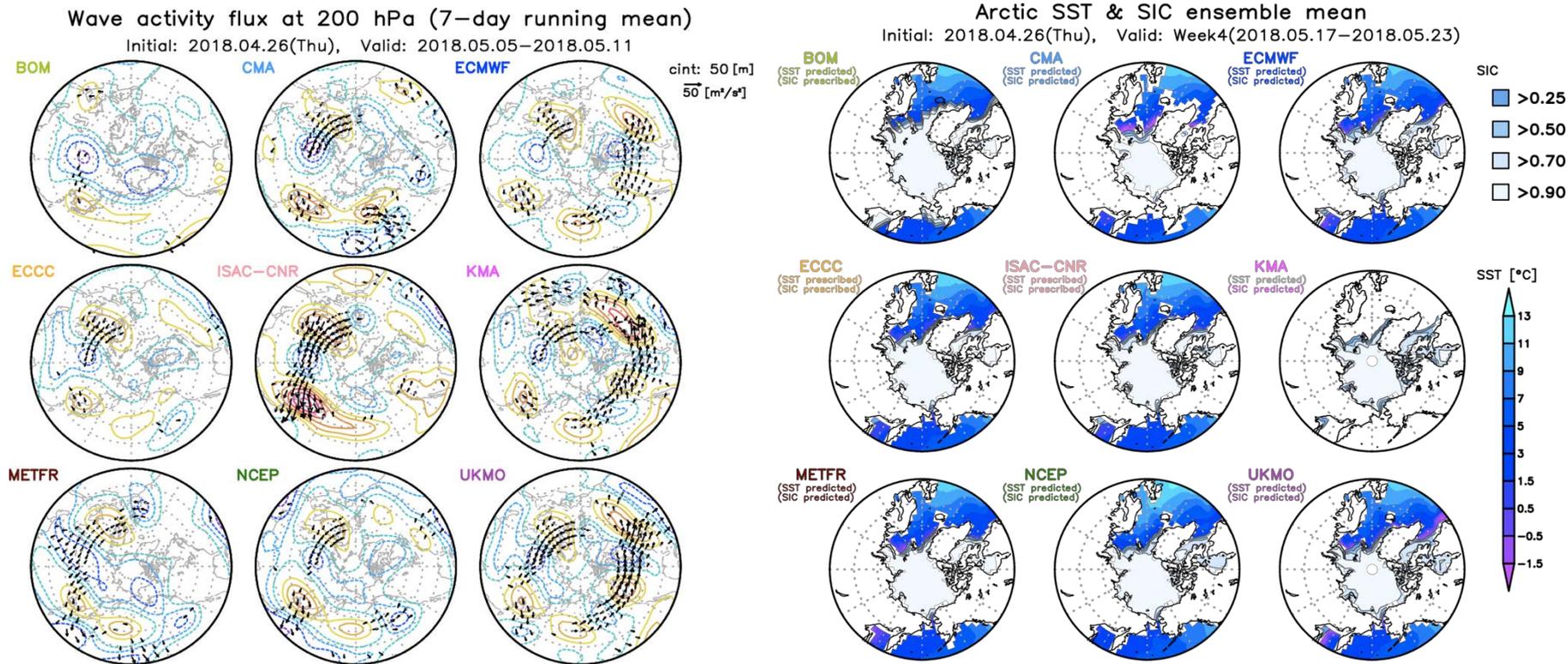


Matsueda and Takaya (2012)
J. Clim.

Examples of S2S application products (3)

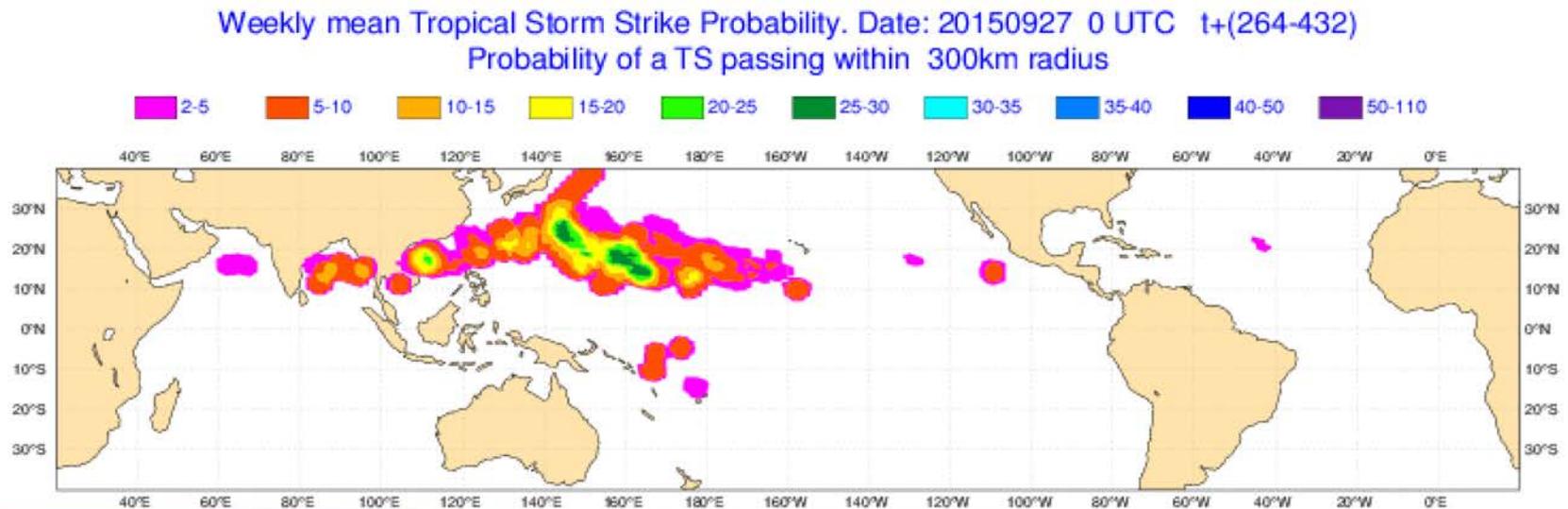
S2S Museum: Example of research demonstration with S2S data

<http://gpvjma.ccs.hpcc.jp/S2S/>



Examples of S2S application products (4)

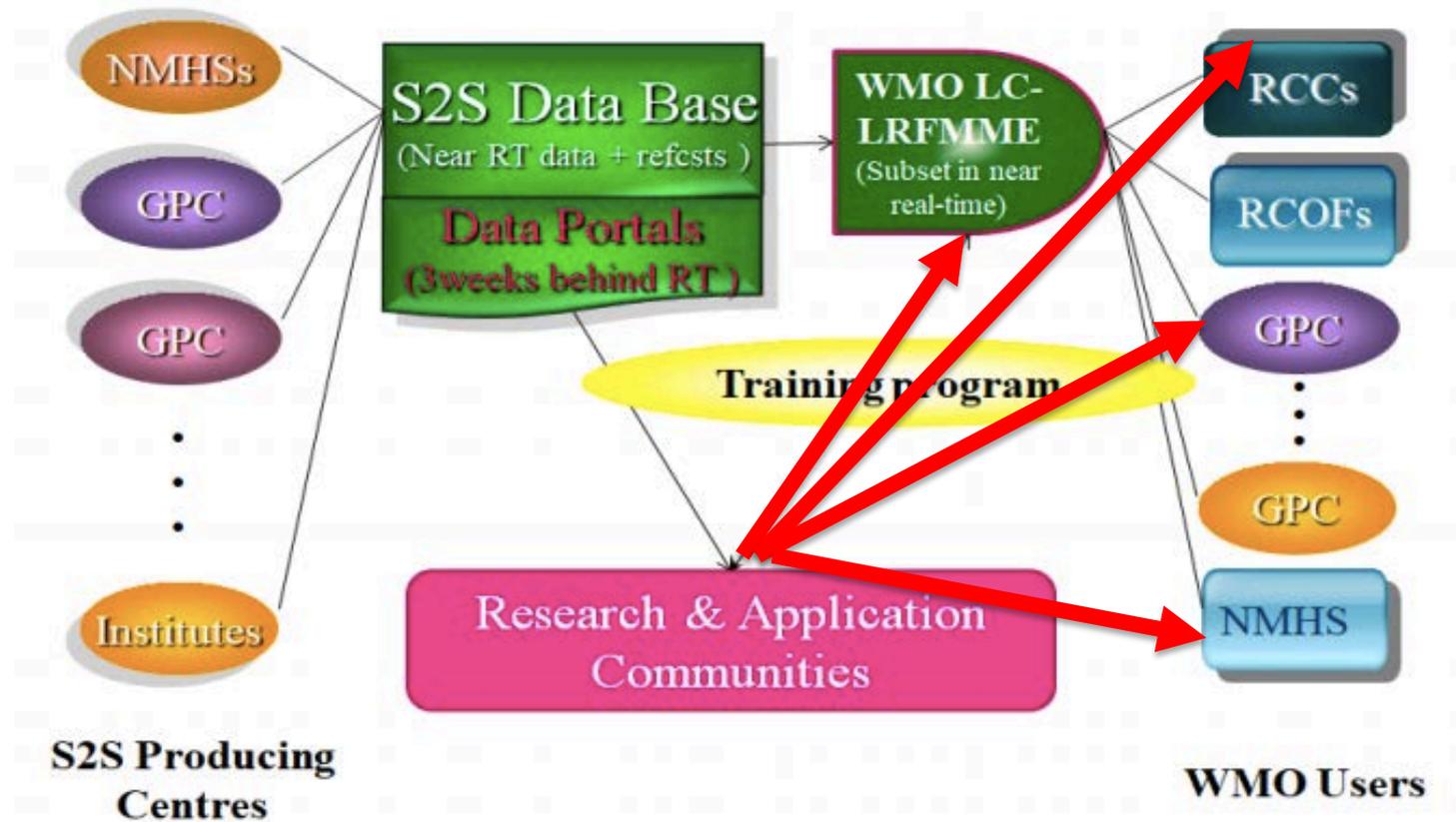
Tropical cyclone forecasts are produced routinely using S2S data



Source: Vitart (2015, ECMWF sub-seasonal workshop)

TC activity is modulated by MJO/ISO.

S2S project linkage with WMO operational activities



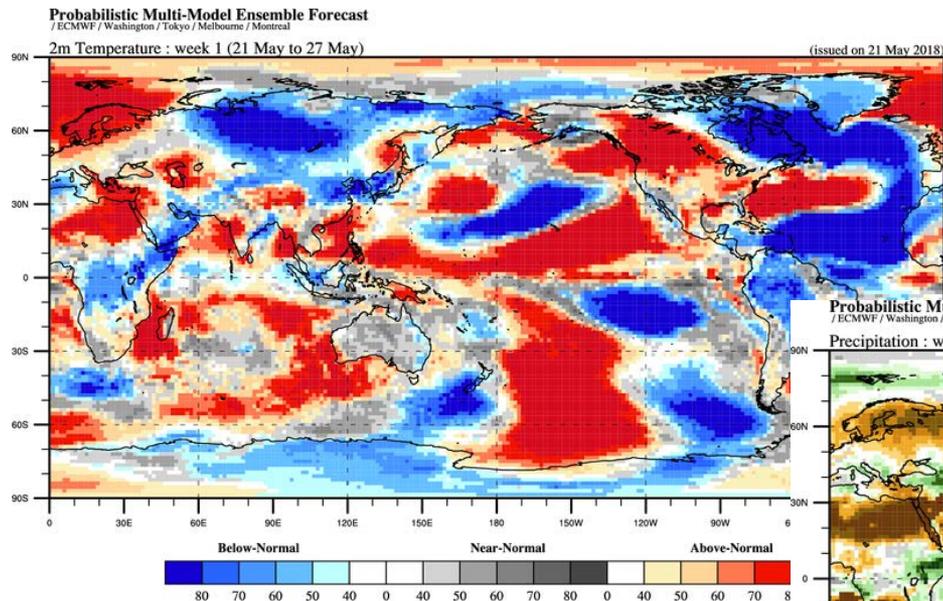
We need to make sure to establish a WMO operational mechanism to support S2S forecast activity in the future.

Source: S2S Newsletter No.8

http://www.s2sprediction.net/file/newsletter/Newsletter_No8.pdf

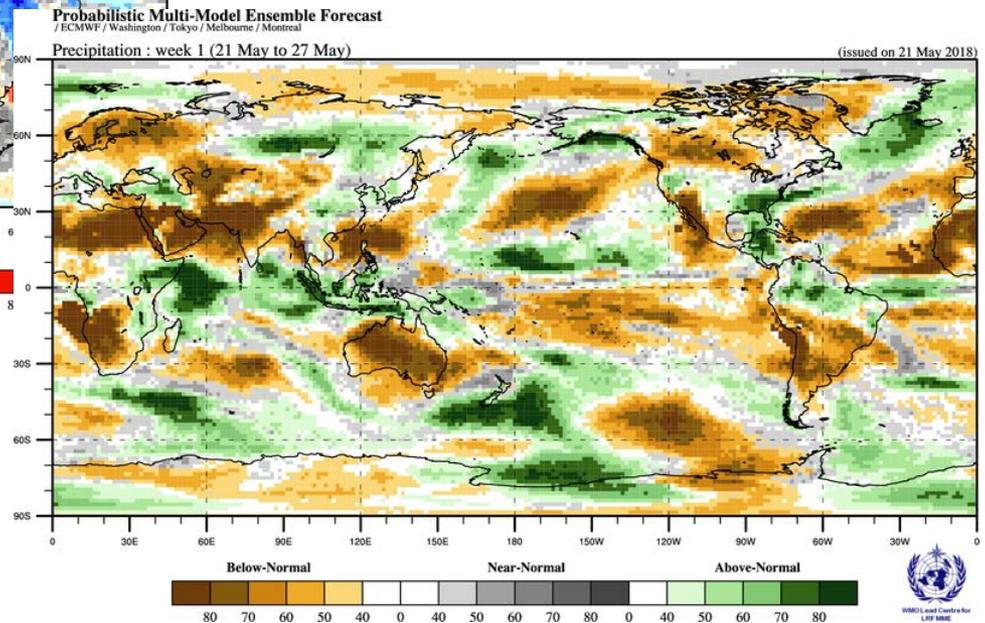
Pilot of subseasonal forecast exchange

Probabilistic prediction map of 2m air temperature and precipitation produced by LC-MMELRF



2-m temperature:
Tercile probabilistic forecast
using parametric method
(Gaussian fitting)

Precipitation:
Tercile probabilistic forecast
using parametric method
(Gamma fitting)

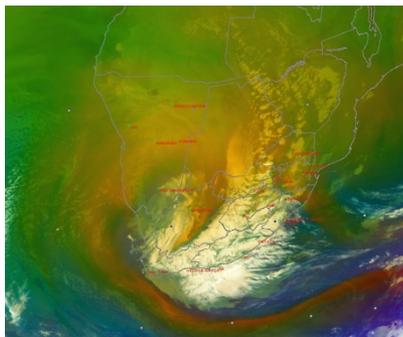


Courtesy LC-MMELRF

R20 best practices of in a past research project

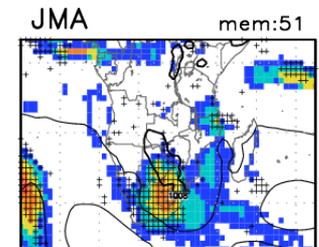
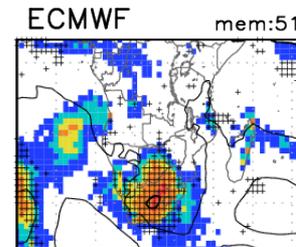
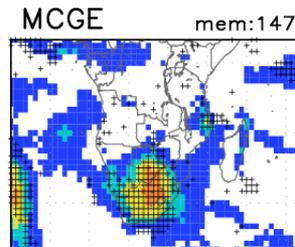
GIFS-TIGGE (Global Interactive Forecast System-THORPEX Interactive Grand Global Ensemble)
to **WMO SWFDP** (Severe Weather Forecast Demonstration Project)

Flash floods/snow in South Africa (June 2011)

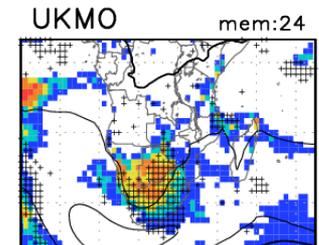
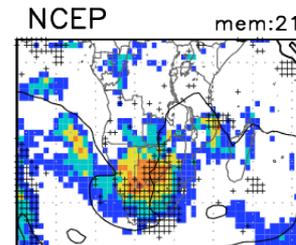
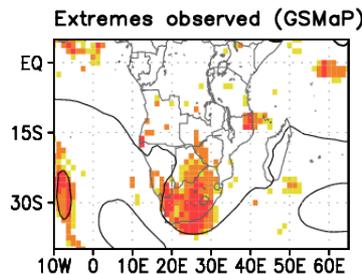


+ 7-day
forecast

Occurrence probability of extreme 24hr precipitation
Valid: 2011.06.01.12UTC +6-7days



00UTC 08 June, 2011



contour: observed SLP [hPa]
observed extremes defined with
90th, 95th and 99th percentiles
no observation

+: extremes observed (90th)
contour: control SLP [hPa]
probability exceeding climatological 90th percentile [%]

URL: http://tparc.mri-jma.go.jp/TIGGE/tigge_SWFDP.html

Strengthening R2O linkages

Specific S2S follow-on activity may be required to take over research application products. How? Who?

- Communication/networking between research and operation at workshops, meetings (e.g., RCOFs)
- Establishment of operational S2S data dissemination
- Undertaking research application products by operational bodies (RCCs, NMHSs)
- Sharing work load (virtual centres or/and global climate centres?)

Knowledge/software sharing in our community

- Encouraging researchers to share their innovating and practical applications, software and data
- Distribution of application software as **open license software** via **portal sites, Git Hub, individual web pages, journals/technical reports**
(Some journals offer places to present/share analysis/software and data.)

SCIENTIFIC DATA 

COMPUTERS &
GEOSCIENCES
AN INTERNATIONAL JOURNAL

Geoscientific
Model Development

- Implementation of such software is, however, still a big challenge confronting our community.

Workshop on Predictability, dynamics and applications research using the TIGGE and S2S ensembles

ECMWF | Reading, UK
2-5 April 2019



This workshop will provide an opportunity to review the main scientific advances in:

- predictability, dynamical process studies
- applications of ensemble forecasts
- ensemble applications include energy, retail and agriculture, as well as disaster risk mitigation
- multi-model prediction and ensemble post-processing

This workshop could be a showcase of S2S applications.

More details is available at

<https://www.ecmwf.int/en/learning/workshops/workshop-predictability-dynamics-and-applications-research-using-tigge-and-s2s-ensembles>

Closing remarks - for strengthening R2O linkages -

S2S Phase 2: Enhancing operational infrastructure and user applications

Research to Operations (R2O) and S2S Forecast and Verification Products Development

Real-time Pilot for S2S Applications research & demonstrations

Great idea itself does not make real value, if it is not in real use (operational services).

Innovation = idea + realization

Research Operation

Efforts in the operational side (LC-LRFMME, GPCs, RCCs, NMHSs) are important to make this happen.



¡Muchas gracias!

Please visit S2S page: <http://s2sprediction.net/>.

The screenshot shows the homepage of the Subseasonal-to-Seasonal (S2S) Prediction Project. The header features the S2S logo and a navigation menu with items: About S2S, News, Documents, Sub-projects, Database, Products, Meetings, People, Links, and Site Map. The main content area includes the S2S logo, logos for WWRP (World Weather Research Programme) and WCRP (World Climate Research Programme), and a 'News Letter' section. The 'News Letter' section highlights the 'WWRP/WCRP Sub-seasonal to Seasonal Prediction Project (S2S) Phase I Final Report' and a document from the WMO describing the three WWRP core projects. To the right, there are five links to Wiki pages: Teleconnections (Contact: Hai Lin), Madden-Julian Oscillation (MJO) (Contact: Duane Waliser), Monsoons (Contact: Harry Hendon), Africa (Contact: Richard Graham), and Extremes (Contact: Frederic Vitart). Below the main content, there are tabs for 'S2S News', 'Upcoming Events', 'News Letter', and 'FAQs'. The 'S2S News' tab is active, showing a 'Special collection in AGU's Journal of Geophysical Research - Atmospheres & Geophysical Research Letters on topics related to S2S Prediction'. To the right, there is a 'S2S Database' section with buttons for 'CMA' and 'IRI/LDEO Data Lib', and a dropdown menu for 'ECMWF'. Below the database section, the text 'The result of S2S' is partially visible.