Seasonal forecasting in Australia and the South Pacific

APEC Climate Center (APCC) Member Working Group Meeting

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Acknowledgements

David Jones, Oscar Alves, Brad Murphy, Matt Wheeler, Harry Hendon, Eun-Pa Lim, Janita Palahad

Overview

- The Australian Bureau of Meteorology's current operational climate prediction activities and update of prediction service
- Climate prediction for the Pacific Islands

- Why switch to a dynamical forecast?
- Australian Bureau of Meteorology CGCM – POAMA1.5

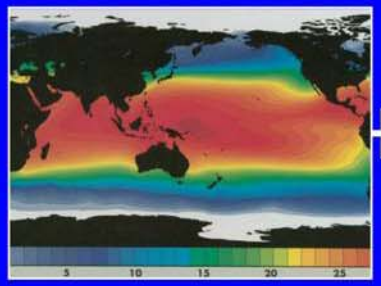
- Prediction of extremes

SEA TEMPERATURE (SST) - BASED EMPIRICAL SEASONAL PREDICTION

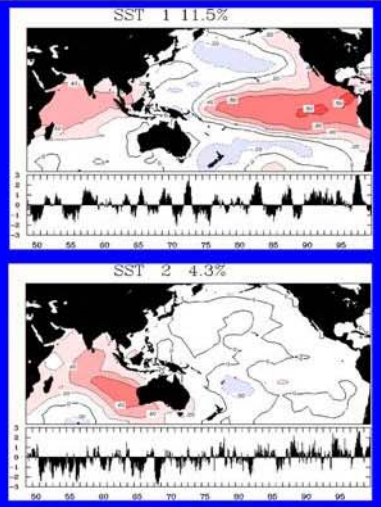
AUSTRALIAN RAINFALL DATA 1949 - 99

AUSTRALIAN TEMPERATURE DATA 1949 - 99

HISTORICAL SST 1949 - 99



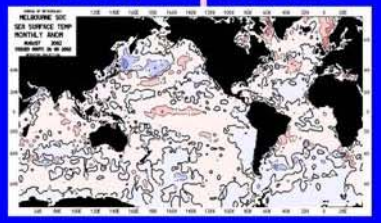
STATISTICAL RELATIONSHIPS BETWEEN SST PATTERNS AND AUSTRALIAN TEMPERATURES AND RAINFALL



CHARACTERISTIC SST PATTERN

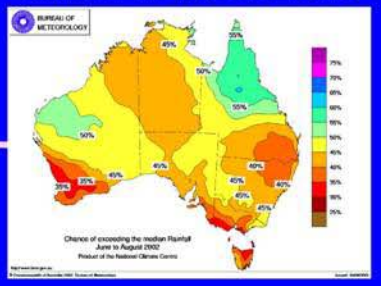
PRINCIPAL COMPONENT ANALYSIS

RECENT SST PATTERNS

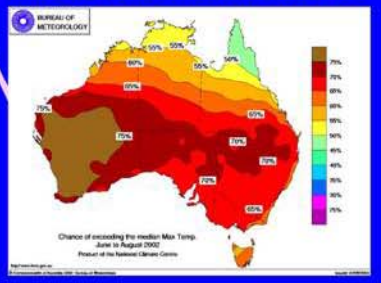


STATISTICAL PREDICTION SCHEME

RAINFALL PROBABILITIES



TEMPERATURE PROBABILITIES



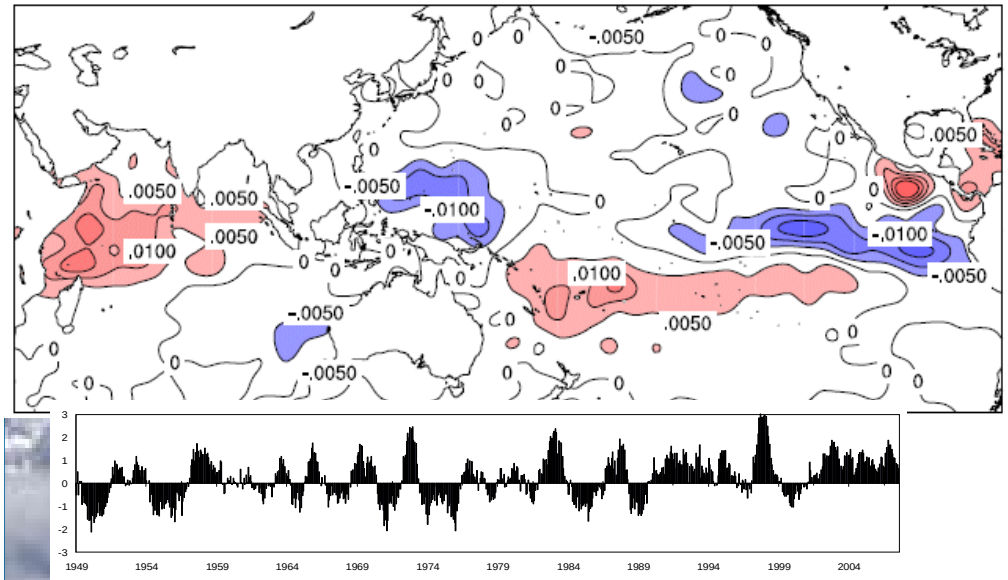
PROBABILITY TABLES

Township Rainfall Outlook Probabilities

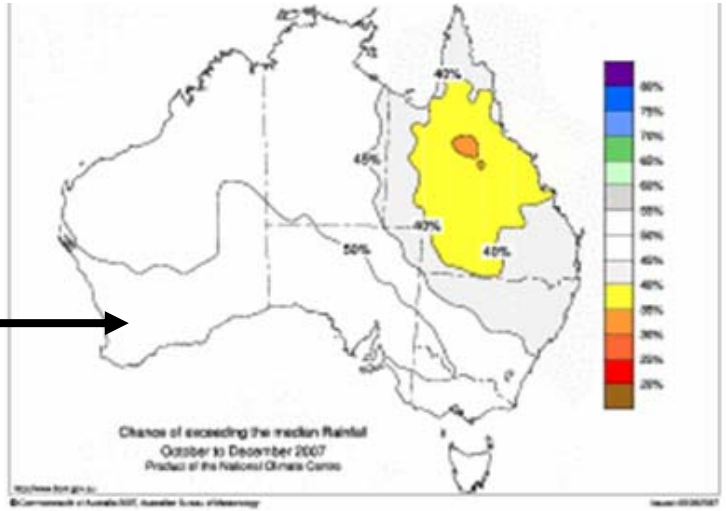
Town	33rd percentile (mm)	Probability of "dry" conditions %	67th percentile (mm)	Probability of "wet" conditions %
Western Australia				
Albany	317	45	343	23
Balfour Downs	9	34	33	33
Balladonia	52	41	78	26
Broome	3	37	39	30
Bunbury	424	46	498	22
Carnarvon	85	35	117	32
Carnegie	6	34	41	33
Corrigin	146	49	188	20
Cue	49	35	79	31

Update of statistical forecast

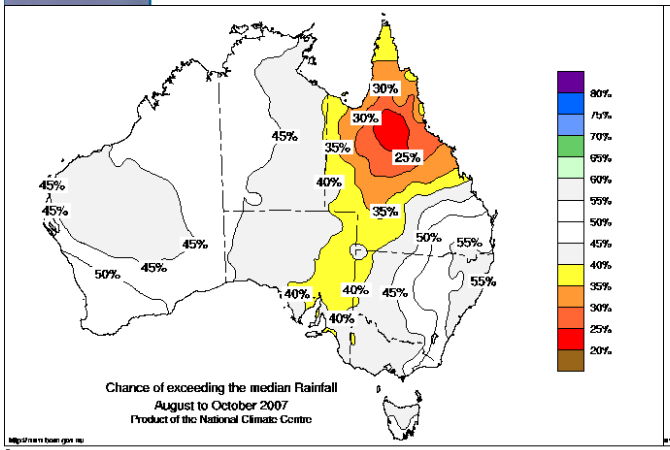
August EOF 1 weights –still positive



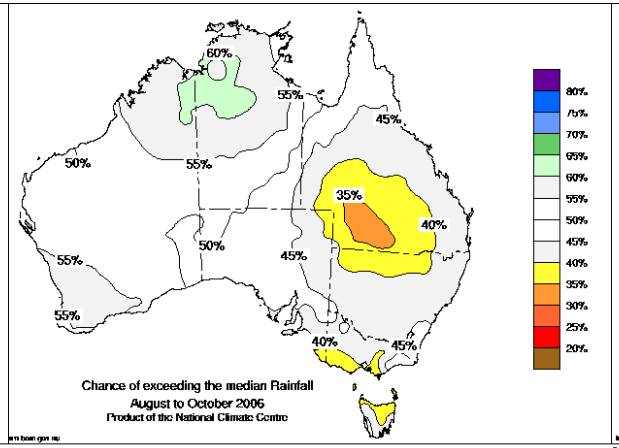
EOF1 contribution to OND above median rain forecast



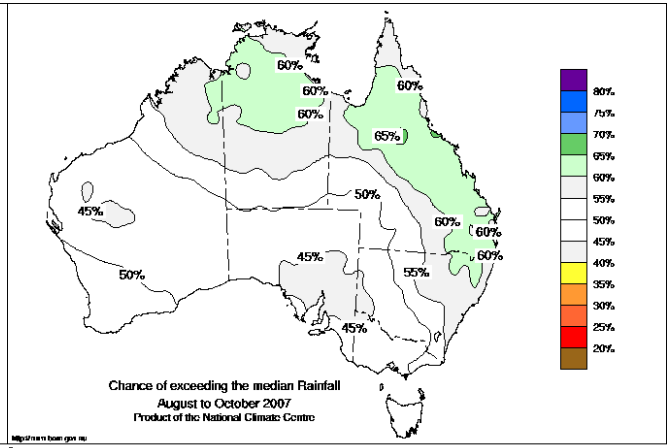
Operational ASO 2007



SVD ASO 2006

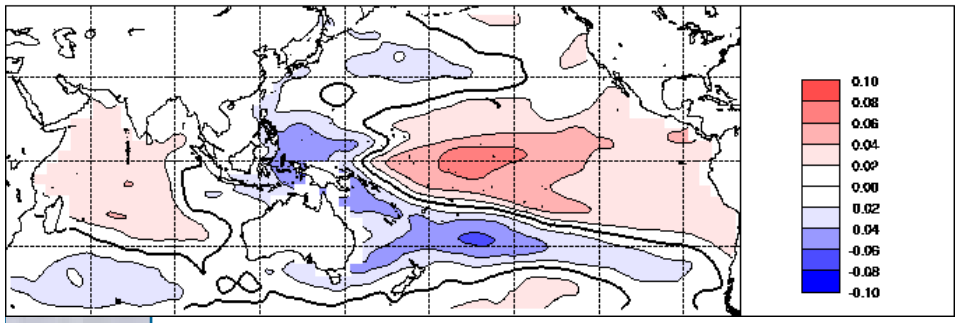


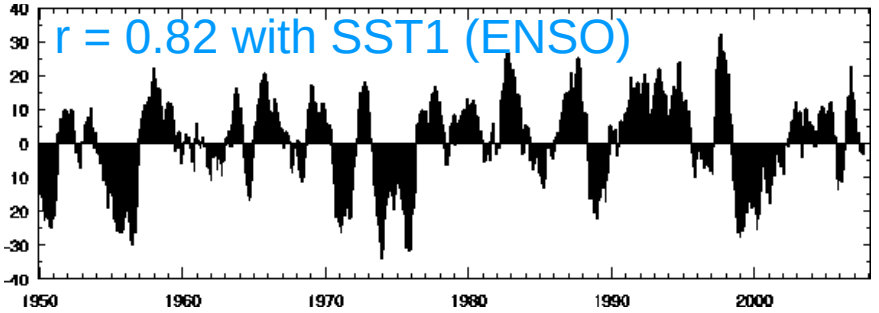
SVD ASO 2007



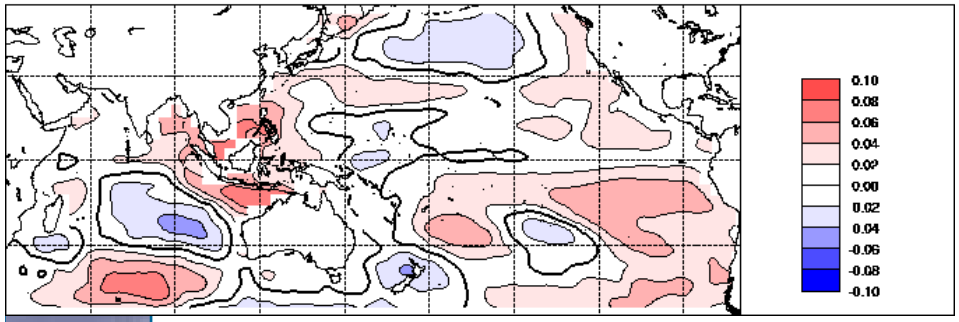
New SCO Predictors – SVD SST - rainfall

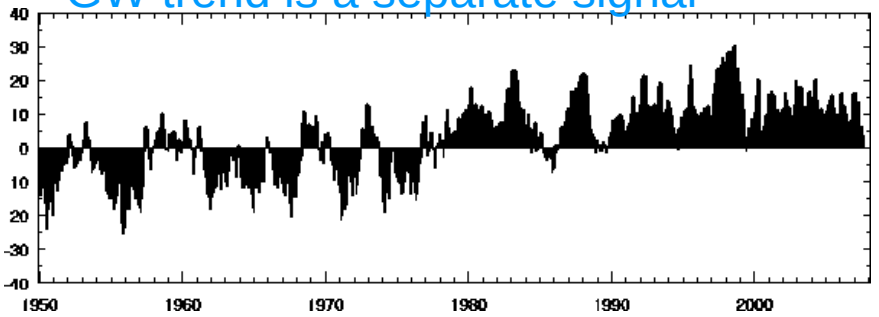
SV 1 for SST: 76.5%



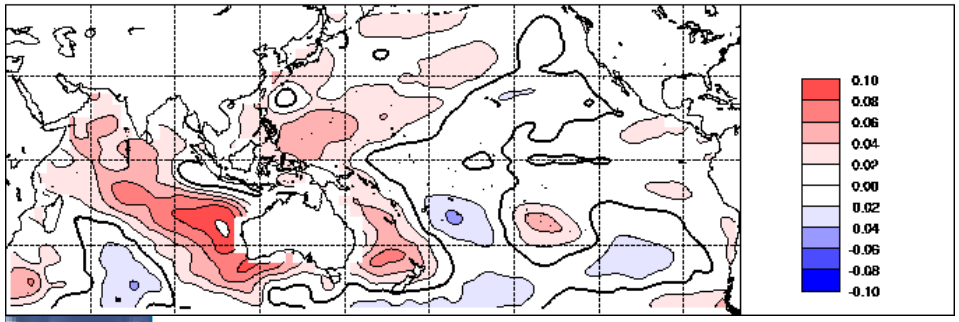


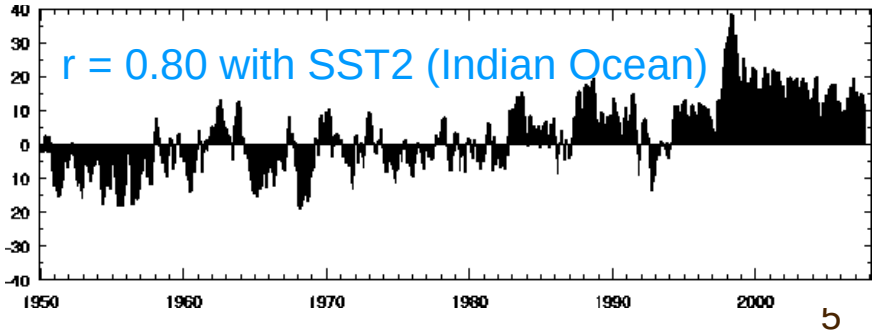
SV 2 for SST: 7.6%





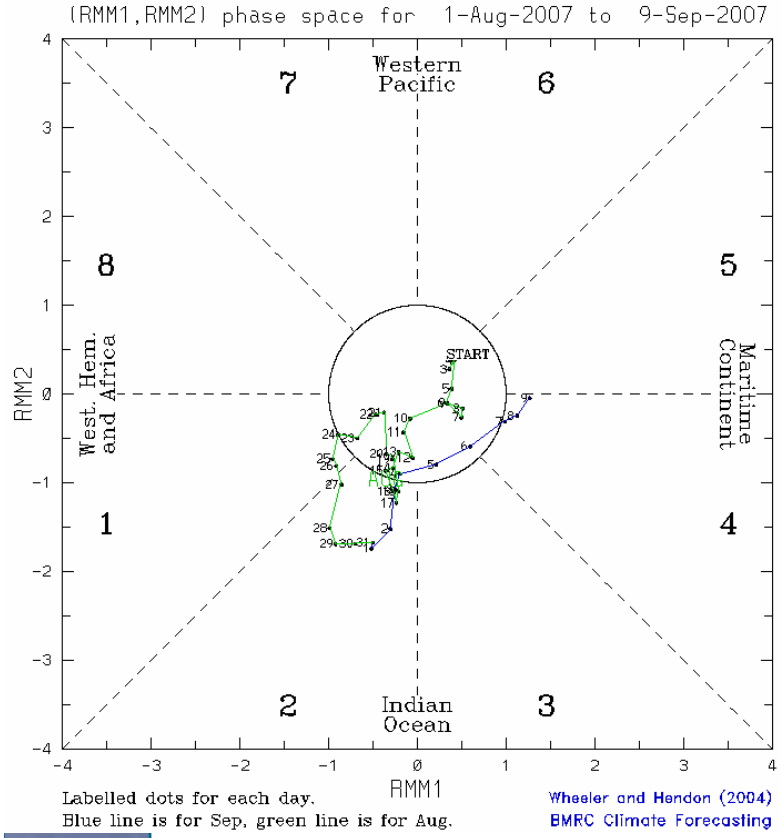
SV 3 for SST: 3.9%

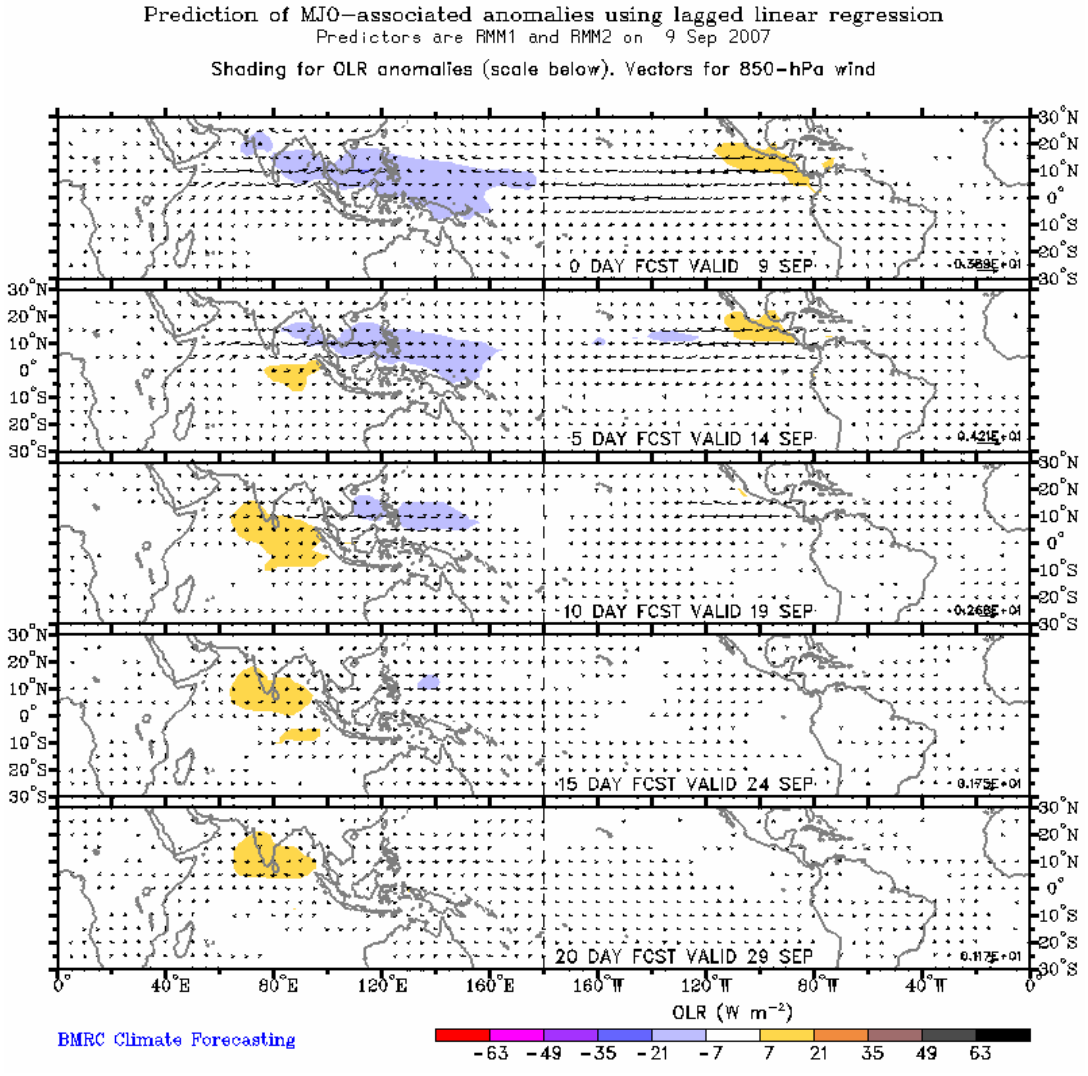




Intraseasonal (MJO) prediction

http://www.bom.gov.au/bmrc/clfor/cfstaff/matw/maproom/RMM/index.htm

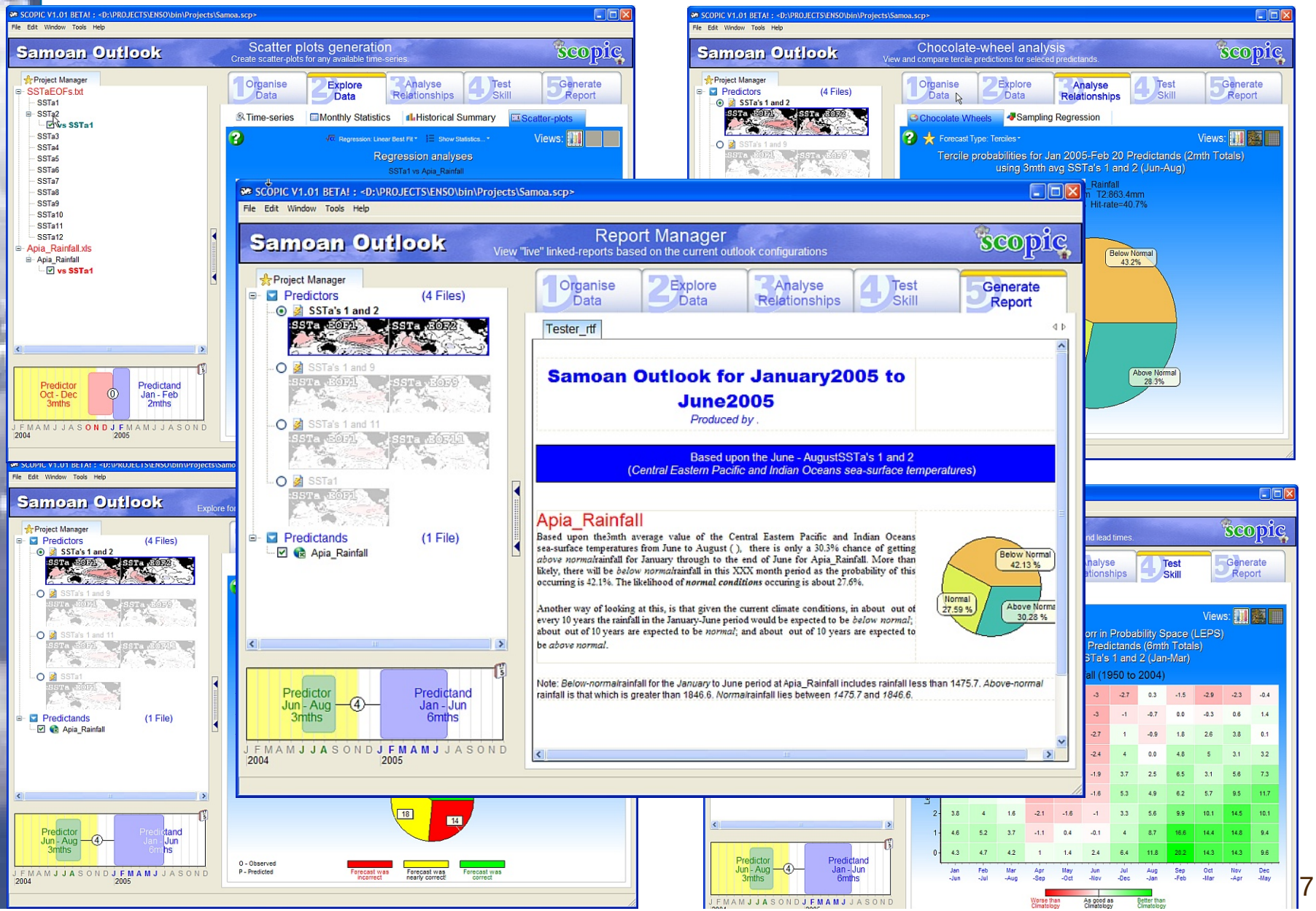




Pacific Islands Climate Prediction Project

http://www.bom.gov.au/climate/pi-cpp/index.shtml

Explore Data, analyse relationships, test skill, generate reports



Coupled Model Prediction
Predictive Ocean Atmosphere Model for Australia

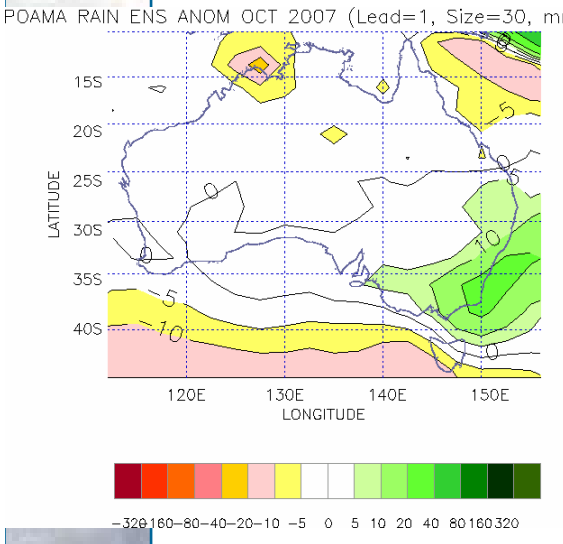
poama.bom.gov.au

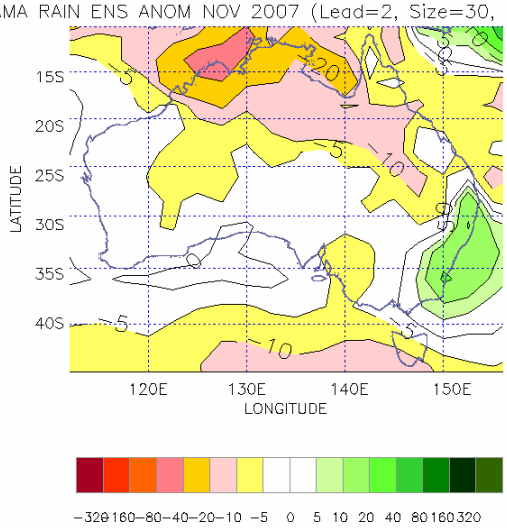
http://opendap.bom.gov.au:8080/thredds/bmrc-poama-catalog.html

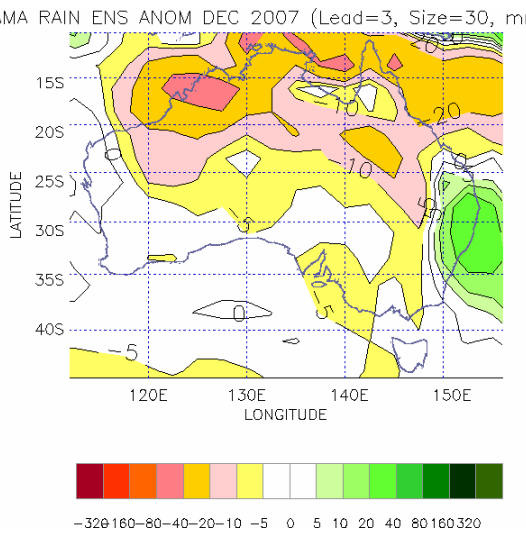
- Australian Bureau of Met. is one of nine WMO Global Producing Centres for Long Range Forecasts.
- Daily 9-months forecasts produced. Currently switching to POAMA version1.5 and expanding operational role.
- Operational products issued by the BoM National Climate Centre: Nino SST forecast. (POAMA SST, temp and precipitation forecasts issued for 1.5).
- Forms part of APCC model suite.

Rainfall & Temperatures

http://poama.bom.gov.au/experimental/index.htm



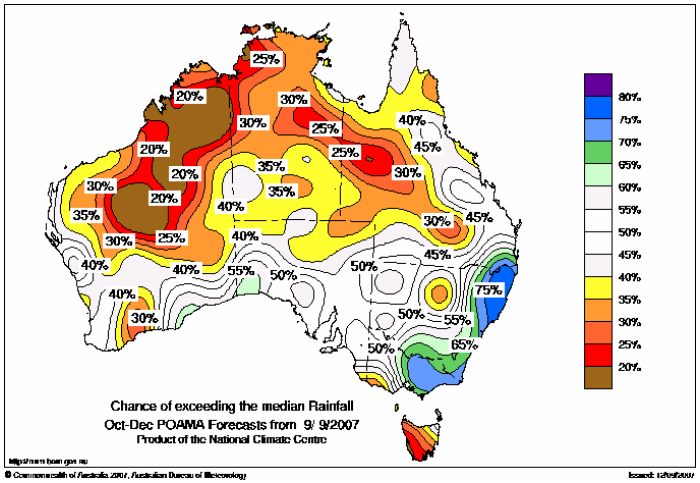




October

November

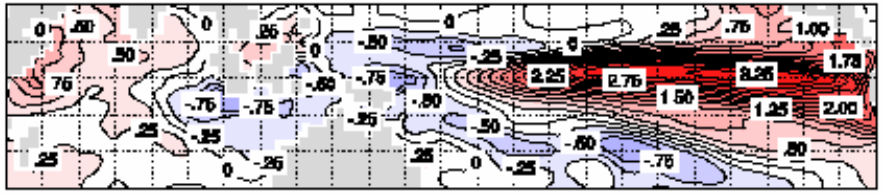
December

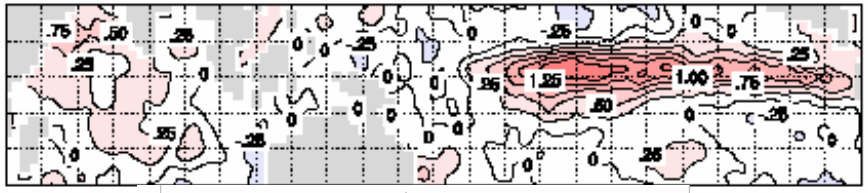


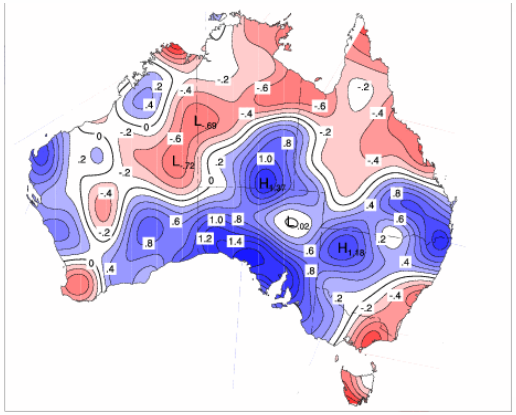
Direct model output seasonal probability of above median rainfall

POAMA prediction of SST and Australian Rainfall

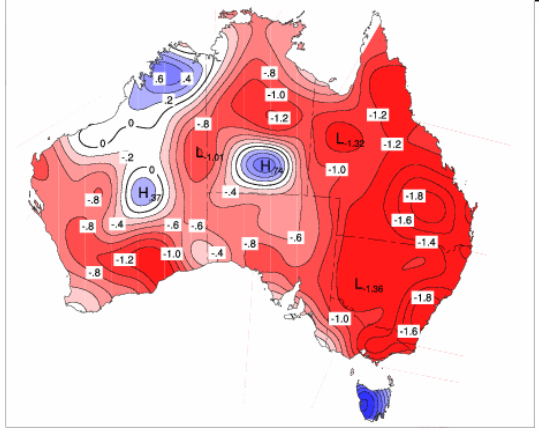
1997(SON) vs 2002(SON)

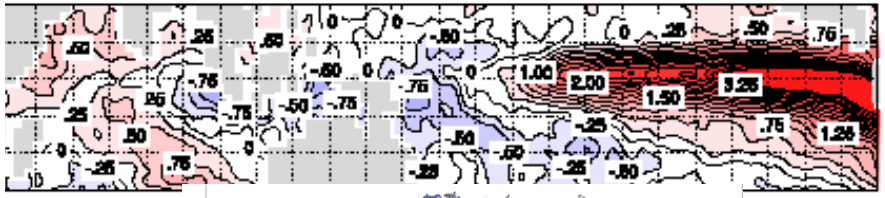


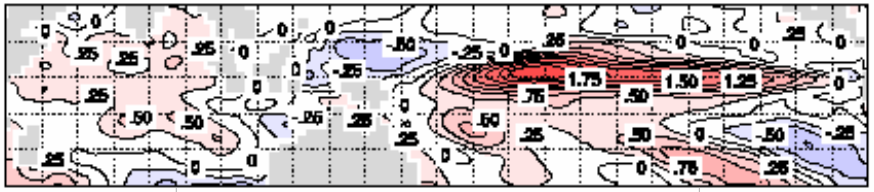


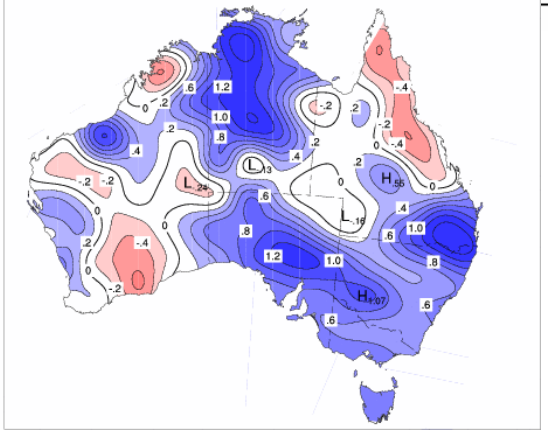


OBS

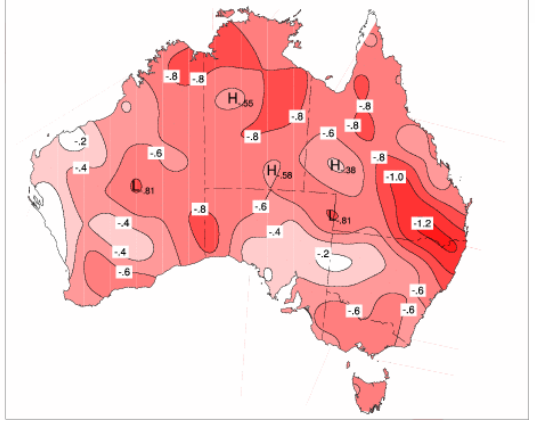








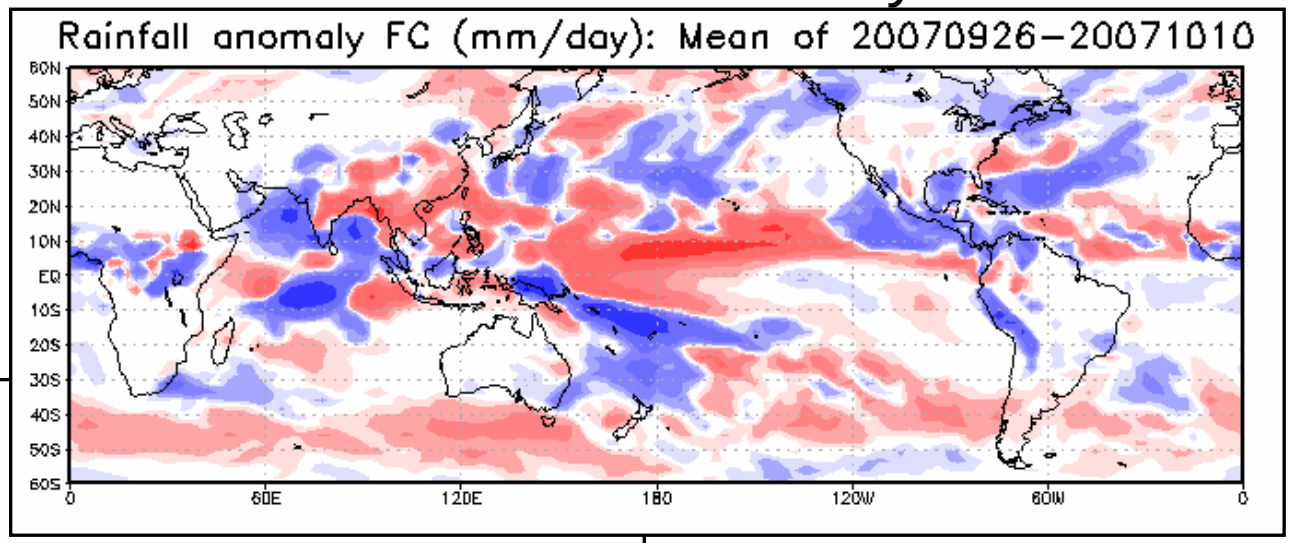
POAMA at Lead 0



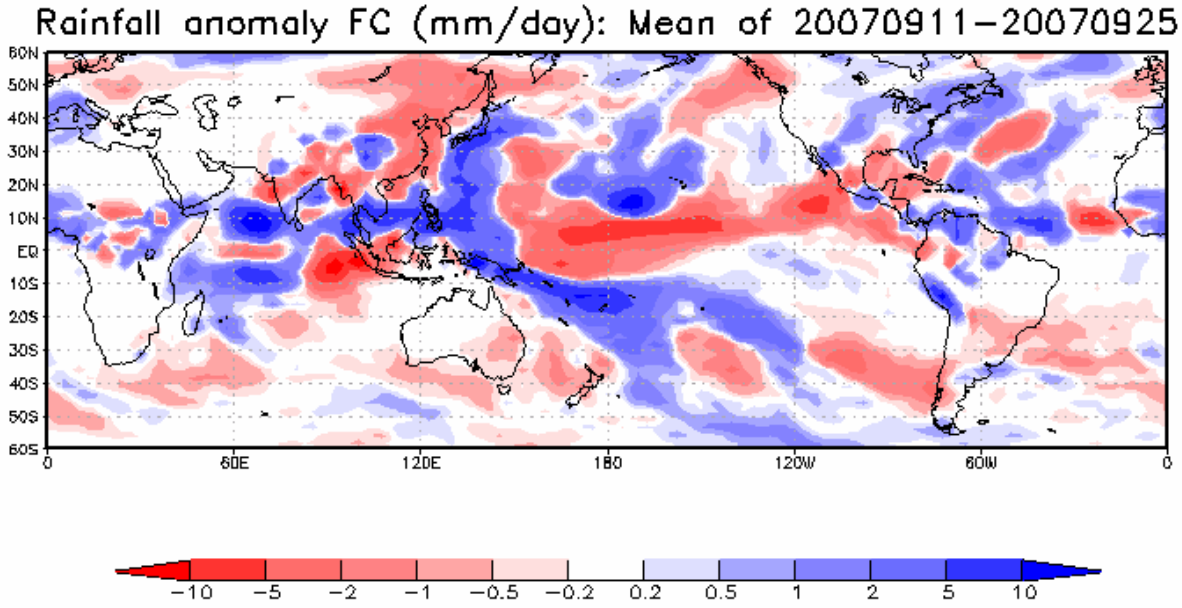
Intraseasonal Forecasts

http://poama.bom.gov.au/experimental/poama15/ri_map.htm

Days 16-30



Days 1-15

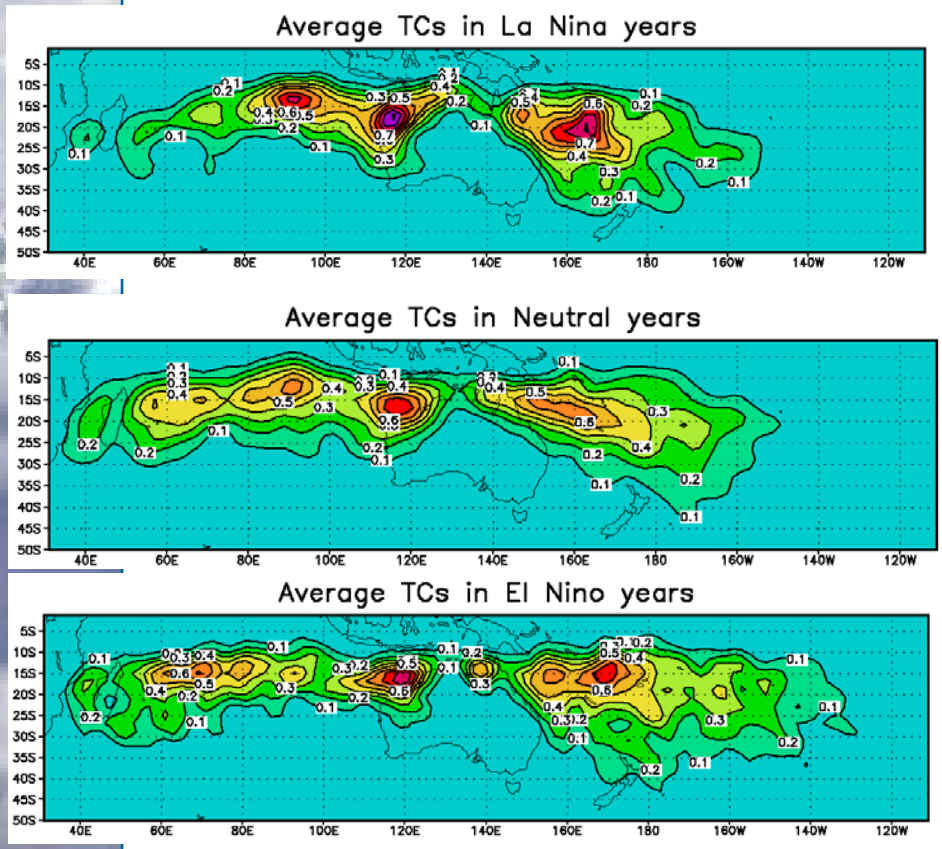


Intraseasonal forecast of MJO, rainfall & convection

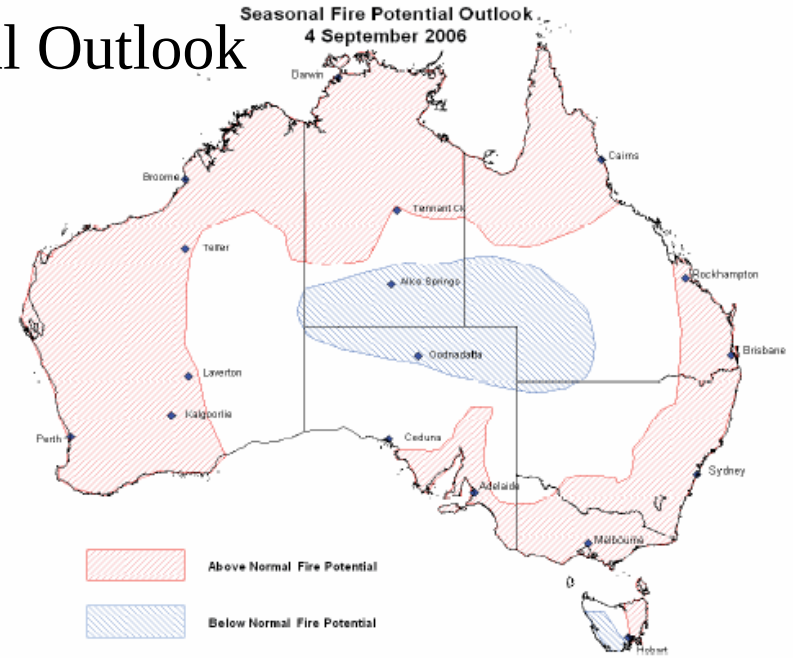
Prediction of Extremes

current, near future and research

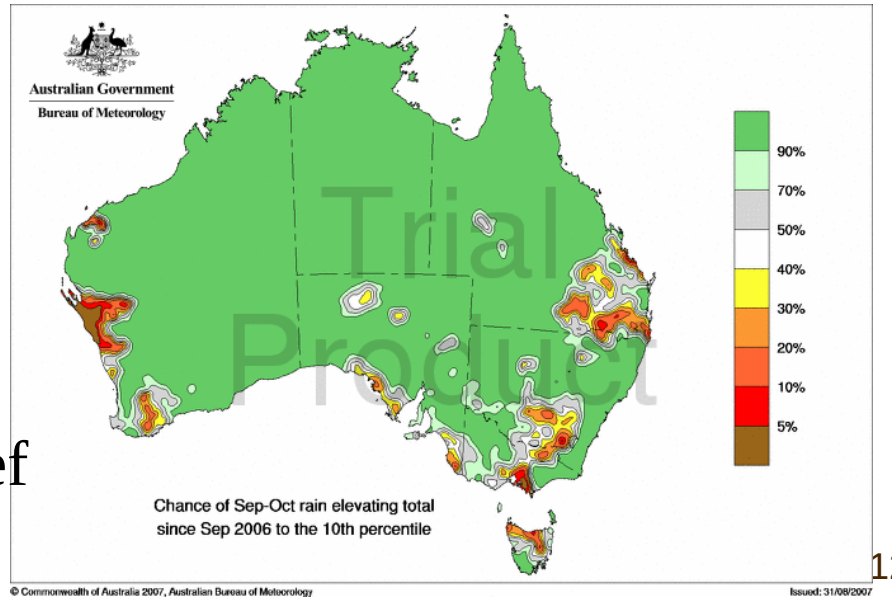
Tropical cyclones in La Nina (top), neutral and El Nino (bottom) years



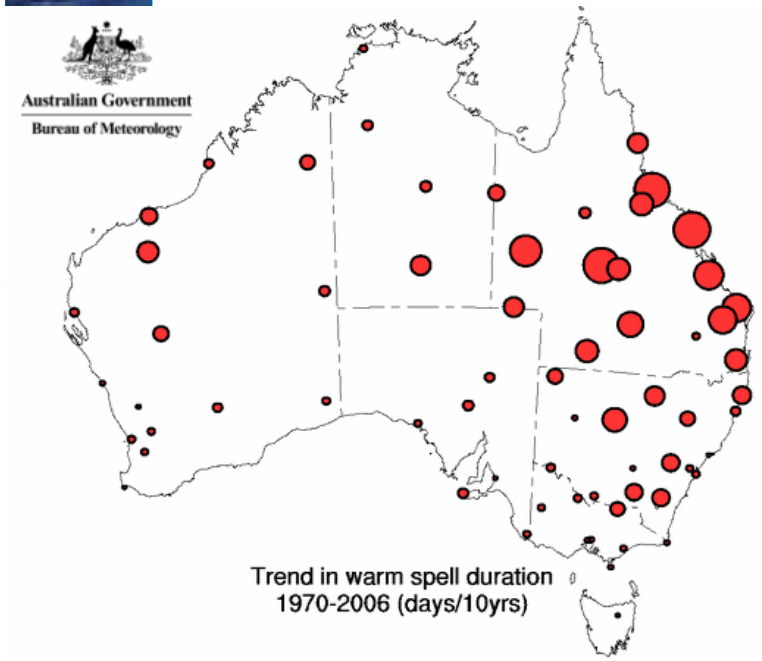
Fire Potential Outlook

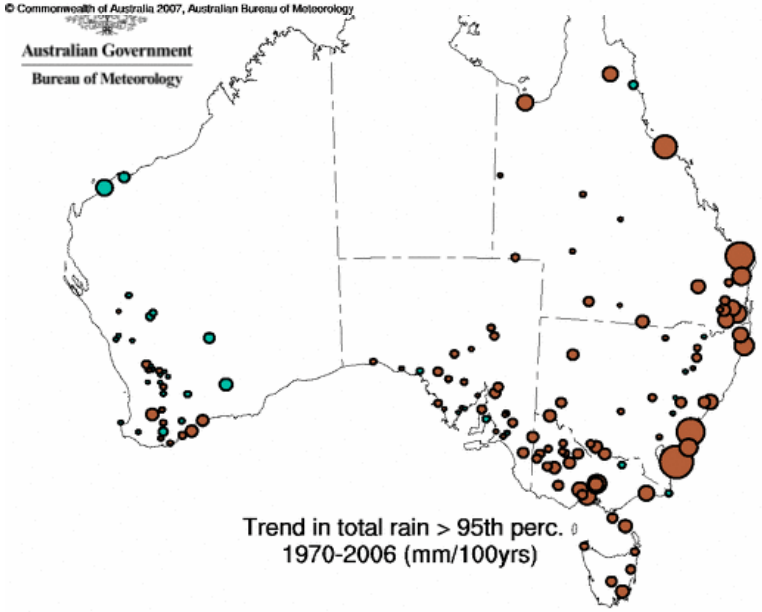


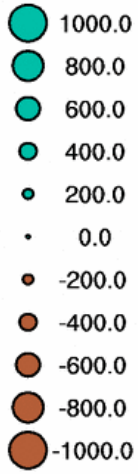
Drought Relief



Prediction of Extremes – Possibilities?







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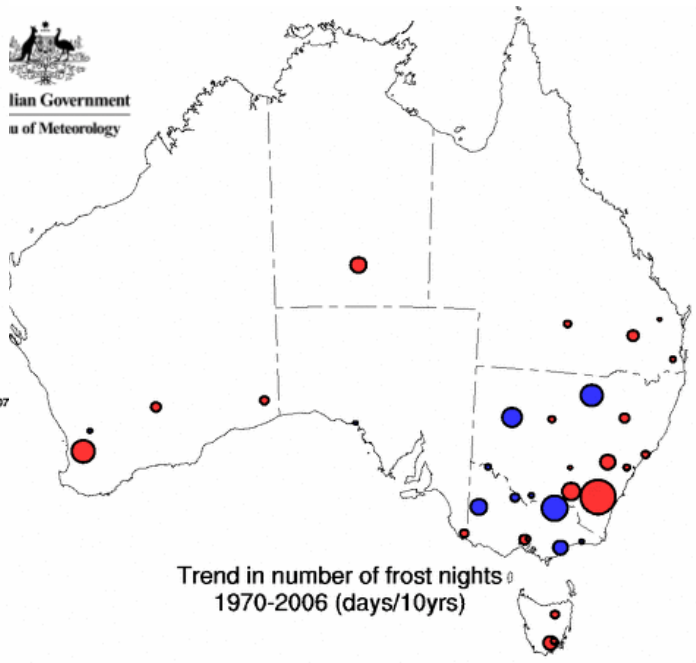

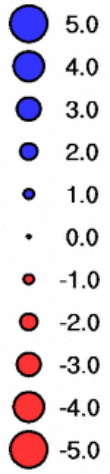

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Summary

- Current seasonal forecasts of rainfall and temperature use statistical relationships with SST anomalies in the Pacific and Indian Oceans.
- Skill of current forecasts affected by warming trend in oceans updating with SVD statistical scheme.
- over the next year explore skill and implement POAMA1.5 forecasts for rainfall and temperature over Australia.
- Possibility to expand prediction of extremes in the coming years.

Thank You