

# Long-range predictors:

## Sources of potential skill

Although we are interested in the S2S timescale, large-scale climate drivers operating on longer seasonal timescales influence S2S prediction skill.

For example, La Niña events are associated with increased cloudiness that increases the likelihood of higher rainfalls and flooding.

### Seasonal timescale drivers

- El Niño – Southern Oscillation (ENSO)
- Indian Ocean Dipole (IOD)

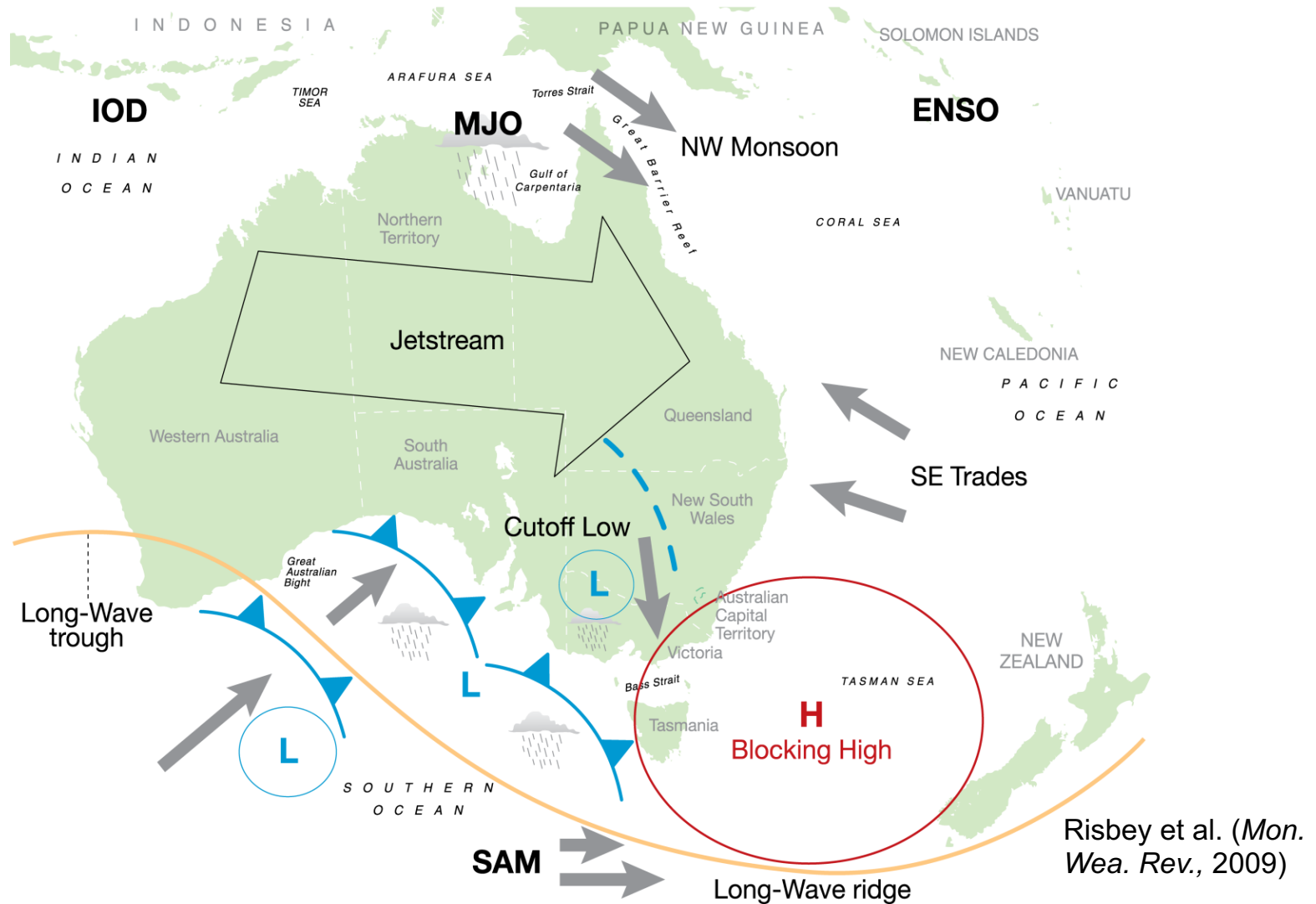
### Subseasonal timescale drivers

- Madden-Julian Oscillation (MJO)
- Southern Annular Mode (SAM)
- Blocking

# Long-range forecasting: Global forecasting centres

Model / Agency	Model description No. of Ensemble Members	Update frequency	Length of forecast	GPC for Long-Range Forecasts (WMO) *	Model Output (graphs and data)	Verification	Additional comments
<a href="#">POAMA / Bureau of Meteorology</a>	Coupled ocean-atmosphere GCM 33 member ensemble	Fortnightly	8 months	Y	<a href="#">NINO3.4 IOD</a>	<a href="#">Verification</a>	
<a href="#">GEOS5 / NASA-GMAO (USA)</a>	Coupled ocean-atmosphere-land model 12-15 member ensemble	Monthly	8 months	N	<a href="#">NINO3.4 &amp; IOD(IDM)</a>  <a href="#">Data</a>	<a href="#">Verification</a>	NINO3.4 and IOD available.
<a href="#">CFSv2 / NOAA-NCEP (USA)</a>	Coupled ocean-atmosphere-land model 40 member ensemble	Daily	8 months	Y	<a href="#">NINO3.4</a>	<a href="#">Verification</a>	Forecast data not available publicly, only graph.
<a href="#">JMA/MRI-CPS2 / JMA</a>	Coupled ocean-atmosphere GCM 51 member ensemble	Monthly	6 months	Y	<a href="#">NINO3.4</a>  <a href="#">Data</a>	<a href="#">Verification</a>	
<a href="#">System 4 / ECMWF (EU)</a>	Coupled ocean-atmosphere GCM 51 member ensemble	Monthly	6 months	Y	<a href="#">NINO3.4</a>	<a href="#">Verification</a>	NINO3.4 and IOD available. Forecast data not available publicly, only graph.
<a href="#">GloSea5 / UKMO</a>	Coupled ocean-atmosphere GCM 60 member ensemble	Monthly	6 months	Y	<a href="#">NINO3.4</a>	<a href="#">Verification</a>	Shorter forecast period compared to other models. Forecast data not available publicly, only graph.
<a href="#">ARPEGE / MeteoFrance</a>	Coupled ocean-atmosphere GCM 51 member ensemble	Monthly	6 months	Y	<a href="#">NINO3.4</a>	<a href="#">Verification</a>	NINO3.4 and IOD available. Forecast data and graph not available publicly.
<a href="#">CanSIPS / Meteorological Service of Canada</a>	MME using two coupled ocean-atmosphere GCMs 20 member ensemble	Monthly	6 months	Y	<a href="#">NINO3.4</a>	<a href="#">Verification</a>	Data available via IRI multi model comparison page. Verification for ENSO is pp 12-15 of Tech note.

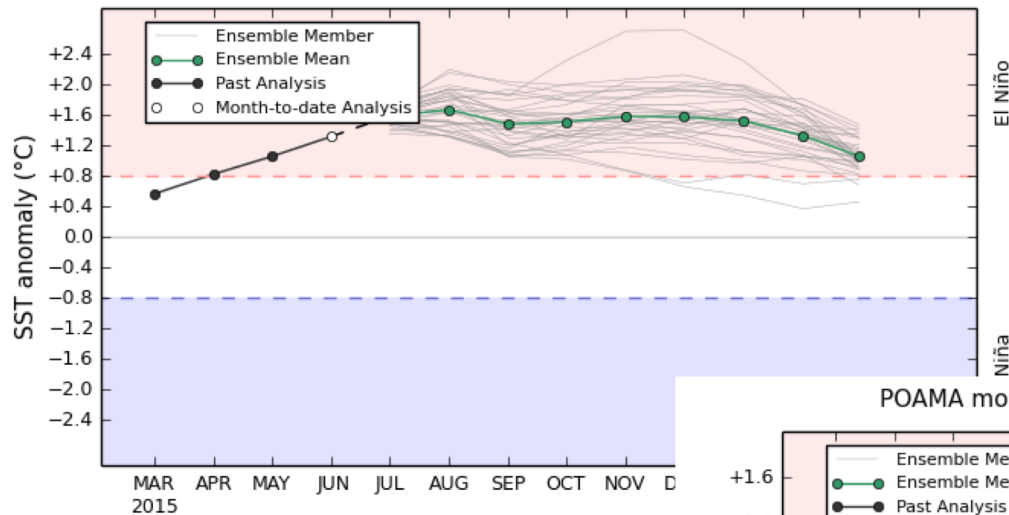
# Example – predictors of Australian weather: Sources of potential skill



# Operational seasonal products:

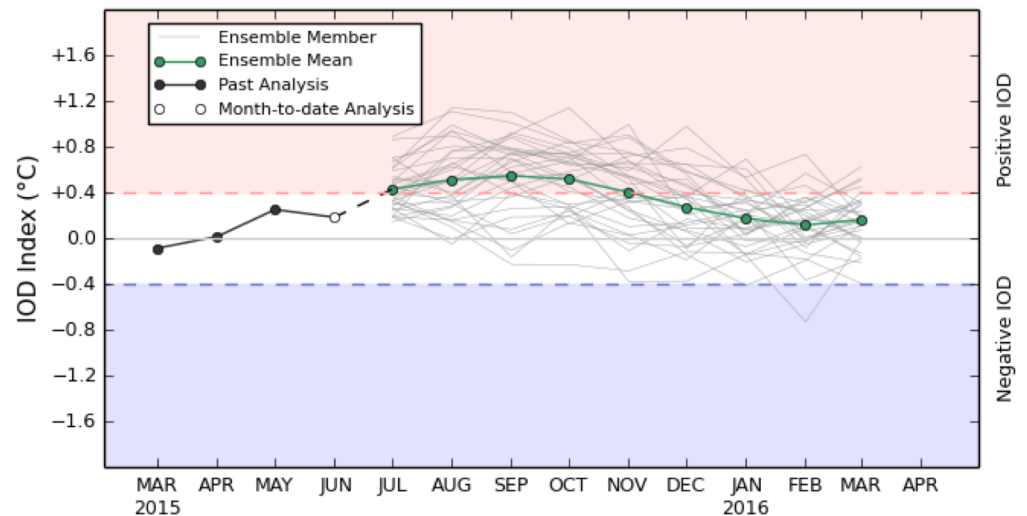
## Climate driver outlooks and model summaries

POAMA monthly mean NINO34 - Forecast Start: 21 JUN 2015



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POAMA monthly mean IOD - Forecast Start: 21 JUN 2015



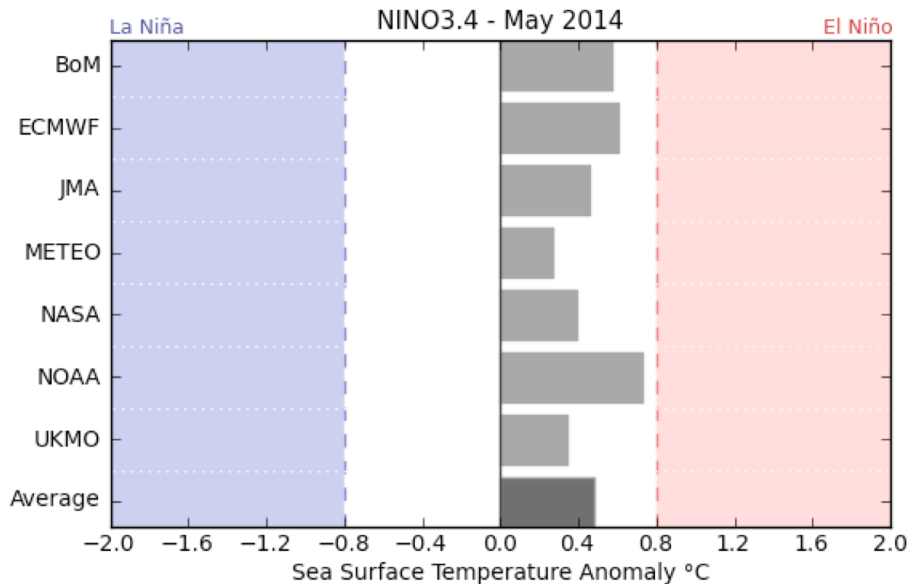
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Base period 1981-2010

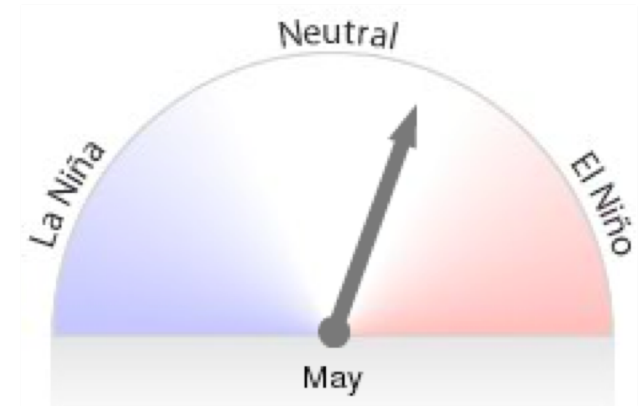


# Operational seasonal products: ENSO and IOD outlooks and model summaries

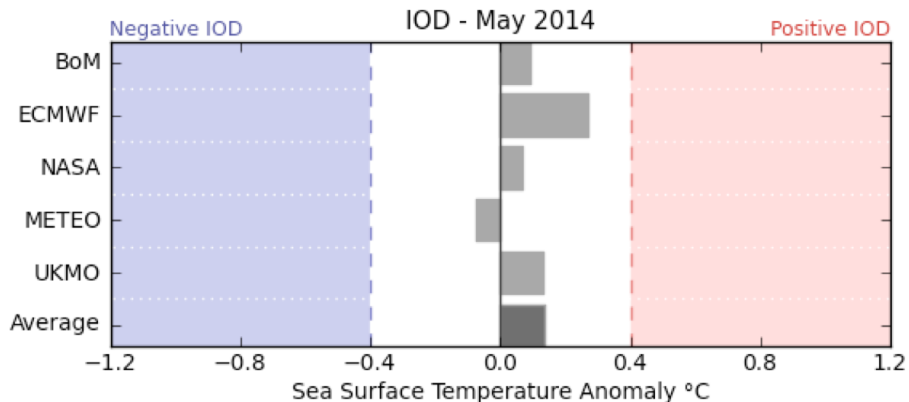
## ENSO



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## IOD

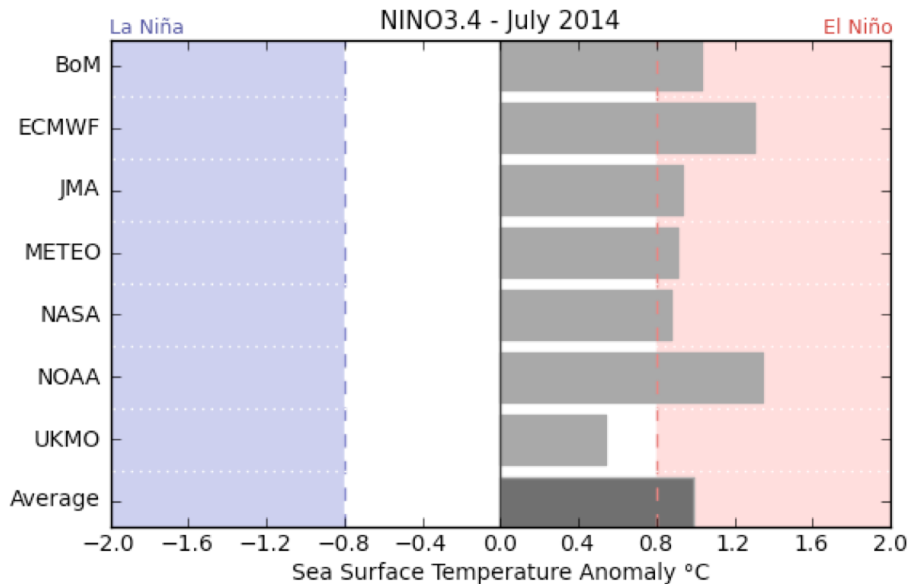


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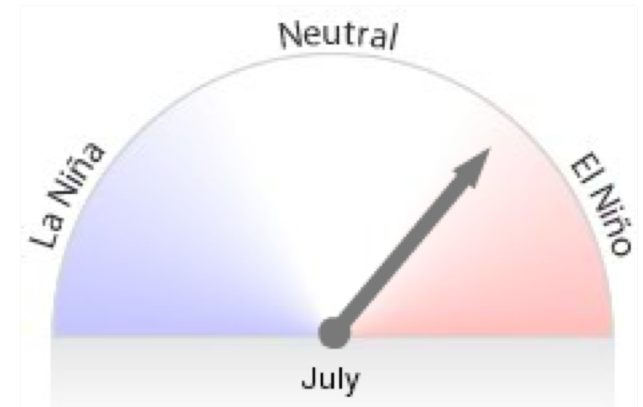
The Bureau of Meteorology accesses other centre's seasonal predictions (some publically available, others not), including UKMO, ECMWF and NOAA, to produce a transparent multi-model summary

# Operational seasonal products: ENSO and IOD outlooks and model summaries

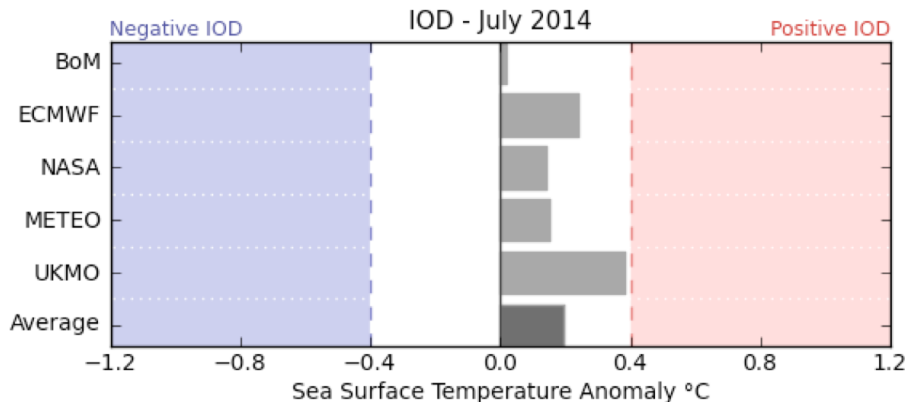
## ENSO



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## IOD

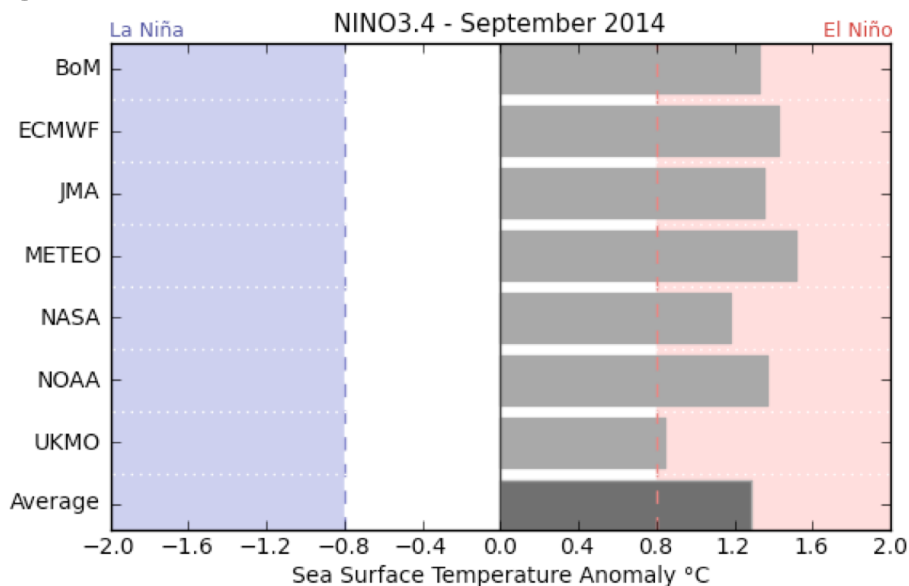


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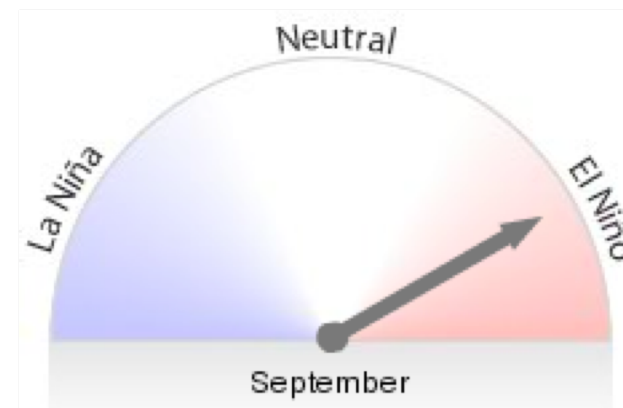
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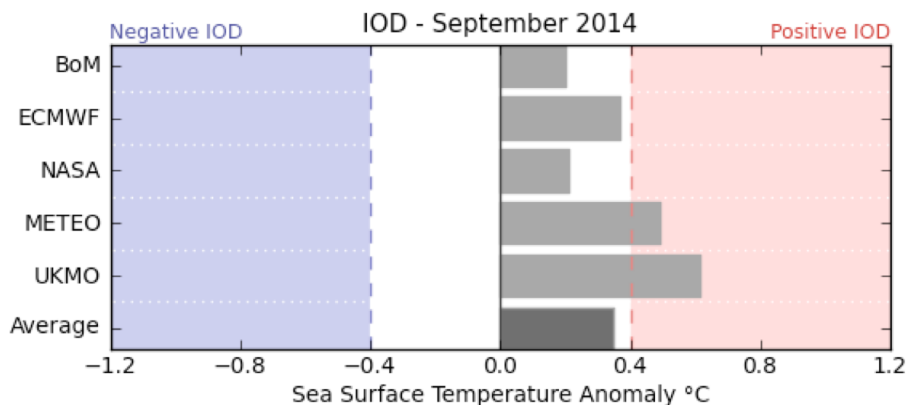
## ENSO



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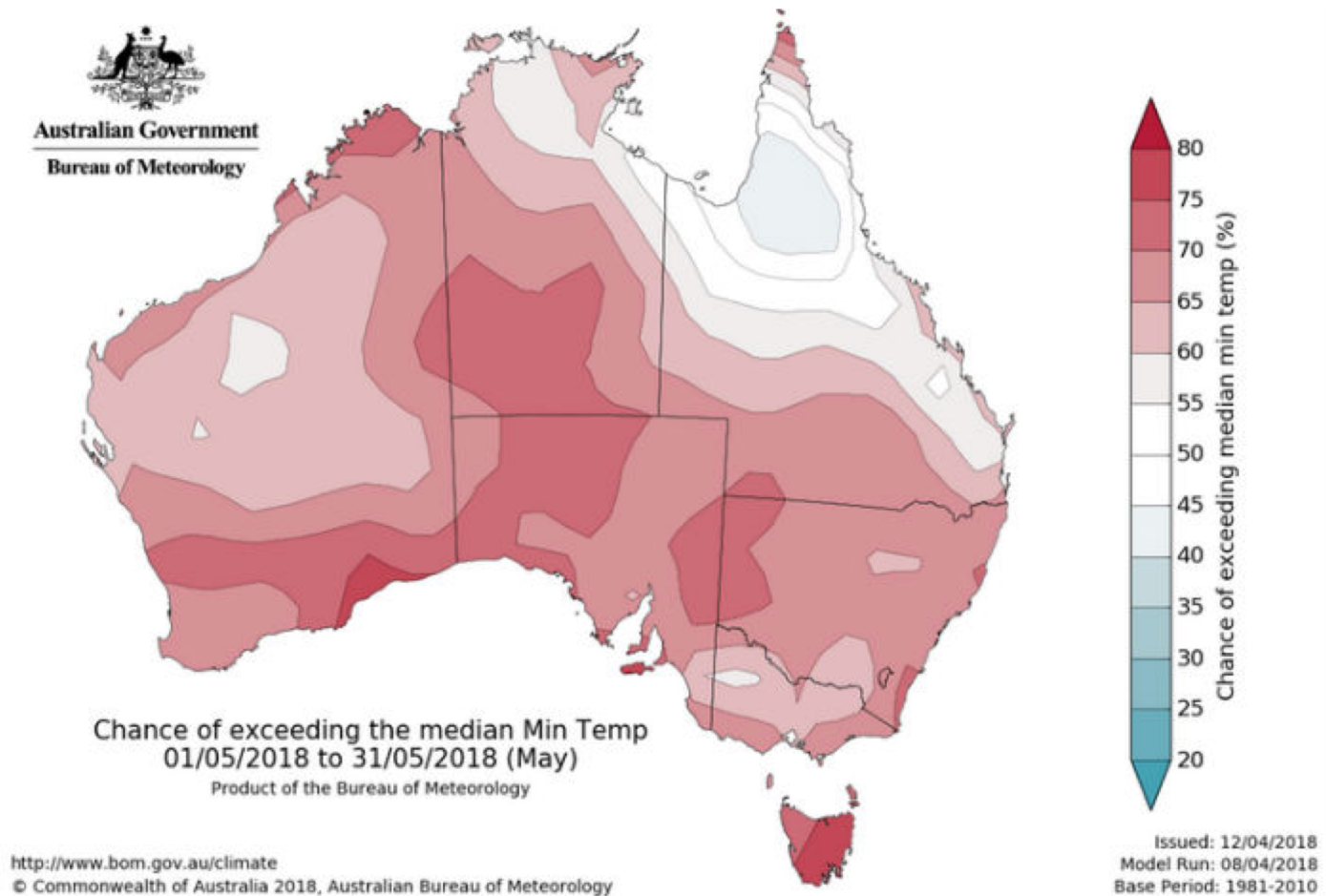
## IOD



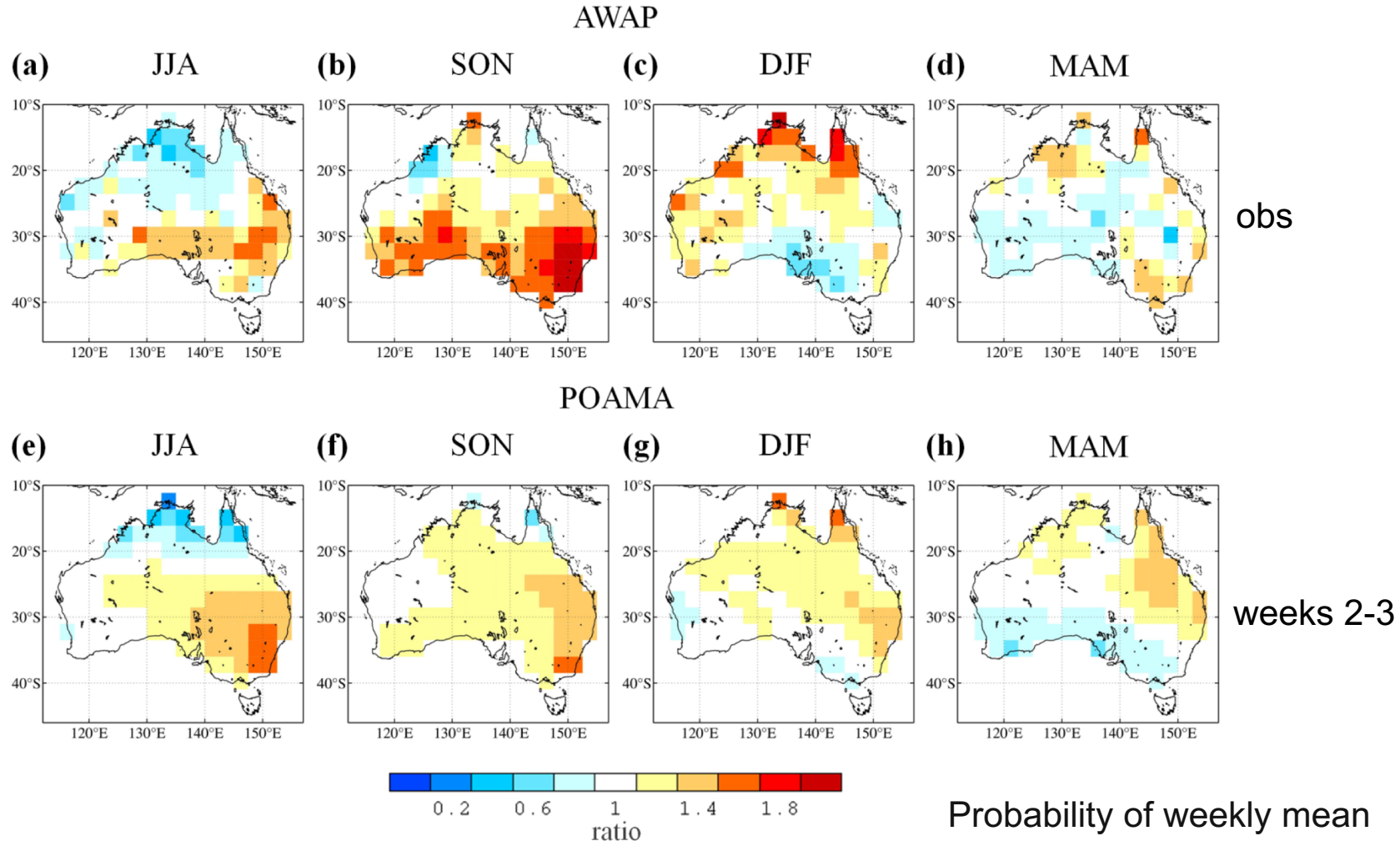
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# Operational seasonal products: Temperature and rainfall outlooks



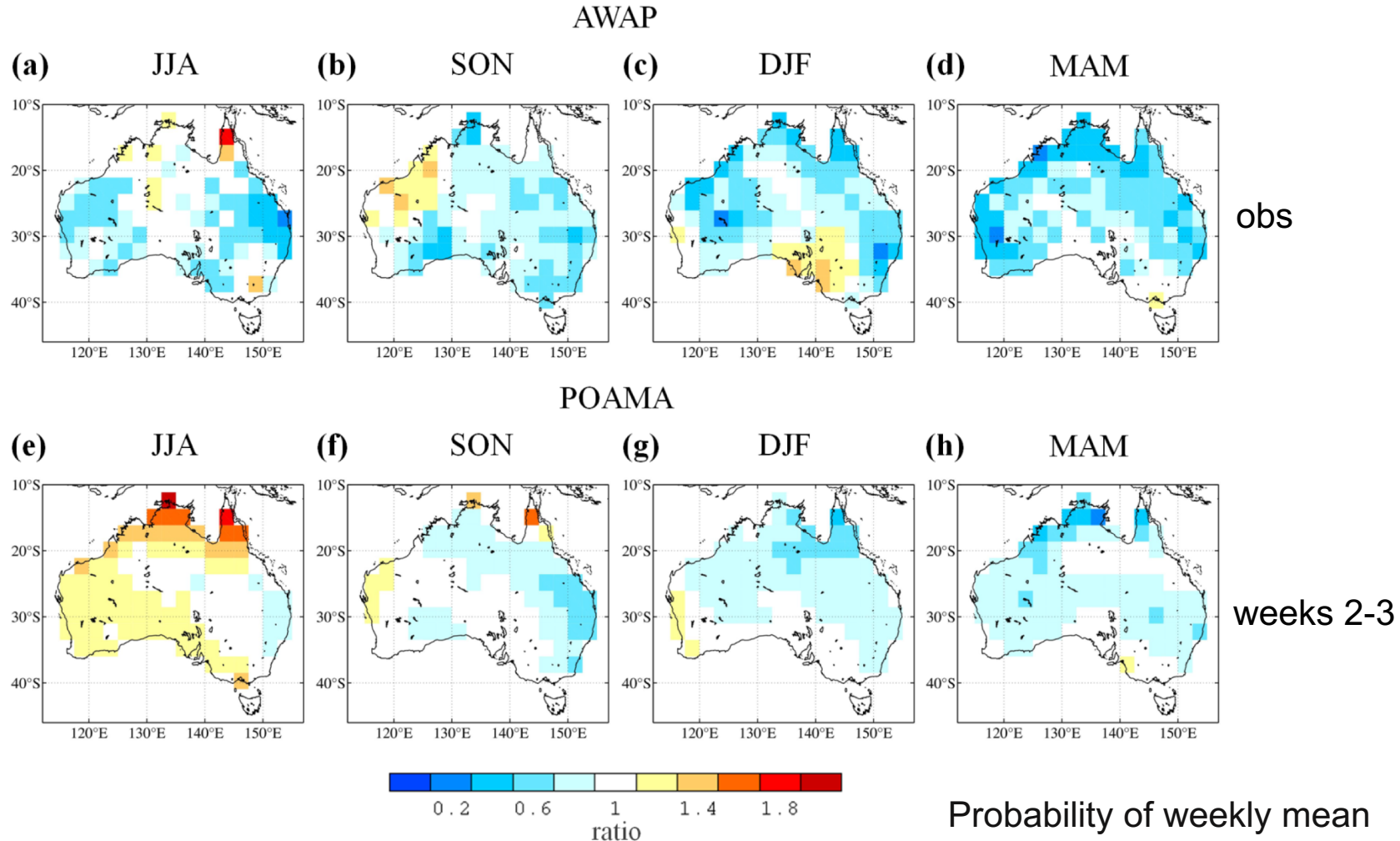
# Experimental S2S temperature forecasts: Exceedance probabilities during El Niño



White et al. (*Clim. Dyn.*, 2013)

Probability of weekly mean  
Tmax exceeding the 90th  
percentile, expressed as a  
ratio to the mean probability

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# Longer-range forecasting: What are we missing?

***Impact-based*** forecast information focused on ***natural hazards***, producing useful, useable and actionable information, with the overarching goal of seamlessly linking longer-range forecasts with risk management to support decision-making