

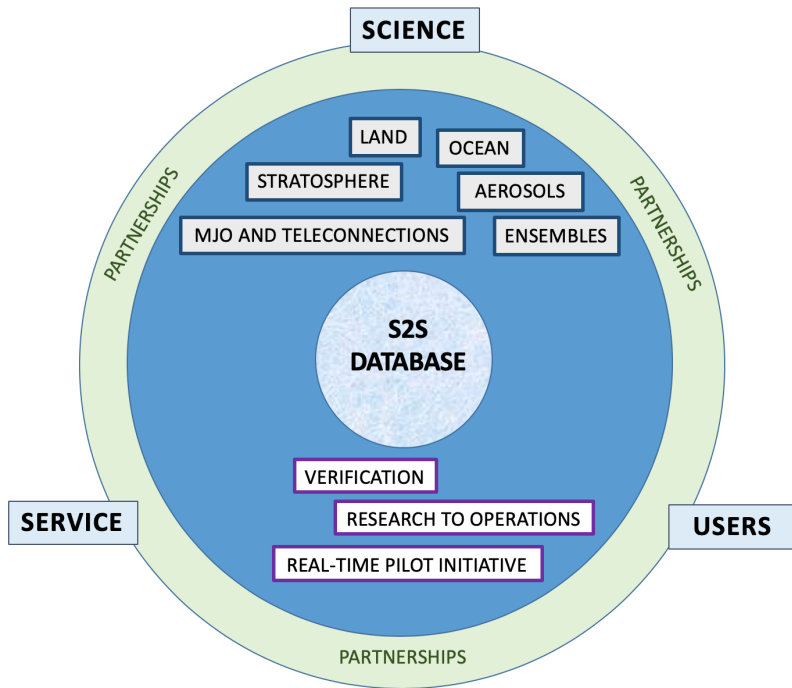


Sub-seasonal to Seasonal Prediction Project Updates

Andrew W. Robertson, IRI, Columbia University
Frederic Vitart, ECMWF
December 2022



S2S Phase II: 2019–2023



Science

New research foci on improving S2S forecasts and understanding

Research-Operations Applications Dev.

New activities to demonstrate S2S forecast applications value and improve operational infrastructure

Data Infrastructure

Enhance S2S Database
Ocean variables, more surface variables
4xdaily, additional models (eg IMD)



Seasonal Prediction and Applications(3-7 July 2023)

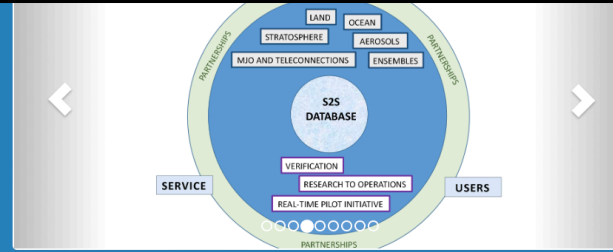
We would like to announce the organization of the "WWRP/WCRP S2S Summit: Advancing Sub-seasonal to Seasonal Prediction and Applications" which will take place at the University of Reading (UK), 3rd to 7th July 2023.

The abstract submission will open on 15th November 2022. Abstract submission deadline will be 15th January 2023.

More information will be available soon.

Updated: 2022-10-27 05:58

WWRP/WCRP S2S summit: Advancing Sub-seasonal to Seasonal Prediction and Applications(3-7 July 2023)



Sub-projects Wikis

- 📖 **MJO and Teleconnections** (Dr. Cristiana Stan)
- 📖 **Aerosols** (Dr. Andrea Molod)
- 📖 **Land** (Dr. Paul Dirmeyer)
- 📖 **Ocean** (Dr. Charlotte DeMott)
- 📖 **Stratosphere** (Dr. Amy Butler)
- 📖 **Ensembles** (Dr. Yuhei Takaya)
- 📖 **Research to Operations/Verification** (Dr. Caio Coelho)
- 📖 **Applications** (Dr. Joanne Robbins, Dr. Chris White)

Regional Activities Wikis

- 📖 **Africa** (Dr. Zewdu T. Segele)
- 📖 **Australia and South Pacific** (Dr. Claire Spillman)
- 📖 **South-East Asia** (Dr. Thea Turkington, Mr. Tan Wee Leng)
- 📖 **South Asia** (Dr. Susmitha Joseph)
- 📖 **East and Central Asia** (Mr. Xin Hu)
- 📖 **Europe** (Dr. Christian Grams, Dr. Alexey Karpechko)
- 📖 **North America** (Dr. Andrea Lang)
- 📖 **Latin America & Caribbean** (Mr. Diego A. Campos Diaz, Dr. Alan

S2S Database & Products

S2S Archiving Data Center

ECMWF

CMA

IRI/LDEO Data Lib.

ECMWF Products (graphics)

S2S Museum

Github Codes

Real-time Pilot Wiki

List of Projects participating in the S2S Real Time Pilot Initiative

Machine Learning Wiki

Forecast and verification products development

Statistics

ECMWF

Usage statistics (Data volumes, # of requests, active users, and users/country)

CMA

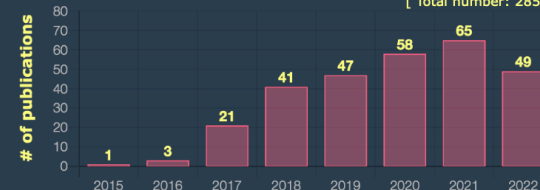
Usage statistics

IRI

Usage statistics

Publications using the S2S DB

[Total number: 285]



Mailing List

Stay up to date on the latest information on the S2S Prediction Project activities, newsletters, updates to the S2S database, regional activities by joining to our mailing list:

• General S2S Prediction Project

The latest news including S2S Prediction Project activities, newsletters, etc.

• S2S Regional Activities

News updates from specific regions (e.g. Africa, South Asia...)

Sign up now

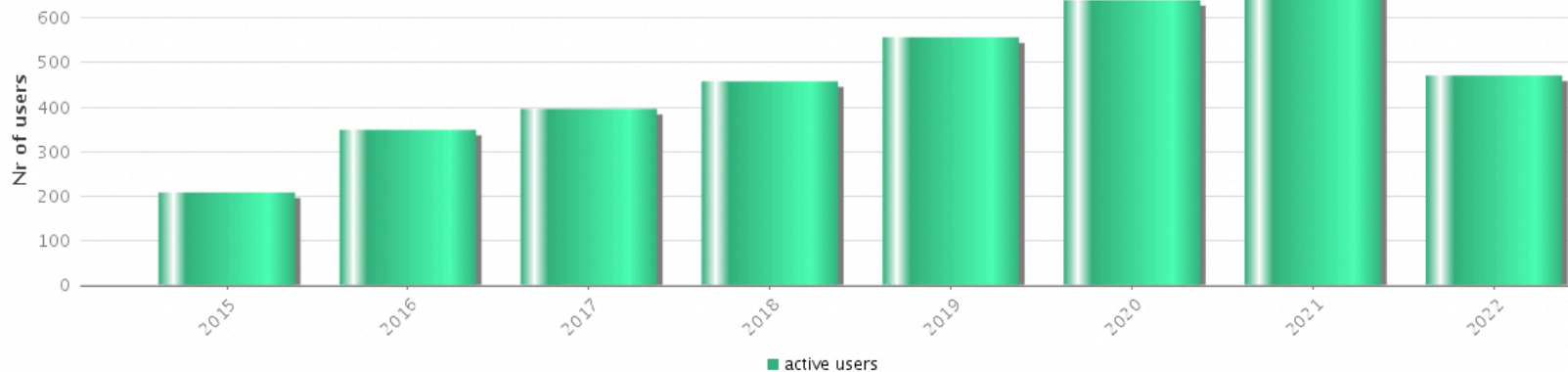
Sign up now



The WWRP/WCRP S2S Database

■ user requests

Number of active users



■ active users

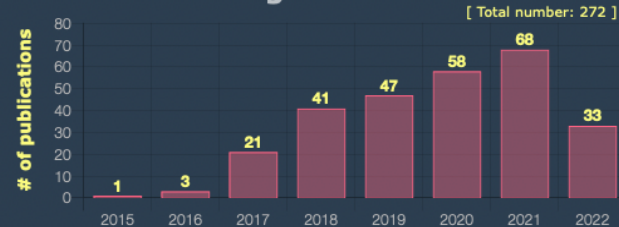
ECMWF server



At least one active user

Archive size 200 TBs
 Number of active users 1776 (ECMWF)
 Delivered volume: 1.3 PBs
 Publications: > 270

Publications using the S2S DB

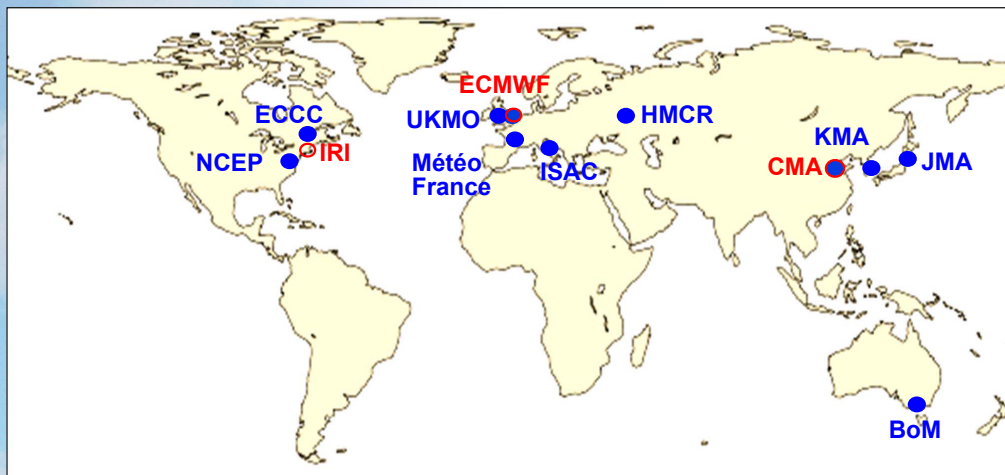


WMO OMM

Contributing Centres to S2S database

● Data provider (11)

○ Archiving centre (3)



The S2S database is also archived at CMA and IRI.

CMA S2S Archiving Data Center

Introduction Data Access Description Sub-project Documents Old Version Login Register

Subseasonal-to-Seasonal Prediction Project

The World Weather Research Programme (WWRP) and the World Climate Research Programme (WCRP) Sub-seasonal to Seasonal Prediction Project (S2S) was launched in November 2013, with the primary goals of improving forecast skill and understanding the dynamics and climate drivers on the sub-seasonal to seasonal timescale (from 2 weeks to a season). The S2S project has a special emphasis on high-impact weather events, developing coordination among operational [More...](#)

<http://s2s.cma.cn/>

Database

- API Service
- Data Acquisition
- S2S Products
- User Agreement

SCIENCE

LAND OCEAN STRATOSPHERE AEROSOLS MID AND TELECONNECTIONS ENSEMBLES

S2S DATABASE

VERIFICATION RESEARCH TO OPERATIONS REAL-TIME PILOT INITIATIVE

SERVICE **USERS**

PARTNERSHIPS

Sub-projects Wiki The new research sub-projects

- Wiki page for Teleconnections (Contact : Hai Lin)
- Wiki page for Madden-Julian Oscillation (MJO) (Contact : Duane Waliser)
- Wiki page for Monsoons (Contact : Harry Hendon)
- Wiki page for Africa (Contact : Richard Graham)
- Wiki page for Extremes (Contact : Frederic Vitart)
- Wiki page for Verification and Products (Contact : Calo Coelho)

ECMWF S2S

Language: english

DESCRIPTION Expert Mode

SOURCES ECMWF S2S

ECMWF S2S

<http://iridl.ldeo.columbia.edu/SOURCES/.ECMWF/.S2S/>

Description

an outline showing sub-datasets of this dataset

BAMS paper The Subseasonal to Seasonal (S2S) Prediction Project Database

ECMWF ECMWF S2S Wiki Page

Model Table S2S Model Description Table at ECMWF S2S Wiki Page

README Please see these notes for explanation on accessing and using the S2S Database in the IRI Data Library

S2S Model Updates News Updates on S2S Model Changes from the ECMWF S2S Archive

S2S Project WWRP/WCRP S2S Project Page

Wiki IRI Wiki Page with IRI/IDL S2S data examples

Datasets and Variables

BOA BoM POAMA Ensemble

climatologies ECMWF S2S climatologies(hindcast observed)

CMA Beijing Climate Center (BCC) Climate Prediction System for S2S.

CNRM CNRM Ensemble Prediction System.

ECCC ECCC Ensemble Prediction System.

ECMWF ECMWF Ensemble.

Era Era Interim Reanalysis.

HMCR HMCR Ensemble.

ISAC ISAC-CNR Ensemble.

JMA JMA Ensemble System.

KMA KMA Seasonal Prediction System.

NCEP NCEP CFSv2 Ensemble.

UKMO UKMO Ensemble Prediction System.

Other Info

license

Acknowledgement: Please add the following Acknowledgement to any publication resulting from the use of the S2S database: "This work is based on S2S data. S2S is a joint initiative of the World Weather Research Programme (WWRP) and the World Climate Research Programme (WCRP). The original S2S database is hosted at ECMWF as an extension of the TIGGE database". For dataset source, please cite: Vitart et al., The Sub-seasonal to Seasonal (S2S) Prediction Project Database. Bull. Amer. Meteor. Soc., 98(1), 163-176. doi: <http://dx.doi.org/10.1175/BAMS-D-16-0017.1>. Besides the above acknowledgement, users should register any journal articles (or other scientific documents) that are based on S2S data by sending an email to: Subseasonal_to_Seasonal_Prediction@googlegroups.com.

reference

Vitart, F., C. Ardiouze, A. Bonet, A. Brookshaw, M. Chen, C. Codresan, M. Déqué, L. Ferranti, E. Fuentes, H. Hendon, J. Hodgson, H. Kang, A. Kumar, H. Lin, G. Liu, X. Liu, R. Melguzzi, I. Mellas, M. Manoussakis, D. Mastrangelo, C. MacLachlan, P. McLean, A. Minami, R. Mladek, T. Nakazawa, S. Najm, Y. Nie, M. Rixen, A.W. Robertson, P. Ruti, C. Sun, Y. Takaya, M. Tolstykh, F. Venuti, D. Waliser, S. Woolnough, T. Wu, D. Won, H. Xiao, R. Zaripov, and L. Zhang, 2017: The Subseasonal to Seasonal (S2S) Prediction Project Database. Bull. Amer. Meteor. Soc., 98, 163–173. <https://doi.org/10.1175/BAMS-D-16-0017.1>

Last updated: Fri, 18 Sep 2020 19:28:54 GMT

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IRI

WWRP/WCRP Sub-seasonal to Seasonal prediction (S2S) database

Inclusion of a new model (IPA-CAS) in 2022

	Time-range	Resol.	Ens. Size	Freq.	Hcsts	Hcst length	Hcst Freq	Hcst Size
ECMWF	D 0-46	Tco639/319L91	51	2/week	On the fly	Past 20y	2/weekly	11
UKMO	D 0-60	N216L85	4	daily	On the fly	1993-2015	4/month	7
NCEP	D 0-44	N126L64	4	4/daily	Fix	1999-2010	4/daily	1
ECCC	D 0-32	~39 km 85 levels	21	weekly	On the fly	2001-2020	weekly	4
BoM	D 0-60	T47L17	33	2/weekly	Fix	1981-2013	6/month	33
JMA	D 0-34	40/55km 128 levels	50	weekly	Fix	1991-2020	2/month	13
KMA	D 0-60	N216L85	4	daily	On the fly	1996-2009	4/month	3
CMA	D 0-60	T266L56	4	2/week	On the fly	Past 15y	2/week	4
CNRM	D 0-47	T359L91	25	weekly	Fix	1993-2017	weekly	10
CNR-ISAC	D 0-32	0.75x0.56 L54	40	weekly	Fix	1981-2010	6/month	5
HMCR	D 0-63	1.1x1.4 L28	20	weekly	Fix	1990-2015	weekly	10
IAP-CAS	D0-65	C96L32	16	daily	Fix	1999-2018	daily	4

Fields in S2S Database

<http://s2sprediction.net>

2. Single-level fields

	Unit	Abbreviation	Description
Potential vorticity at 320K	K m ² kg ⁻¹ s ⁻¹	pv	Inst 00Z
10 metre U	m s ⁻¹	10u	Inst 00Z
10 metre V	m s ⁻¹	10v	Inst 00Z
CAPE	J kg ⁻¹	cape	Daily Av. 4x
Skin temperature	K	skt	Daily Av. 4x
Snow depth water equivalent	kg m ⁻²	sd	Daily Av. 4x
Snow density	kg m ⁻³	rsn	Daily Av. 4x
Snow fall water equivalent	kg m ⁻²	sf	Daily Accumulated
Snow albedo	%	asn	Daily Av. 4x
Soil moisture top 20 cm	kg m ⁻³	sm20	Daily Av. 4x
Soil moisture top 100 cm	kg m ⁻³	sm200	Daily Av. 4x
Soil temperature top 20 cm	K	st20	Daily Av. 4x
Soil temperature top 100 cm	K	st100	Daily Av. 4x
Surf. Air Max. Temp.	K	Mx2t6	4xday
Surf. Air. Min. Temp.	K	Mn2t6	4xday.
Surf. Air. Temp.	K	2t	Daily Av. 4x
Surf. Air Dewpoint Temp.	K	2d	Daily Av. 4x
Sea surface temperature	K	sstk	Daily Av. 4x
Sea ice cover	Proportion of sea ice	ci	Daily Av. 4x
Surf. Pressure	Pa	sp	Inst 00Z
Time-integrated outgoing long-wave radia.	W m ⁻² s	ttr	Daily Accumulated
Time integrated surface latent heat flux	W m ⁻² s	shlf	Daily Accumulated
Time-integrated surface net solar radiation	W m ⁻² s	ssr	Daily Accumulated
Time-integrated surface net thermal radia.	W m ⁻² s	str	Daily Accumulated
Time-integrated surface sensible heat flux	W m ⁻² s	sshf	Daily Accumulated

Time-integrated surface solar rad. downwards	W m ⁻² s	ssrd	Daily Accumulated
Time-integrated surface thermal radiation downwards	W m ⁻² s	strd	Daily Accumulated
Total cloud cover	%	tcc	Daily Av. 4x
Total column water	kg m ⁻²	tcw	Daily Av. 4x
Total precipitation	kg m ⁻²	tp	Daily Accumulated
Convective Precipitation	kg m ⁻²	cp	Daily Accumulated
Northward turbulent surface stress	N m ⁻² s	nsss	Daily Accumulated
Eastward turbulent surface stress	N m ⁻² s	ewss	Daily Accumulated
Mean sea-level pressure	Pa	mssl	Inst 00Z
Water runoff	Kg m ⁻²	ro	Daily Accumulated
Surface water runoff	Kg m ⁻²	sro	Daily Accumulated

1. Multi-level fields

	Unit	Abbrev.	Descript	1000	925	850	700	500	300	200	100	50	10
Geop. height	gpm	gh	Inst. 00Z	x	x	x	x	x	x	x	x	x	x
Spec. hum.	Kg/kg	q	Inst. 00Z	x	x	x	x	x	x	x			
Temperature	K	t	Inst 00Z	x	x	x	x	x	x	x	x	x	x
U	m/s	u	Inst 00Z	x	x	x	x	x	x	x	x	x	x
V	m/s	v	Inst 00Z	x	x	x	x	x	x	x	x	x	x
W	Pa/s	w	Ins 00Z					x					

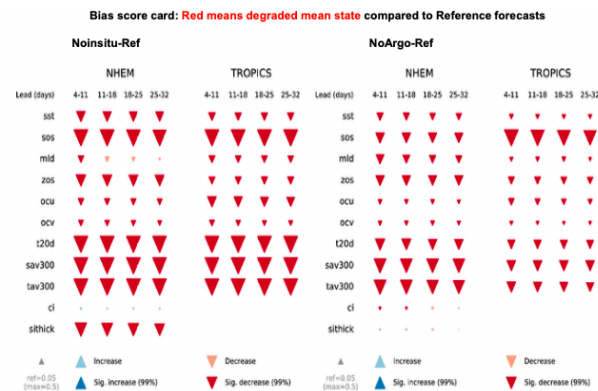
All data is on a 1.5x1.5deg lat-lon grid

Science sub-project activities

3 initiatives have been launched which involve coordination with operational and research centres in order to improve S2S operational prediction:

- Evaluating the Impact (direct and indirect) of Aerosols on NWP and Subseasonal Prediction (WGNE-S2S-GAW Coordinated experiment)

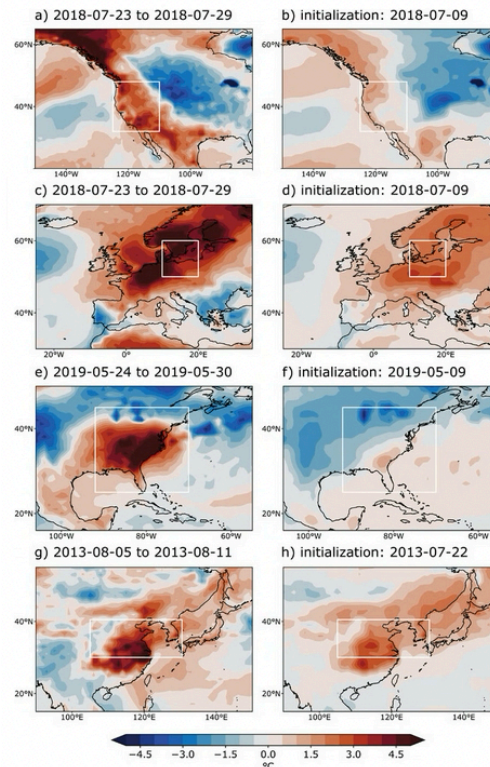
4 centres have run the experiments which are uploaded in CPTEC server. Evaluation will start soon
- Coordinated experiment to better understand stratosphere-troposphere interaction in NWP and climate models (Collaboration with SPARC/SNAP)
- Ocean observing system experiments to better understand the impact of ocean observations on sub-seasonal forecasts, with specific focus on the evaluation of the upcoming Tropical Pacific Observing System (TPOS)



Science sub-project Activities

Community papers published or submitted in 2021/22:

- Representation of MJO teleconnections in S2S models (Stan et al. 2021, BAMS).
- S2S ocean forecasting (DeMott et al. 2022, EOS)
- Advances in the subseasonal prediction of extreme events: Relevant case studies across the globe (Domeisen et al. 2022, BAMS)
- Recent advances in application and utility of S2S forecasts (White et al. , 2022, BAMS)



S2S Real-Time Pilot Project

Real-time S2S data access for climate services co-development projects

The S2S Real Time Pilot Initiative

- Started November 2019 & will continue until end October 2022 (includes 1-year extension recently approved)
- Goals:
 - Identify what is needed to make S2S forecasts usable, how this varies by sector/organisation/experience
 - Understand how projects engage with users, how this relates to pull-through/demand
 - Develop understanding of the S2S forecast value chain & the needs for end-to-end user applications
 - Development of best practice guidelines and/or recommendations to enhance pull-through & sustainability

- Approach
 - 16 co-development projects
 - 3 sets of questionnaires: April/May 2020, Winter 2020/2021, Autumn 2021



- Sectors:
- Water
 - Energy
 - Health
 - Agriculture/food security
 - Disaster risk reduction

Countries/regions:

- Senegal
- Ethiopia
- Bangladesh
- Guatemala
- Columbia
- Ghana
- Kenya
- Nigeria
- Singapore
- USA
- Europe
- Asia & Pacific
- Global

Approach

- 16 co-development projects
- 3 sets of questionnaires:
 - Virtual workshop 14-18 Nov 2022

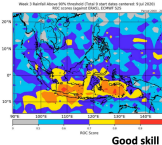
Disaster risk reduction in Southeast Asia S2S Real Time Pilot

Thea Turkington¹, Raizan Rahmat¹, Ryan Kang¹, Wee Leng Tan¹, Keith Paolo Landicho², Lawrence Anthony Dimailig³, G. Srinivasan³, Laura Hendy⁴

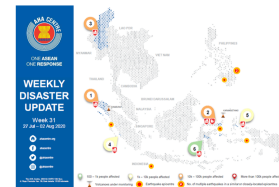
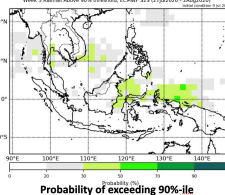
1: ASMC (ASEAN Specialised Meteorological Centre), 2. The AHA Centre, 3. RIMES (Regional Integrated Multi-Hazard Early Warning System for Africa and Asia), 4. UN ESCAP (United Nations Economic and Social Commission for Asia and the Pacific).

S2S Forecasts tailored to ASEAN Centre for Humanitarian Action needs: Exceedance of weekly rainfall above 90%-ile, 3 weeks ahead

Week 3 (Day 19 -25) skill ROC Score for 90th Percentile



Week 3 Rainfall Extremes Forecast from 13 July for 27Jul-2Aug, 2020



S2S Real Time Pilot Workshop [15th-17th November 2022]

HOME PROGRAM PRESENTATIONS INFORMATION AIM ORGANIZED BY REGISTRATION

Subseasonal-to-Seasonal (S2S) Real Time Pilot (RTP) Workshop

15th-17th November 2022
Virtual

Workshop Program

15th November 2022 12:00 UTC - 13:15 UTC	Overview of the purpose of the S2S RTP • Lightning talks from projects involved in the S2S RTP
13:30 UTC - 15:00 UTC	Experiences within the S2S RTP • Theme 1: Translating S2S forecasts into information relevant to user decisions Invited TALK: Matthew Junger (Lead Research Laboratory) Invited TALK: Anthony Mwasiti (ICRAC)
16th November 2022 12:00 UTC - 13:30 UTC	Experiences within the S2S RTP • Theme 2: Use and evaluation of S2S forecast applications

<http://s2sprediction.net/workshop/>

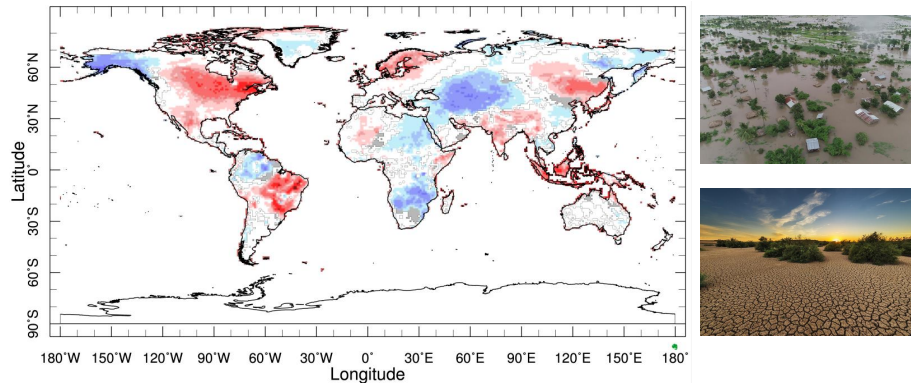
S2S AI/ML Competition

- The WMO Research Board has identified Artificial Intelligence (AI) as a key research topic in weather and climate science for the upcoming years
- A competition was held to encourage the use of AI tools to extract valuable information from the S2S database.
 - **Can purely empirical forecasts beat S2S systems?**
 - **Can AI/ML methods improve S2S system forecasts by better calibration/multi-model ensembling methods?**
- Hosted by Swiss Data Science Center at ETH Zürich, with ECMWF support through the new European Weather Cloud for data access and some CPU time
- Timeline: June-November 2021
- **All codes and forecasts are open source** to foster community learning on AI/ML methods for S2S
- 30k Swiss Francs prize from WMO

Prize Challenge to improve Sub-seasonal to Seasonal Predictions using Artificial Intelligence

01 June – 31 October 2021

Improved sub-seasonal to seasonal (S2S) forecasts could enhance food security, sustainable energy and water, and reduce disaster risks through early warnings.



The World Meteorological Organization ([WMO](#)) is launching a prize challenge to improve current forecasts of precipitation and temperature **3 to 6 weeks into the future** from today's best computational fluid dynamical models using Artificial Intelligence and/or Machine Learning techniques.

The challenge is organized by the World Weather Research Programme ([WWRP](#))/World Climate Research Programme ([WCRP](#)) Subseasonal-to-Seasonal Prediction Project ([S2S Project](#)), in collaboration with the Swiss Data Science Center ([SDSC](#)) and the European Centre for Medium-Range Weather Forecasts ([ECMWF](#)).

How will it work? [Renkulab](#) will host all the codes and scripts, with training and verification data easily accessible from the [European Weather Cloud](#) and data access scripts provided. All the codes and results will be made open access after the competition.

Vitart, F., Robertson, A.W., Spring, A., Pinault, F., Roškar, R., Cao, W., Bech, S., Bienkowski, A., Caltabiano, N., De Coning, E., Denis, B., Dirkson, A., Dramsch, J., Dueben, P., Gierschendorf, J., Kim, H. S., Nowak, K., Landry, D., Lledó, L., Palma, L., Rasp, S., & Zhou, S. (2022). Outcomes of the WMO Prize Challenge to Improve Sub-Seasonal to Seasonal Predictions Using Artificial Intelligence, Bulletin of the American Meteorological Society

<https://journals.ametsoc.org/view/journals/bams/aop/BAMS-D-22-0046.1/BAMS-D-22-0046.1.xml>

Timeline

- Announcement: 4th May 2021
- Start of the competition: 1st June 2021
- End of the competition: 31st October 2021
- Announcement of winners: 15th December 2021

Prizes

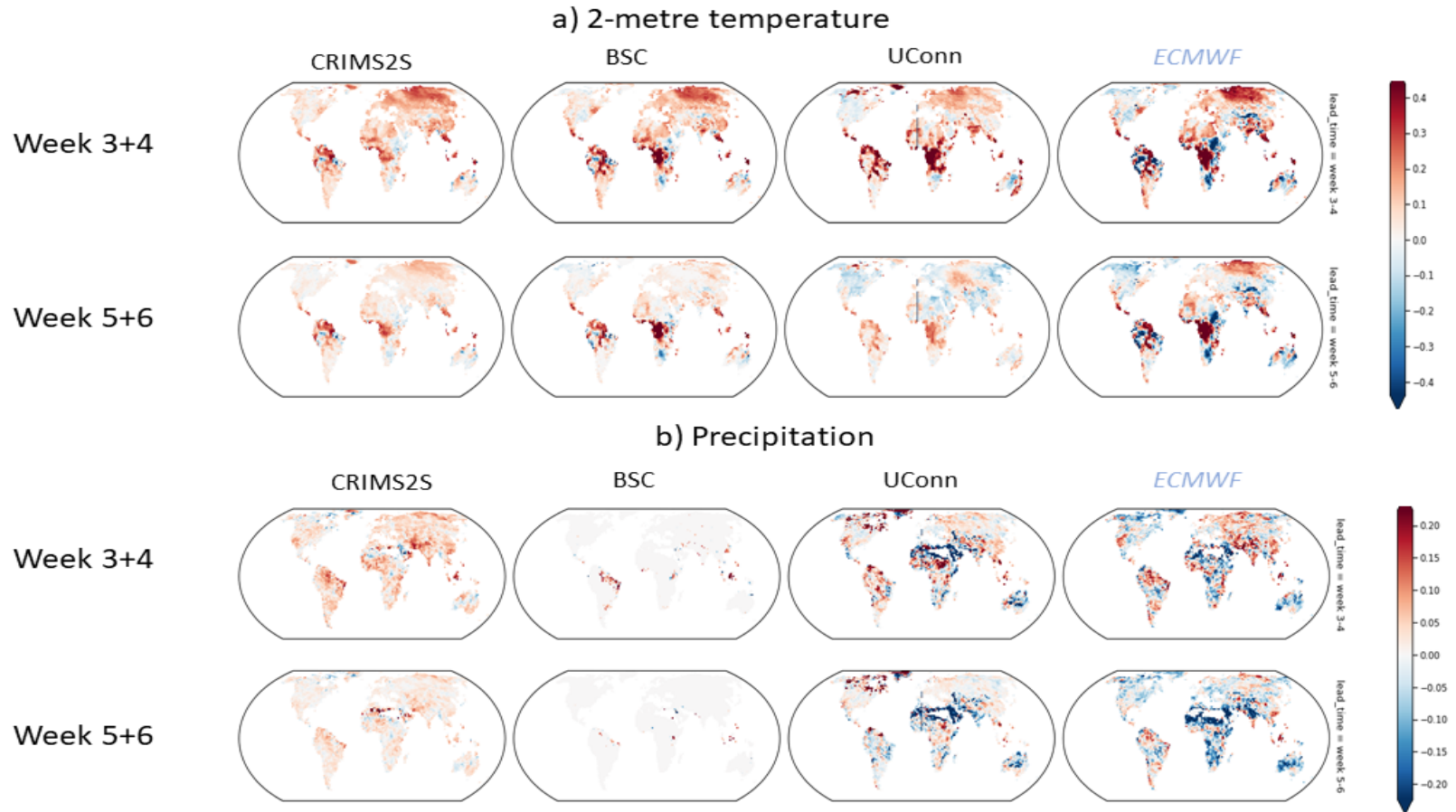
- Prizes for the top three submissions:
- Winning team: CHF 15 000
 - 2nd team: CHF 10 000
 - 3rd team: CHF 5 000

Competition website: <https://s2s-ai-challenge.github.io/>



S2S AI/ML Competition

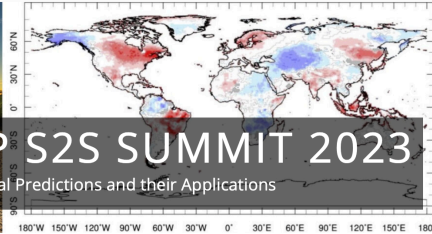
RPSS Score – YEAR 2020



47 teams. 10 submissions. The three winning entries included random forest classification (BSC and UConn), convolutional neural networks (CRIMS2S), as well as logistic regression (BSC), and EMOS multiple linear regression (CRIMS2S).

Plans for 2022-23

- Complete science project activities and coordinated experiments.
- Document Real-time pilot main findings
- Include 2 new models in S2S database (IITM, NASA) and resume archiving of BoM S2S forecasts and re-forecasts.
- Maintain S2S AI/ML challenge data and computing environment
- Write final report on S2S Phase 2 activities
- Organize S2S summit – 3-7 July 2022 University of Reading



WWRP/WCRP S2S SUMMIT 2023

Advancing Sub-seasonal to Seasonal Predictions and their Applications

03 - 07 July 2023

University of Reading, UK

Celebrating 10 years of the **Sub-Seasonal to Seasonal Prediction Project** and looking to the future.

Sub-seasonal to seasonal (S2S) prediction—2 weeks to a season ahead—is increasingly filling the gap between weather and seasonal climate forecasts, helping provide early warnings of high-impact events such as tropical cyclones, floods, droughts, heat, cold waves and their compound impacts on society. As the S2S forecast skill continues to improve through a better understanding of physical mechanisms involved, model advances and statistical calibration of model forecast outputs, more products are becoming available for decision makers to advance applications and services.

The Summit will celebrate the success of the **WWRP/WCRP S2S Prediction Project** over 10 years as it moves towards its completion in December 2023. The event welcomes contributions on all aspects of S2S science, including:

- physical mechanisms leading to predictability on sub-seasonal timescales,
- model evaluation and diagnostics,
- predictability and prediction studies,
- extreme events,
- traditional Model Output Statistics (calibration, verification) as well novel approaches such as, Machine Learning.
- Examples and best practices of development, application, value and communication of S2S products.

Contributions making use of both the S2S and SubX databases are encouraged as these are complementary data sources for advancing sub-seasonal to seasonal prediction research. Forecasting of sub-seasonal weather statistics within the first season, including high impact weather and monsoon onset/cessation dates are also welcome.

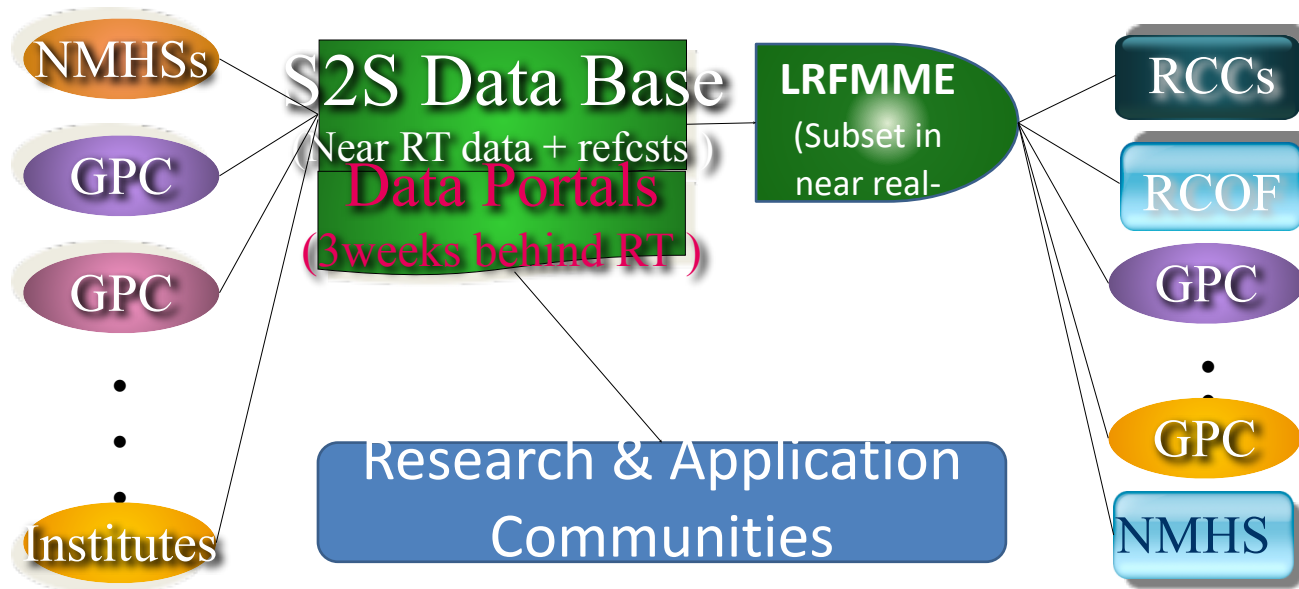
Upcoming dates

- Abstract Submission Opens: 22 November 2022
- Abstract Submission Deadline: 15 January 2023
- Abstract Acceptance Notification: 28 February 2023
- Registration Opens: 01 March 2023

<https://research.reading.ac.uk/s2s-summit2023/>



Major S2S Legacy: New WMO Lead Centre for Sub-Seasonal Forecasts Multi-Model Ensembles (LC-SSFMME) will be designated, along with Global Producing Centres (GPCs) for Sub-Seasonal Forecasts -SSF



**S2S
Producing
Centres**

WMO Users



WMO OMM

Home > news > wrpwrp new international monsoons project office launched support global monsoon research activities

WWRP/WCRP | A new International Monsoons Project Office launched to support global monsoon research activities



17-08-2021

A large proportion of the global population is influenced by monsoons, which can affect people in every aspect of their lives. Adequate and timely monsoon rains are crucial for providing drinking water, farming operations, water resources management, the generation of hydropower, and more. Monsoon variability has a marked influence on the economies of countries in monsoon regions. Understanding, modelling, and predicting monsoons is also considered to be a great challenge to climate science.

That is why, the Working Group on Tropical Meteorology Research (WGTRM) of the World Weather Research Programme (WWRP) aims to coordinate and advance the research of tropical cyclones, monsoon systems and intra-seasonal tropical variability to improve the prediction of high-impact weather in the tropics.

WGTRM works with other components of WMO regarding tropical cyclones and monsoons, specifically the World Climate Research Programme (WCRP). In recognition of this shared interest in monsoons, WWRP and WCRP are delighted to announce that a joint International Monsoons Project Office (IMPO) has recently been established at the Indian Institute of Tropical Meteorology (IITM), Pune, India.

The office will coordinate monsoon-related activities for the next five years with effect from 30 July 2021. Best wishes to the IMPO and, where possible and also thank the Government of India for its support and coordination with the leadership of WWRP and WCRP. For more information on mutually agreed activities to enable monsoon research, please visit the IMPO's website.

ACTIVITY AREAS (1)

- World Weather Research Programme (WWRP)

Planned Research Initiatives

Proposed Project: SAGE (S2S Applications for aGriculture and Environment)

Research Foci	<ul style="list-style-type: none"> ✓ Improving sub-seasonal to seasonal prediction with coupled atmosphere-ocean-land systems ✓ Understanding sources of predictability ✓ Improving on operational products and their use for agriculture, energy and water management
Partners (but not limited to)	WCRP/ESMO and GEWEX, SERCOM/SC-AGR (Agriculture) and SG-ENE (Energy), INFCOM/Joint ET on Earth Observing System Design and Evolution
Working Group or Expert Team	JWGFVR, PDEF, DAOS, SERA, TMR, HAP
Expected period	2024-2028

Thank you!