

# Applications of subseasonal to seasonal (S2S) predictions



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S2S session Theme A4: S2S forecasts for decision making

# Contents

**01 The S2S timescale**

**02 Communicating longer-range predictions**

**03 Putting the user first:  
(potential) applications of S2S  
predictions for decision making**

**04 Challenges and opportunities**



**01**

# The S2S timescale



# The subseasonal-to-seasonal (S2S) timescale: A relatively unexplored predictive timescale

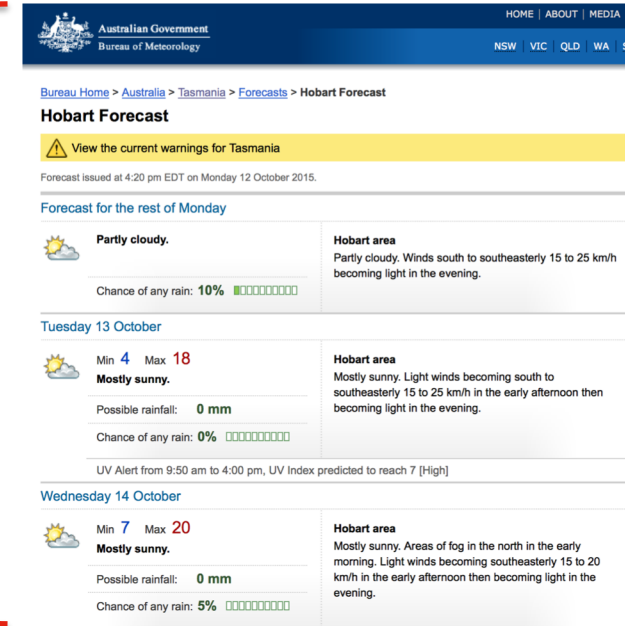
- The S2S timescale – **3-4 weeks (10-30 days) extended range lead time** – has, until recently, been viewed as a predictive ‘desert’
- Research is now looking for ‘windows of forecast opportunity’ on the S2S timescale using teleconnections to known large-scale climate drivers
- However, there is a growing requirement for the employment of S2S predictions for a wide range of societal and economic applications including forecasts of high-impact events such as flooding and heatwaves, streamflow forecasting, and humanitarian planning and response to disasters



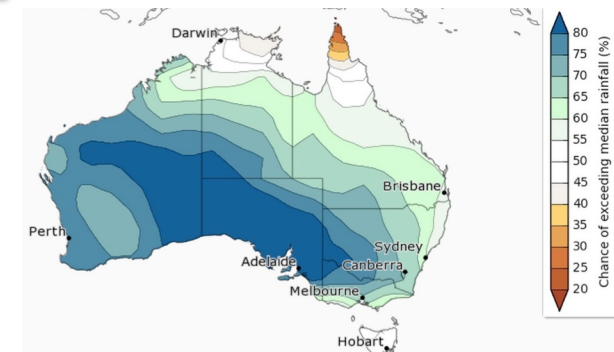


# What is 'longer-range' forecasting?

- |   |  |
|---|--|
| 1. Nowcasting                           | A description of current weather parameters and 0-2 hours description of forecasted weather parameters   |
| 2. Very short-range weather forecasting | Up to 12 hours description of weather parameters   |
| 3. Short-range weather forecasting      | Beyond 12 hours and up to 72 hours description of weather parameters   |
| 4. Medium-range weather forecasting     | Beyond 72 hours and up to 240 hours description of weather parameters  |
| 5. Extended-range weather forecasting   | Beyond 10 days and up to 30 days description of weather parameters, usually averaged and expressed as a departure from climate values for that period.                     |
| 6. Long-range forecasting               | From 30 days up to two years   |
| 6.1 Monthly outlook                     | Description of averaged weather parameters expressed as a departure (deviation, variation, anomaly) from climate values for that month (not necessarily the coming month). |
| 6.2 Three month or 90 day outlook       | Description of averaged weather parameters expressed as a departure from climate values for that 90 day period (not necessarily the coming 90 day period).                 |
| 6.3 Seasonal outlook                    | Description of averaged weather parameters expressed as a departure from climate values for that season.   |



Short-range forecast



Seasonal outlook

<http://www.wmo.int/pages/prog/www/DPS/GDPS-Supplement5-Appl-4.html>

# The S2S timescale: The S2S project

International WWRP-WCRP  
coordinated research on S2S  
predictability and modelling

**Goal is to improve the  
accuracy and use of forecasts  
at lead times from 2 weeks to  
2 months**

Focus is on science, forecasting  
*and* applications

New database of S2S  
predictions (hosted at ECMWF  
and CMA) from 11 global  
producing centers – data portals  
are now OPEN:

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



# The S2S timescale: The S2S project

[About S2S](#) ▾[Documents](#) ▾[Sub-projects](#)[Database](#) ▾[Meetings](#) ▾[People](#) ▾[Notice](#) ▾

## Research Priorities

1. Evaluate potential predictability of subseasonal events, including identifying windows of opportunity for increased forecast skill.
2. Understand systematic errors and biases in the subseasonal to seasonal forecast range
3. Compare, verify and test multi-model combinations from these forecasts and quantify their uncertainty.
4. Focus on some specific extreme event case studies.



## Scientific issues

1. Identify sources of predictability at the sub-seasonal to seasonal time-range.
2. Prediction of the MJO and its impacts in numerical models
3. Teleconnections - forecasts of opportunity
4. Monsoon prediction.
5. Rainfall predictability and extreme events
6. Polar prediction and sea-ice
7. Stratospheric processes



## Modelling issues

1. Role of resolution
2. Role of ocean-atmosphere coupling
3. Teleconnections - forecasts of opportunity
4. Systematic errors.
5. Initialisation strategies for subseasonal prediction
6. Ensemble generation
7. Spread/skill relationship
8. Verification

# Sub-seasonal to Seasonal (S2S) Prediction Project

Sub-Projects

Interactions and teleconnections between midlatitudes and tropics

Madden-Julian Oscillation

Monsoons

Africa

Extremes

Verification

## 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)

S2S Database

**02**

# Communicating longer-range predictions

