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Best practices for climate-related disaster management : The Australian experience

APEC Climate Symposium November 3rd 2015

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Overview

- Climate risks and impacts in Australia
- Case study of Spring 2015
- Our domestic products
- International collaboration (COSSPac)
- Development of Climate Information Services
- Moving from Disaster Management : Hazards Risk and Resilience in the Bureau

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Climate impacts in Australia

Australia is the driest inhabited continent on Earth

- Increased susceptibility to drought
- Very high bushfire risk (especially in the south)
- Northern tropics are susceptible to cyclones and flooding
- Climate variability highly dependent on ENSO

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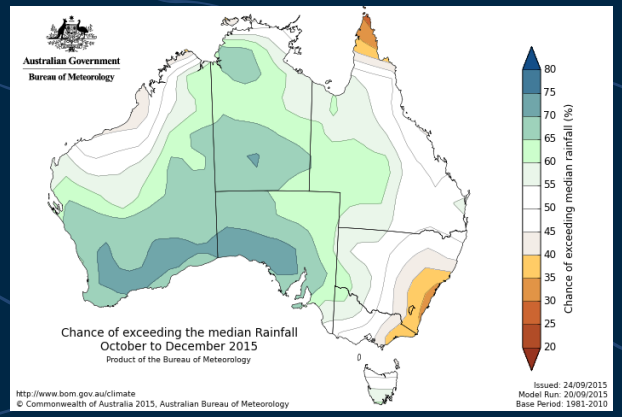
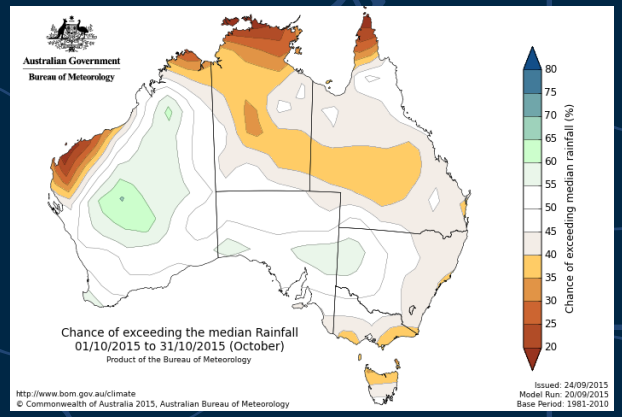
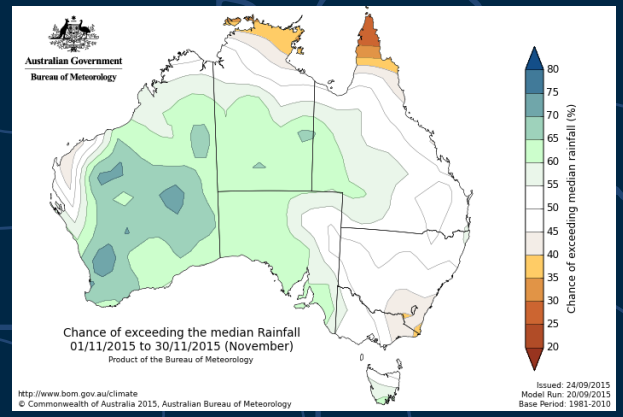
Spring 2015 seasonal forecast







- Monthly seasonal forecast issued on 24th September 2015 (from model run 20th September)
- Interactive plots available on the public website (temperature data also available)
- Post processed from POAMA (global 250 km resolution coupled ocean–atmosphere model with 33 ensemble members)
- Model predicted warm Indian Ocean to mitigate El Nino impacts over Eastern Australia

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Spring 2015 seasonal forecast (video)

- Videos now accompany text and interactive graphics since August 2014
- Feedback from our users (e.g. farmers via state agricultural departments) is very positive
- Reliant on high-bandwidth internet infrastructure

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El Niño impacts

Hazard	Likelihood
Bushfire	More likely
Heatwave	More likely
Tropical cyclone landfall (Qld east coast)	Less likely
Tropical cyclone landfall (NT & WA)	Similar
Widespread flooding (eastern Australia)	Less likely
Storms (WA)	More likely
Drought	More Likely

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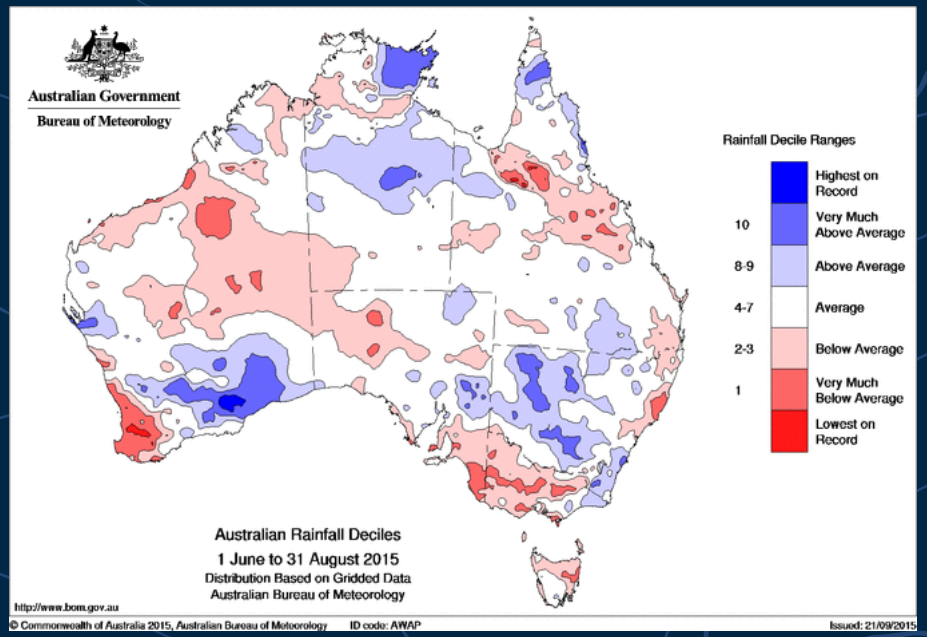
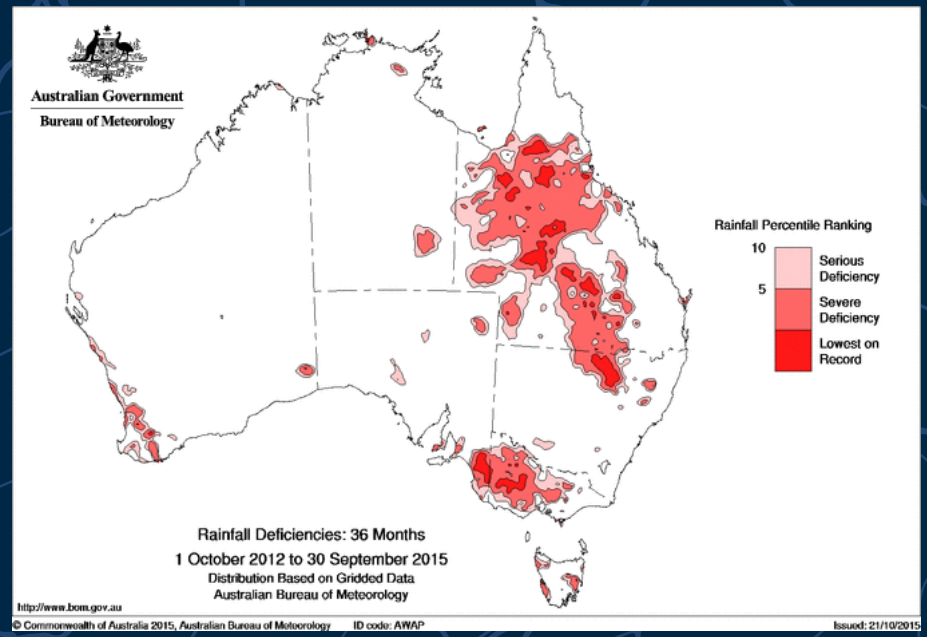
Preceding conditions





- Cool and dry Winter over much of Southern Australia
- Dry conditions continued into September.
- Exacerbating long-term drying trends
- El Nino impacts on Australian rainfall are greatest in Spring

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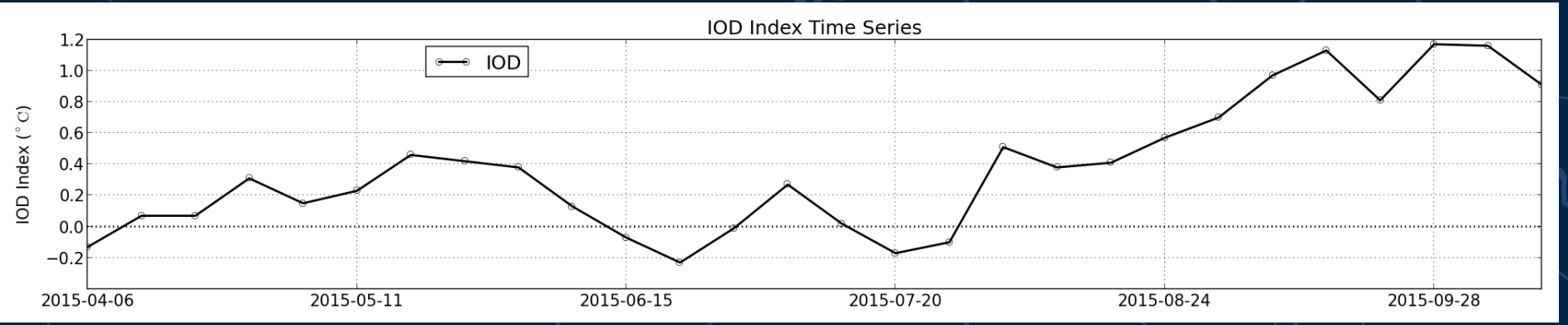
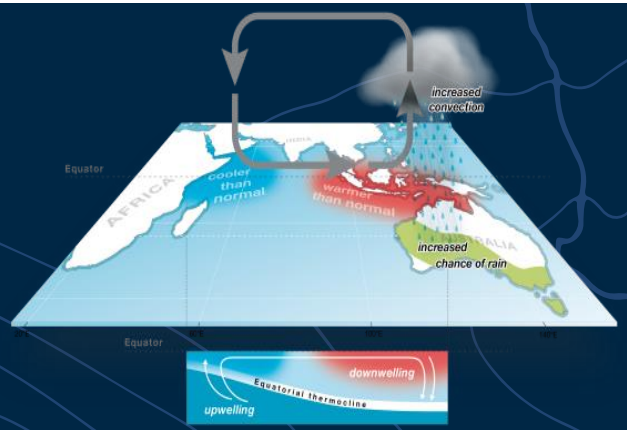
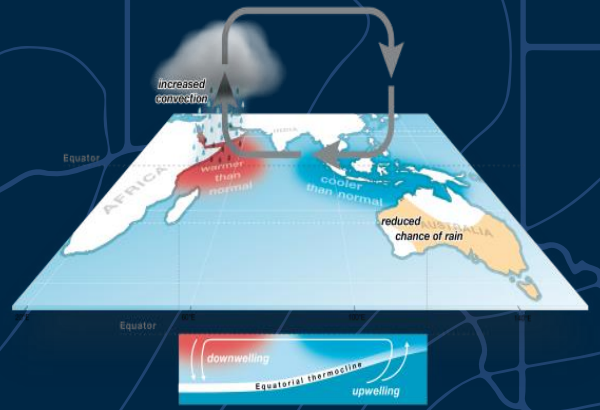
Preceding conditions





Negative phase



Positive phase

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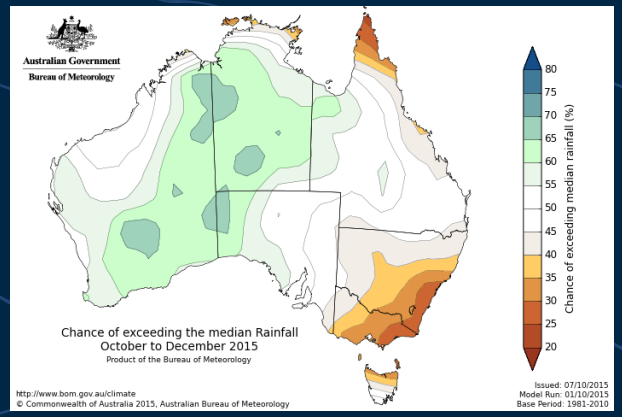
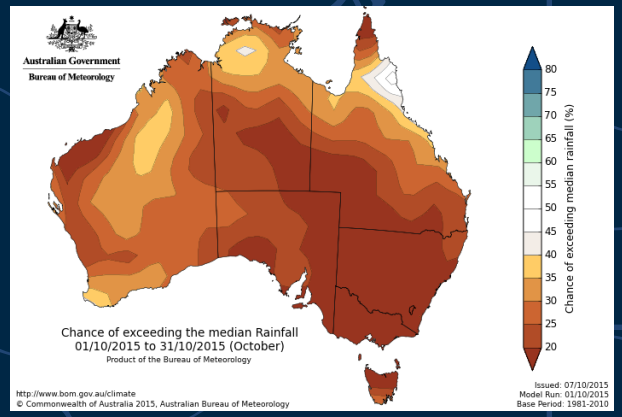
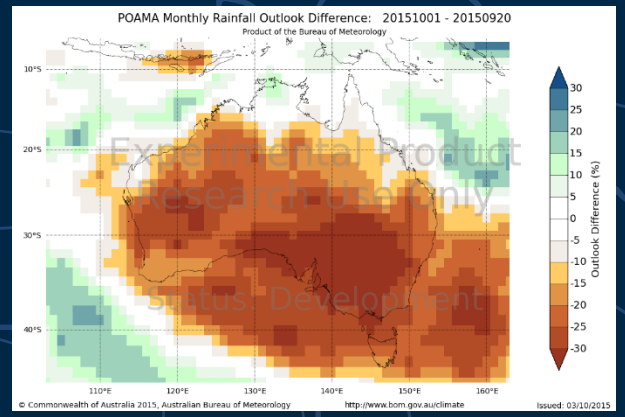
Updated Spring 2015 seasonal forecast







- Model run in 1st week of October incorporated rapid change in IOD
- The strong change in the rainfall signal (indicative of an +IOD and El Nino) required a special update
- Additional ministerial briefings were issued
- Seasonal outlook information included in Critical–Event briefing sent to emergency managers
- Increased bushfire risk

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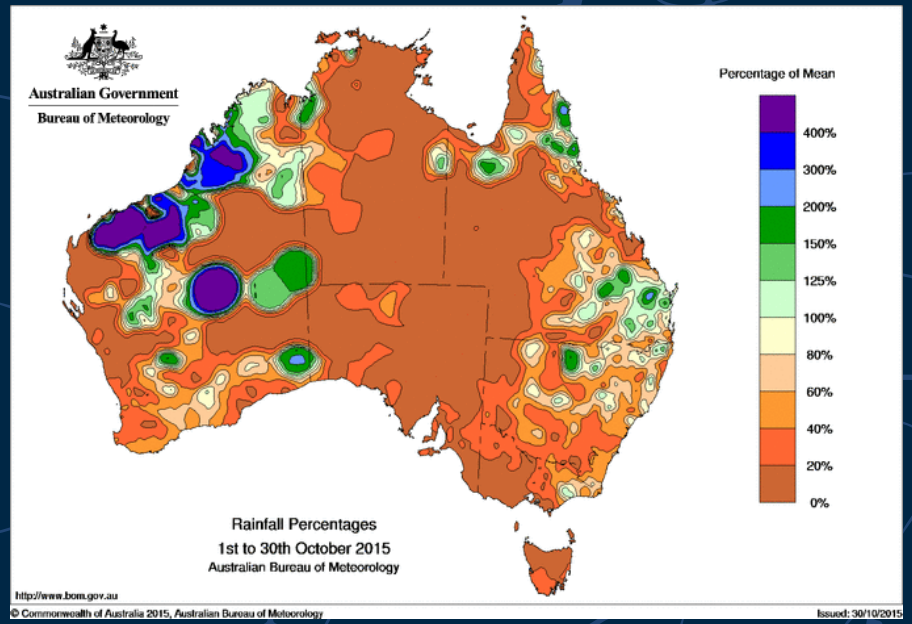
October 2015 rainfall



- Continued dry weather in major agricultural areas, exacerbating current drought areas
- Loss of crops (e.g. wheat) and culling of livestock
- Increased bushfire risk for the upcoming summer

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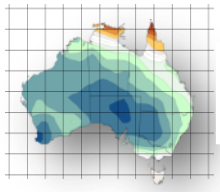
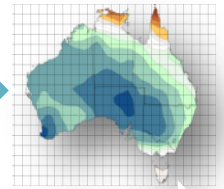
BETTER SEASONAL OUTLOOKS

Finer model detail

Moving from 250 km to 60 km resolution



Australia:120 to 2000 grid points

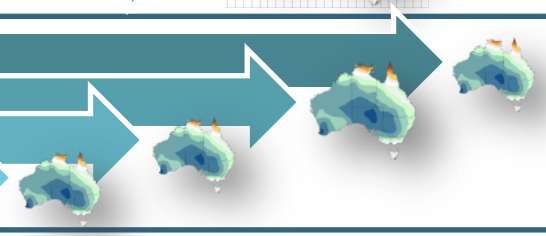


meaning
more localised information
by accounting for local conditions

More outlook periods

Seamless: filling the gap between 7-day and monthly outlooks

Season
Month
Fortnight
Week



Outlooks updated weekly

Higher outlook skill

Likely 10% improvement in outlook accuracy

meaning
the best outlooks for Australia
of all international models

World class service

+

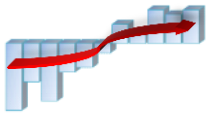
meaning
information is clear, concise and available when and where you need it

More intelligence possible:

- Evaporation
- Humidity
- Wind
- Drought
- Extremes
- Tropical Cyclones

Not only rainfall and temperature

Bigger user returns



Reduce losses: agricultural production lost from 2010-11 La Niña:

More than $2 billion
ABARES

Potential value of improved seasonal forecasts:

More than $1 billion per year
Centre for International Economics 2014

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Realising benefit

Industry	Potential annual value of forecast
	A$m
Construction	192
Electricity	2.3
Coal mining	68
Oil and gas	93
Transport	5
Water supply	28
Agriculture	1 567

Note: All values are given in Australian dollars at 2012 prices

Source: CIE estimates

- Value to agriculture to ~$1.6 billion per year
- Value to other climate sensitive industry up to $192 million per year
- CIE (for MCV) estimates underestimated
- Benefits through applications and better decisions

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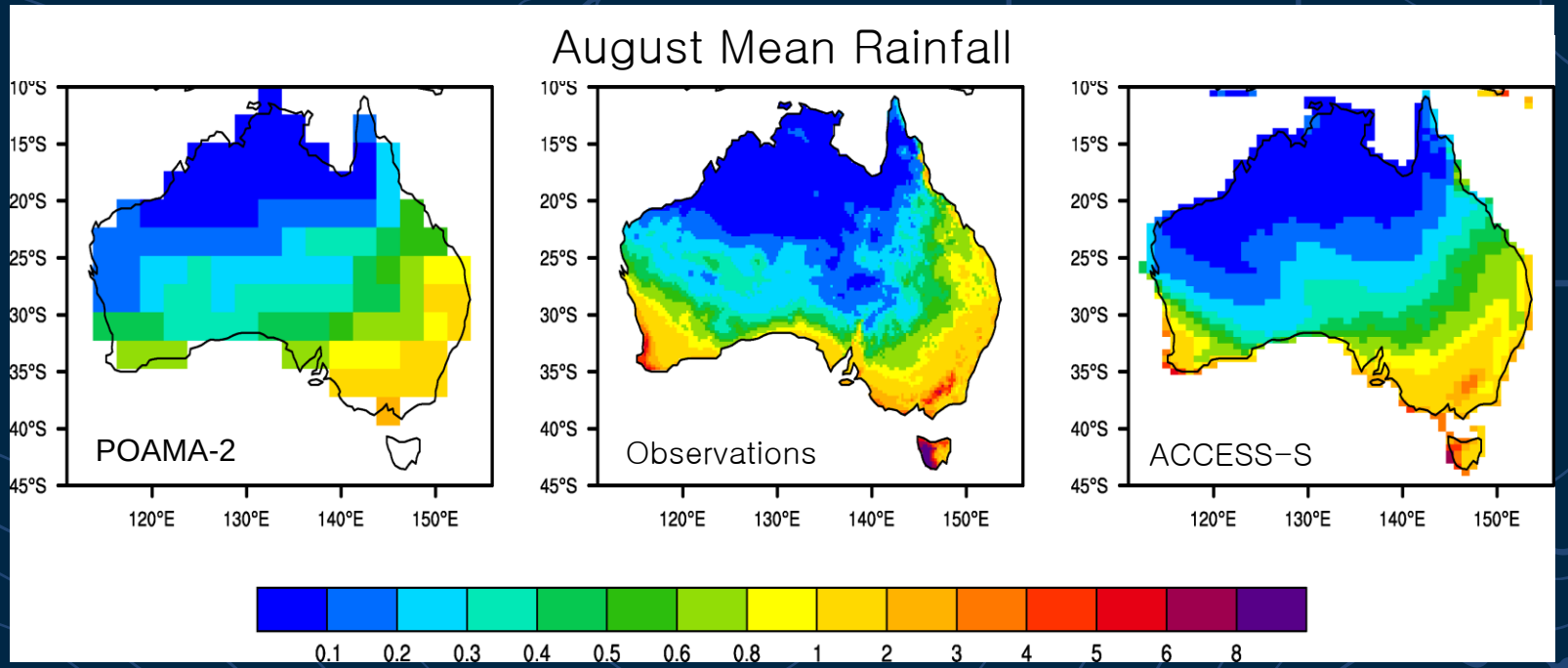
Model improvement in resolution

- Resolution increase from 250Km to 60km
- Able to resolve Great Dividing Range, Tasmania, east coastal zone



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Summary of domestic climate products

- Seasonal outlook forecasts available on public website (including video)
- Accompanied with current conditions of major climate mechanisms (ENSO, IOD)
- Briefs to Federal Minister for the environment and other Federal agencies (agriculture, water)
- Intensive media engagement
  - Radio and TV news
  - Commercial and social media
  - Regular slots in Rural TV shows (i.e. Landline)
  - ~500 media interviews per year
- Bureau regional offices engage with state governments and emergency managers
- Bureau's Hazard, Warnings and Forecast division is responsible for issuing of weather forecasts and warnings

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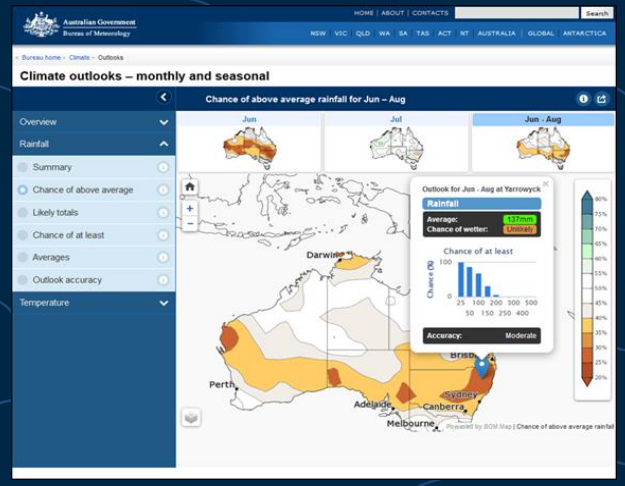
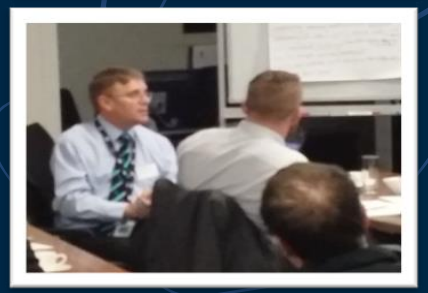
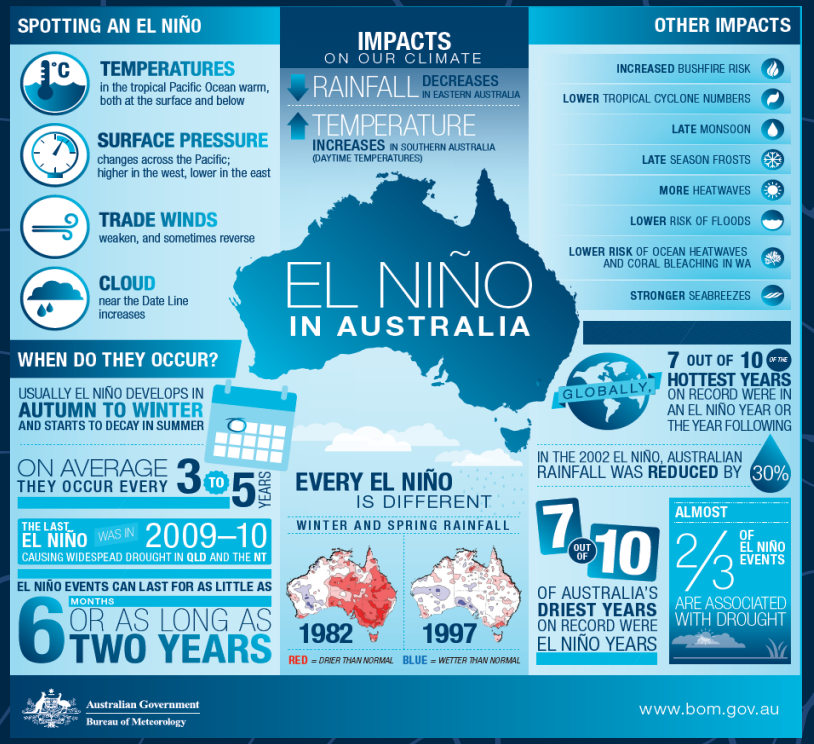
Products and services to advice







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International collaboration

Bureau contributes to several international climate services projects including

- Participation as a Global Producing Centre of Long Range Forecasts (mandated by the WMO)
- Climate and Oceans Support Program in the Pacific (COSSPac)
  - Seasonal Climate Outlooks in Pacific Island Countries (SCOPIC)
  - Online Climate Outlook Forum (OCOF)
  - Malaria Early Warning System (Solomon Islands)
  - Drought Monitoring and Response System (Kiribati)
  - Climate Bulletin
- WMO Tropical Cyclone Panel expert team on TC seasonal forecast (Yuriy Kuleshov)

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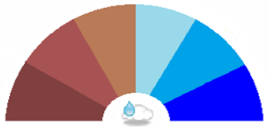
Example COSSPac products

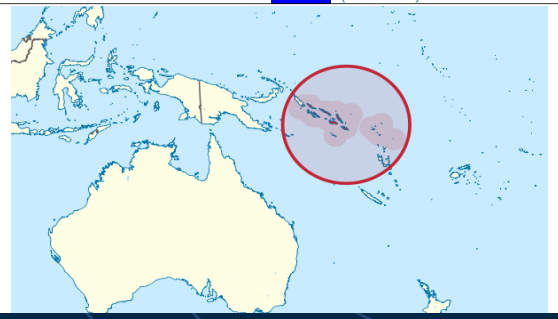
Climate and Ocean Support Program in the Pacific (COSPPac)

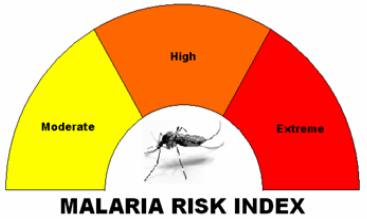
Seasonal Rainfall Watch: August-October 2013



Alert Level

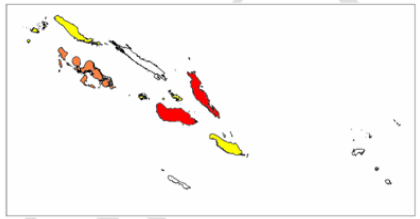
Alert Level	Divisions with Below Normal Rainfall favoured in the coming 3 months	Alert Level	Divisions with Above Normal Rainfall favoured in the coming 3 months
			Fiji (All Divisions), Samoa, Solomon Islands, Tonga (Central)
	Cook Islands (North), Kiribati		Vanuatu (Northern)
			PNG (Momase & Southern), Vanuatu (Southern)



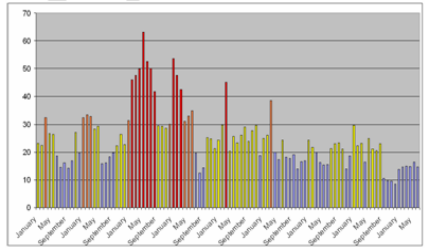


MALARIA RISK INDEX

SOLOMON ISLANDS MALARIA RISK BY PROVINCE



GUADALCANAL MALARIA RISK INDEX (1999-2007)



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Developing Climate Services

WMO definition of Climate Services

- “the dissemination of climate information to the public or a specific user. They involve strong partnerships among providers, such as NMHSs [National Meteorological and Hydrological Services], and stakeholders, including government agencies, private interests, and academia, for the purpose of interpreting and applying climate information for decision making, sustainable development, and improving climate information products, predictions, and outlooks"

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Climate services global focus

Priority areas

Agriculture and food security

Disaster risk reduction

Energy

Health

Water

GFCS GLOBAL FRAMEWORK FOR CLIMATE SERVICES

WMO OMM

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Climate services

Dissemination of information to public or specific users to reduce exposure to climate-related risk

- Working closely with stakeholders and partners
- Focusing on user needs
- Needs to be timely and tailored
- Provides benefits and/or better manages risks

Bureau of Meteorology climate services vision

"To be Australia's trusted and authoritative source of climate information and advice for governments, industries and communities to assist them manage climate risks and opportunities."

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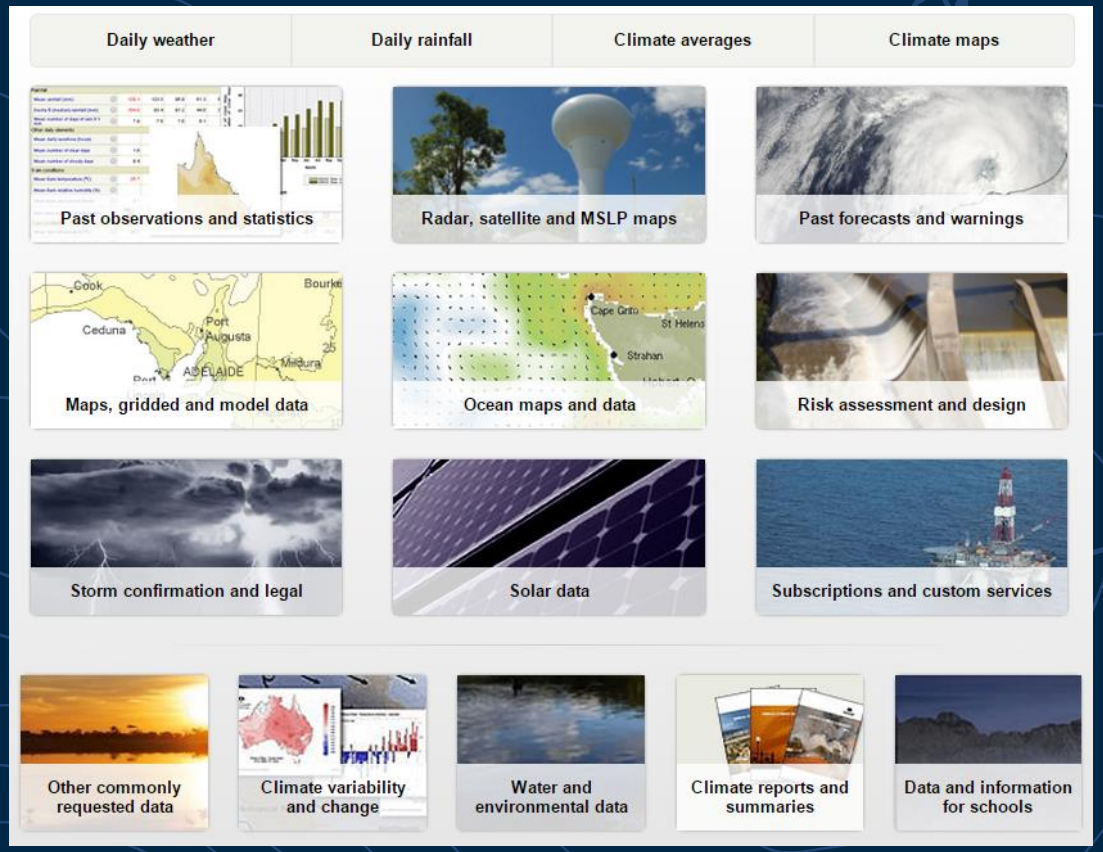
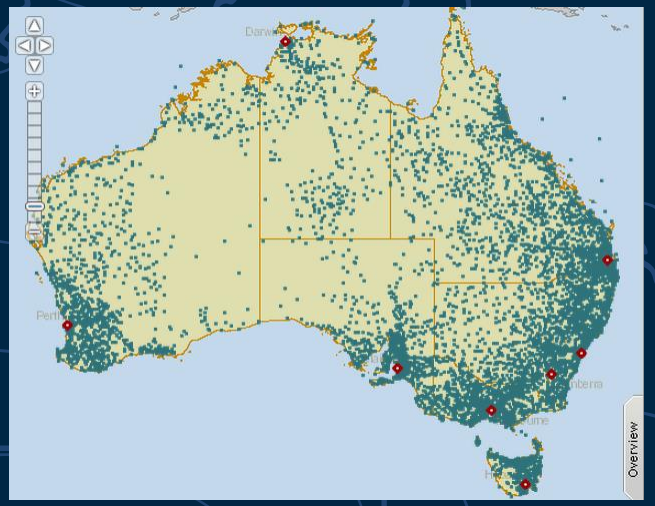
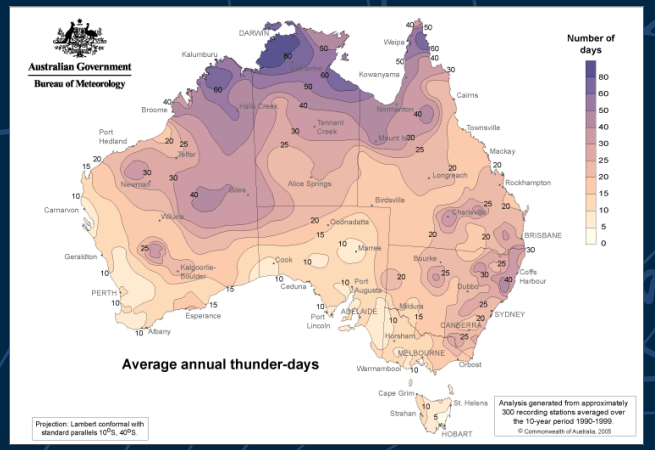
Access to data







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Key elements of best practice in Climate Information Services

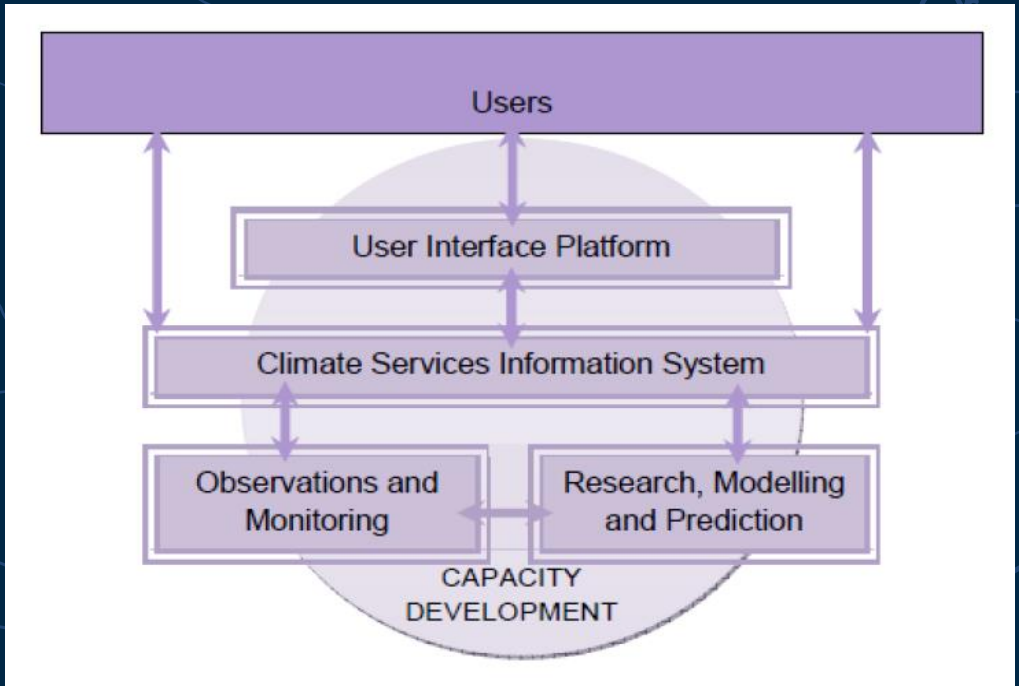

Fig 1.3 from Global Framework for Climate Services Implementation Plan

- Understand customer needs
- Produce and adapt products and services to serve needs
- User Interface Platform includes briefings, communication etc.
- Strong service ethic
- Deliver products that customers like using
- Understand existing and emerging policy needs of government
- Outreach and build capability through partnerships

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Looking to the future

Moving from Disaster Mitigation

- Disaster Risk Reduction (managing hazard related risk)
- Disaster Resilience (building capacity to withstand and recover from hazard impacts)
- Costs of disaster mitigation/repair becoming too expensive
- Moving from purely meteorological warnings into community impacts and consequences
- Creation of Disaster Mitigation/Hazard Impacts Program

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DMP/HI Program Goals

- Provide evolving social science based support for a forecast and warning service for the Australian community.
- Enhance community understanding of the risks and impacts of severe weather events.
- Support international disaster mitigation activities through building partnerships with international organisations and participating in related activities.
- Through active engagement in international and multi-national forums (including WMO) build new capacity in Bureau services

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Moving towards DM / HI Services

Within the Bureau

- Restructure the Hazards, Warning and Forecast Division
- New services; stronger partnerships

National

- Shared responsibility within a new framework : ANZEMC
- Greater responsibility in Fire and Emergency Services
- National Review of Warnings and Information

International

- WMO – Guidelines on Multi-Hazard Impact Based Forecast and Warning Services;
- UKMO, US Weather Services; ISDR and beyond (Sendai Framework)

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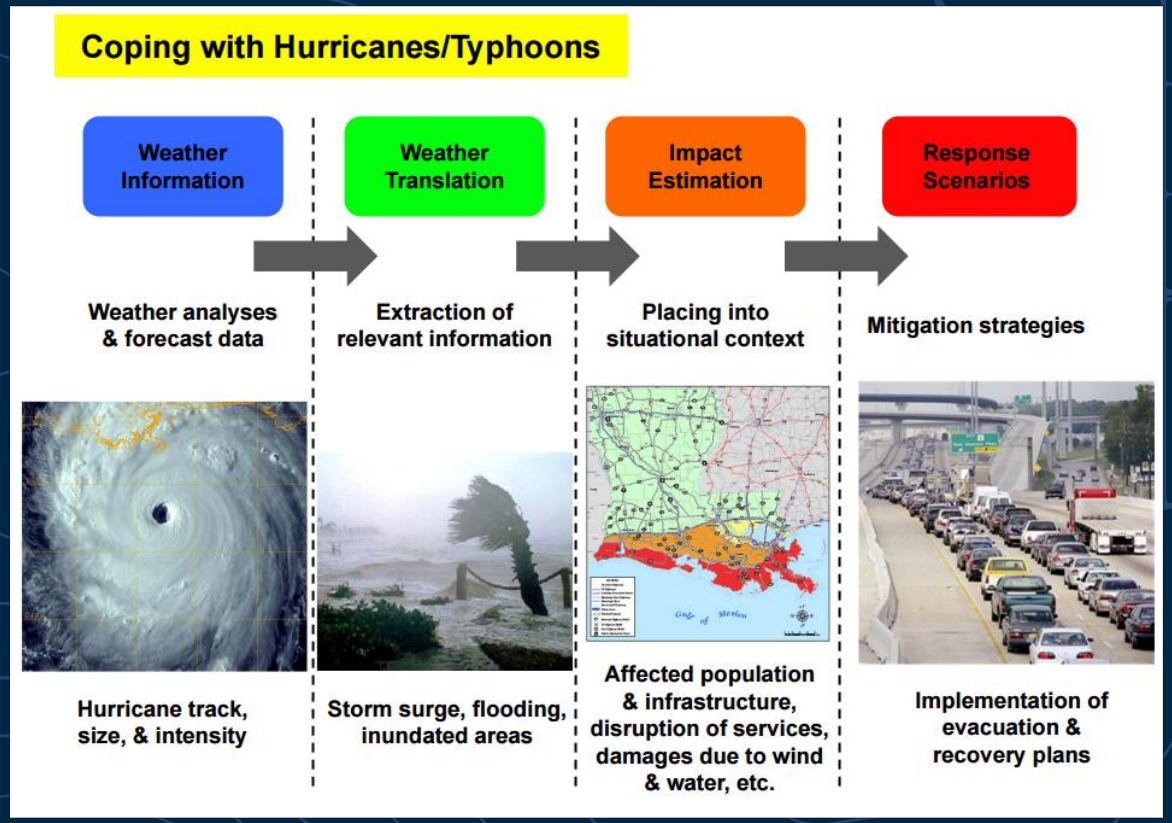
Bureau DM towards DM/HI Services



- UKMO (e.g. Climate Hazards and Impact group)
- US National Weather Service (e.g. Impact based warnings)
- ISDR and beyond – Resilient communities, community risk-based information

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Thank you

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