

Northern Australia Climate Program

Drought and Climate Adaptation Program Queensland Drought Mitigation Centre

Queensland Drought Mitigation Centre

DES

DES 1 – The inside edge for graziers to master Qld's drought prone climate

DES 2 – Do we really know our baseline climate? Using palaeoclimate to plan and prepare for extreme events and floods in Qld

DES 3 – Enabling drought resilience and adaptation: A program of social research and knowledge support

USQ

USQ 4 – Northern Australia Climate Program (USQ, DAF, BoM, UKMO, NT DPIR, DPIRD WA, Rangel NRM WA)

USQ 5 – Producing enhanced crop insurance systems and associated financial decision support tools (USQ, Willis Re, QFF)

DAF

DAF 6 – Delivering integrated production and economic knowledge and skills to improve drought management outcomes for grazing systems

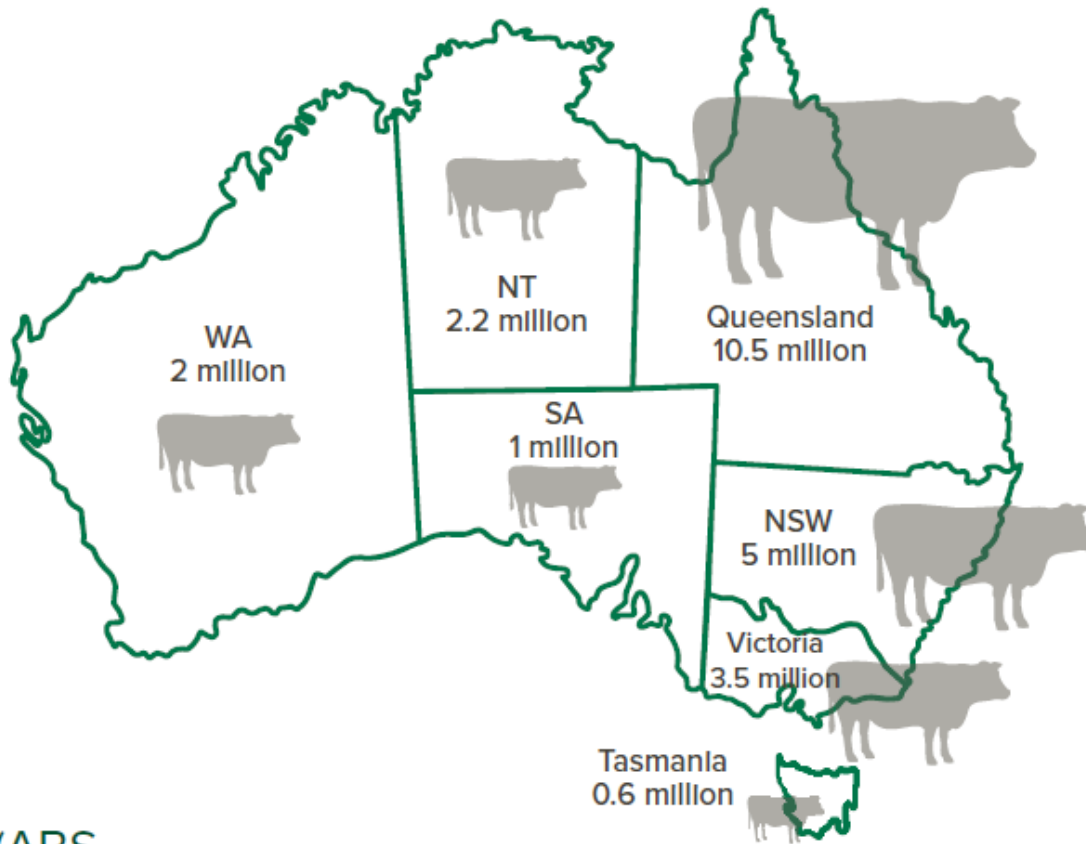
DAF 7 – Use of BoM multi-week seasonal forecasts to facilitate improved management decisions in Qld's vegetable industry

DAF 8 - Grazing Futures: Promoting a resilient grazing industry

DAF 9 – Forewarned is Forearmed: Equipping farmers and agricultural value chains to proactively manage the impacts of extreme climate events

Australia's beef industry

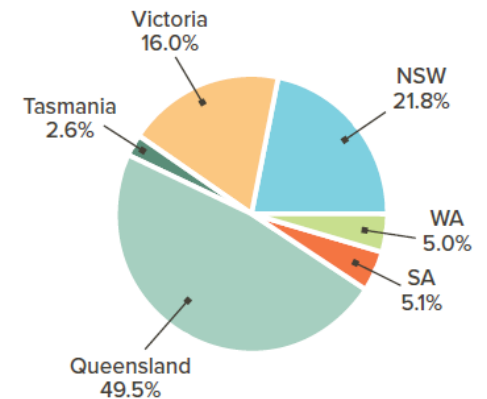
Australia: 25M
head cattle
\$17B
North: 13.8M
head or 55% of
national herd



/ (ABS

Source: ABS (final estimates 2016)

Australian beef and veal production
2.07 million tonnes cwt (2016-17)



Source: ABS

Today

- NACP
 - Climate research
 - ACCESS S, Accuracy, Products
 - Development
 - Forecast visualisation tool
 - Climate extension service
 - Climate Mates

Producer needs – Climate RD&E

- Reliable forecast of wet season rain with lead time
- Start and finish of wet season
- Extreme heat in spring early summer
- Unseasonal rain in winter/spring

Wet season forecast

- Forecast of bottom and top tercile

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NACP

Research

- Improved skill of forecasts
- Multi week, sub-seasonal & multi year forecasts
- MJO forecasts
- Start/end wet season
- Monsoon

Development

- Drought indices
- Drought monitor
- Climate Outlook
- Website
- Case studies
- New tools from research

Extension

- Building capacity of producers to benefit from climate forecasts
- 8 Climate Mates

Partnership with other International Drought Centres (NDMC, NIDIS, IDMP), world leading climate research centres (UKMO, BoM) and state agencies (DAFQ, NTDPIR, DPIRD, Rangl NRM WA)

ACCESS-S1 ACCURACY (and comparison with POAMA)

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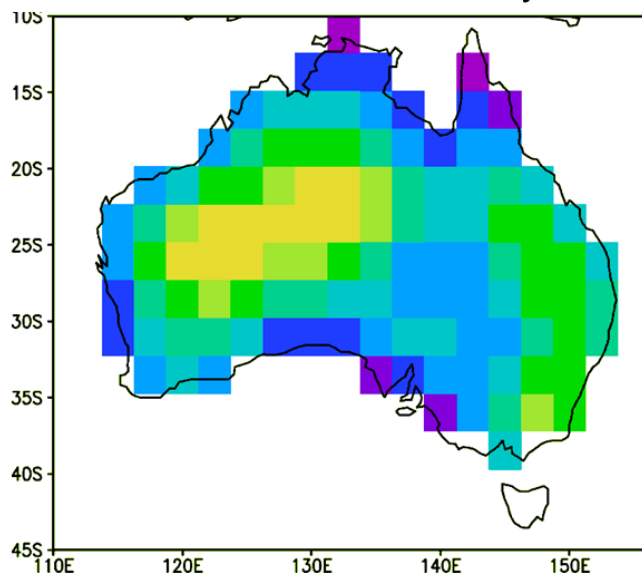
Enhanced resolution for the atmosphere and land with ACCESS-S

Topography

Grid resolution increase from 250 km to 60 km
Able to resolve Dividing Range, Tasmania, coastal zone

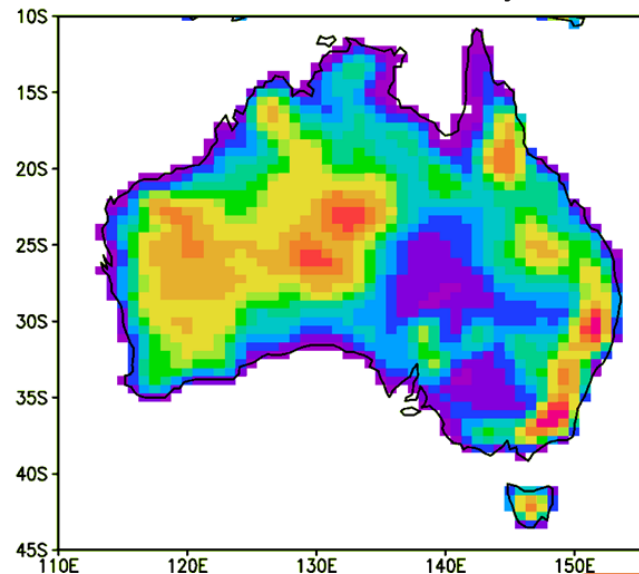
POAMA-2

Current 250 km resolution system



ACCESS-S

New 60 km resolution system

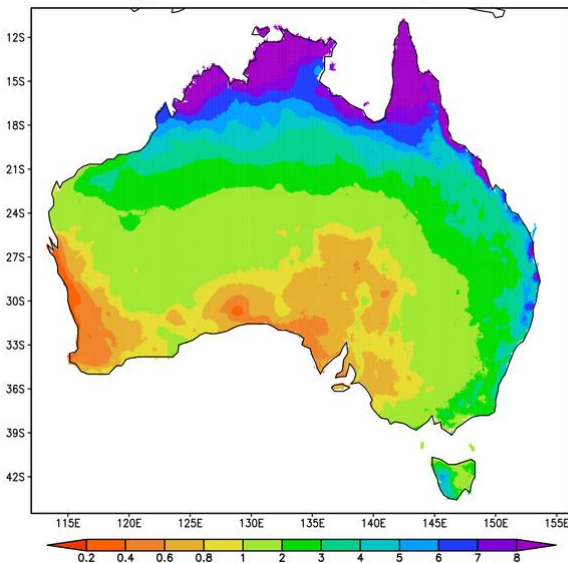


Produces a more realistic climate

Example: Rainfall (mm/day) climatology for the summer (DJF) season

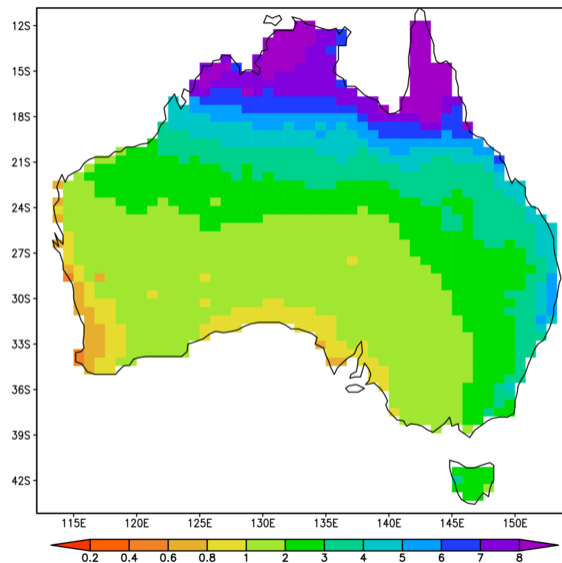
Observation

Climatology PRCP AWAP-0.05-monthly DJF 90-12



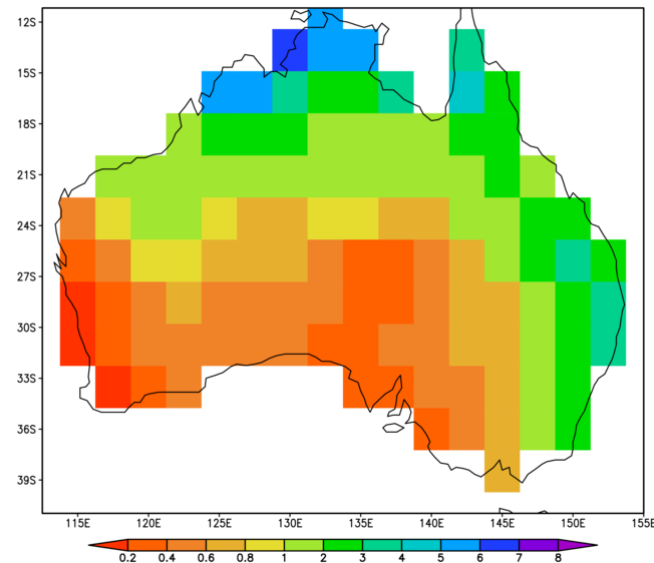
ACCESS-S1

Clim PRCP ACCESS-S1 DJF 1025+1101 1990-2012



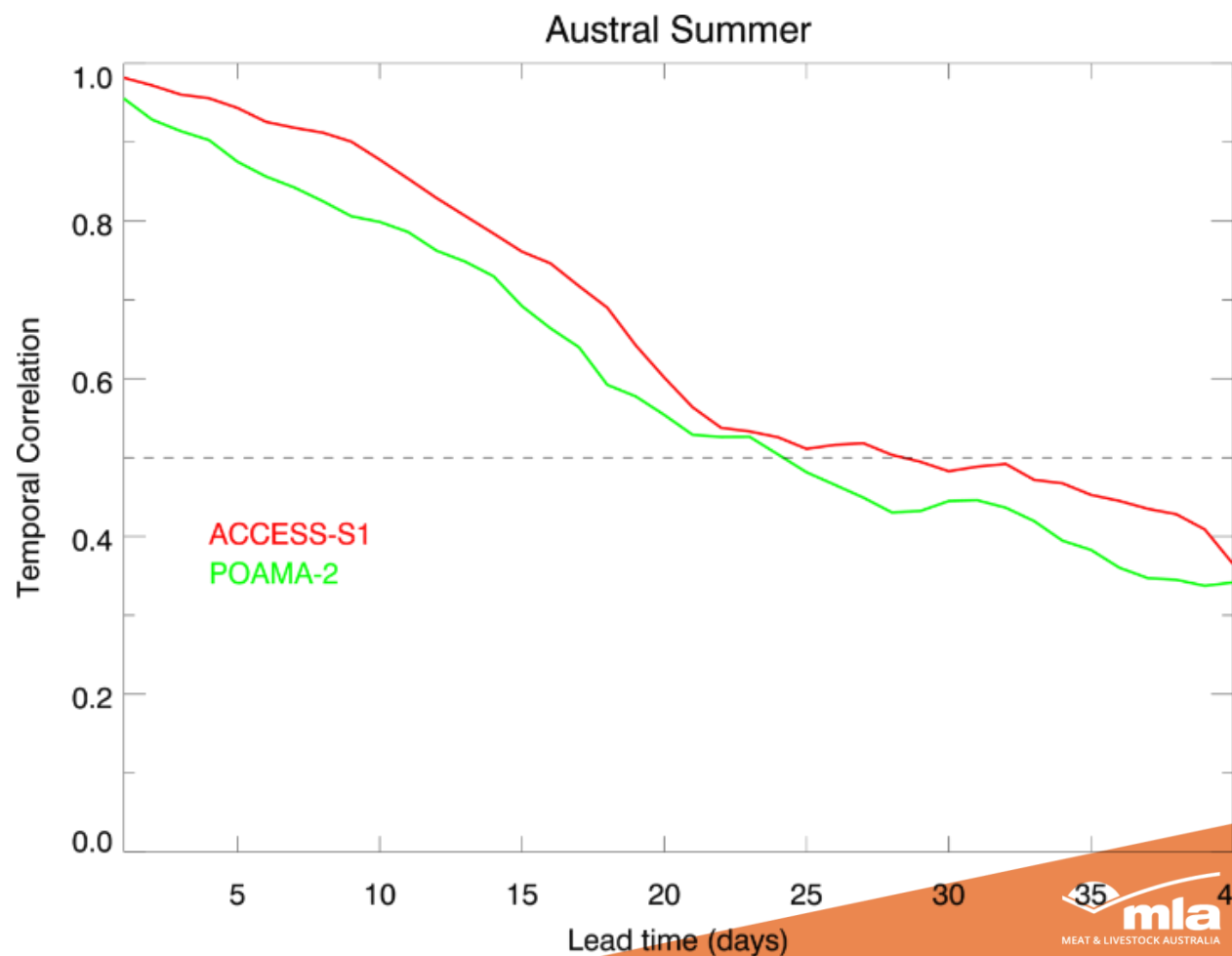
POAMA

Clim PRCP E24 DJF 1026+1101 1990-2012



Prediction of the MJO

Correlation skill for forecasts of the MJO

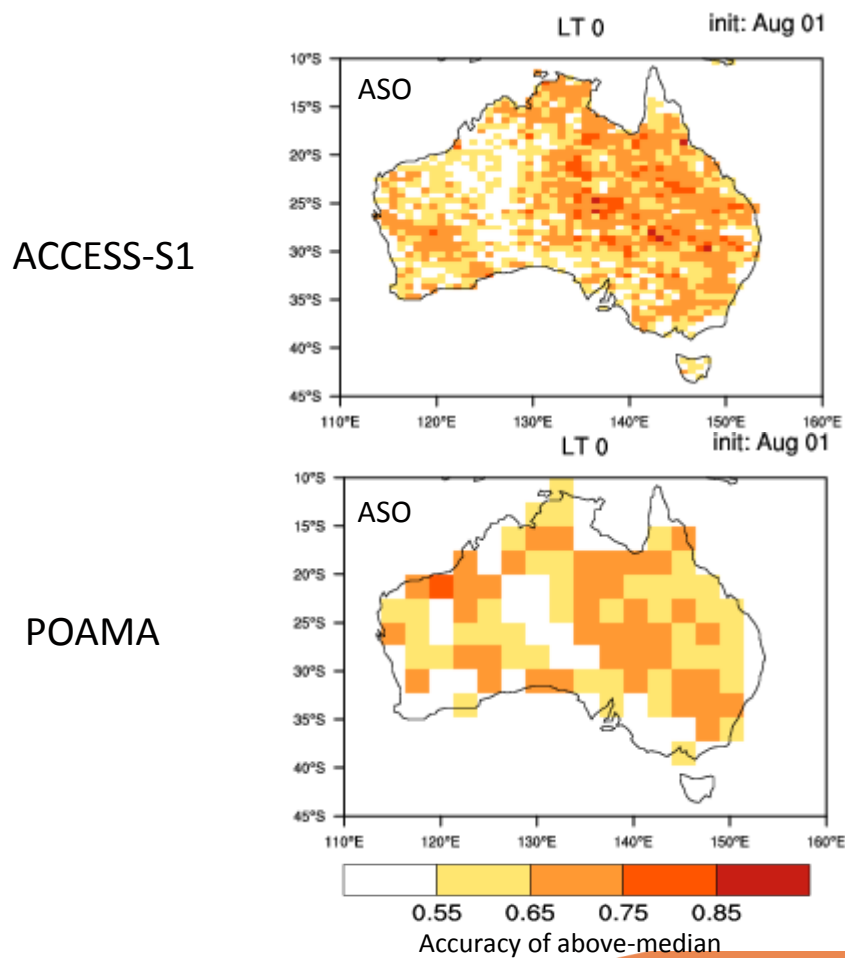


MJO
predictable
to ~3 weeks

Prediction of Australian Climate

Seasonal 0-lead: Some seasonal differences in performance

Spring Rainfall



ACCESS-S Products

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Forecast Visualisation Tool (FVT)

(for prototype products)

NACP Products

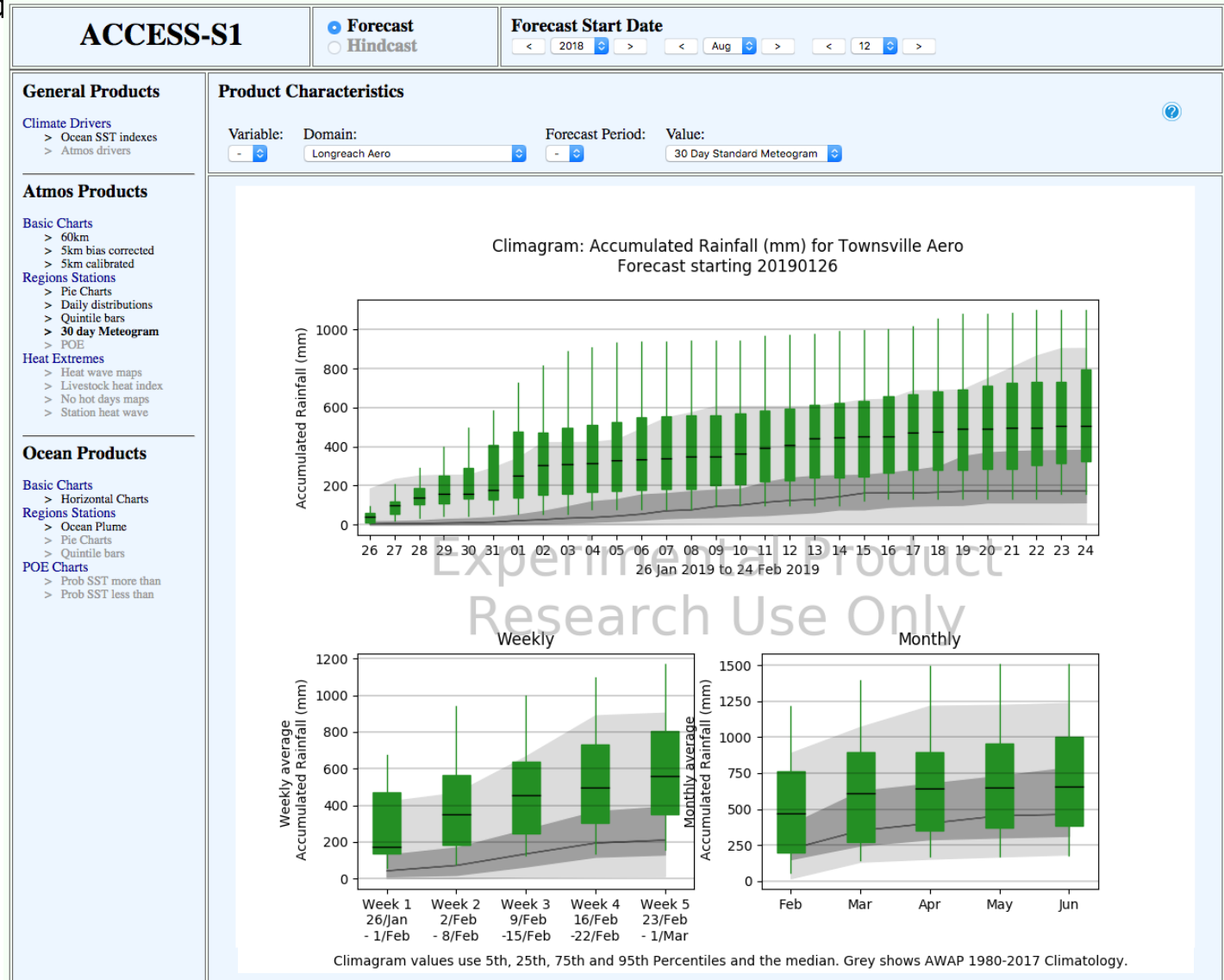
- > MJO
- > Monsoon onset
- > Monsoon breaks
- > Risk of Flash Drought
- > etc

Other Examples

- > Tropical cyclone fc
- > Risk heavy rain
- > Risk of frost
- > Growing season Outlook
- > Probability of exceeding ?
- > Drivers (Blocking etc)
- > Etc

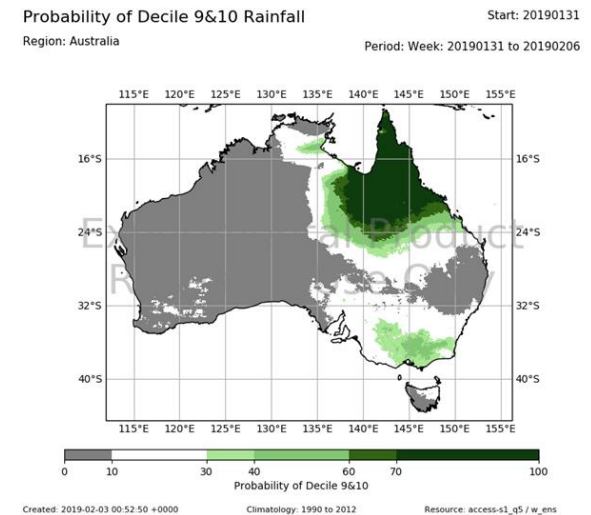
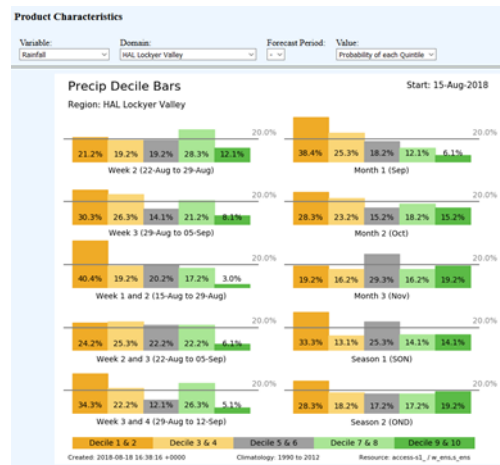
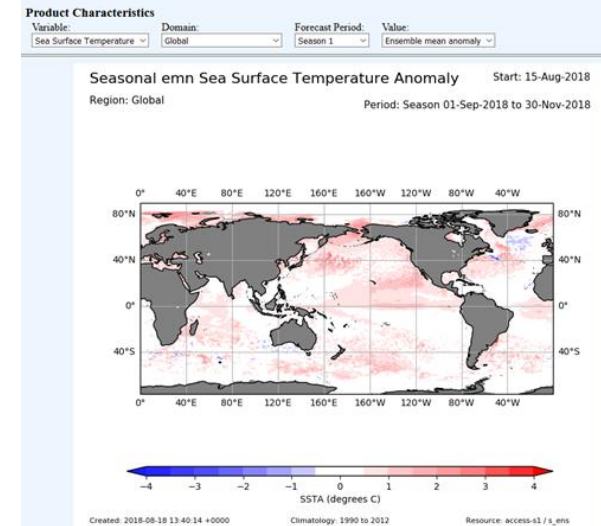
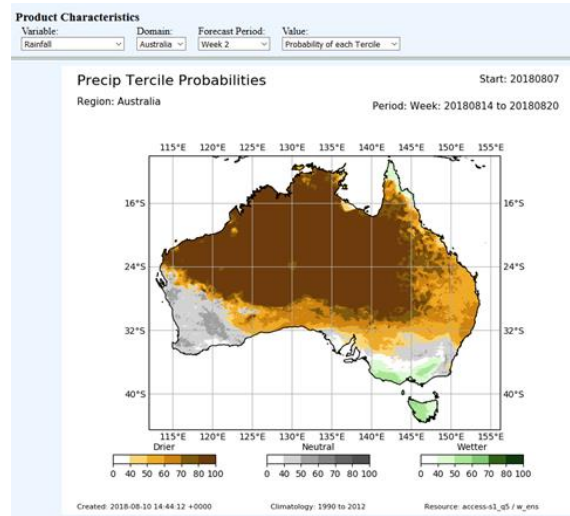
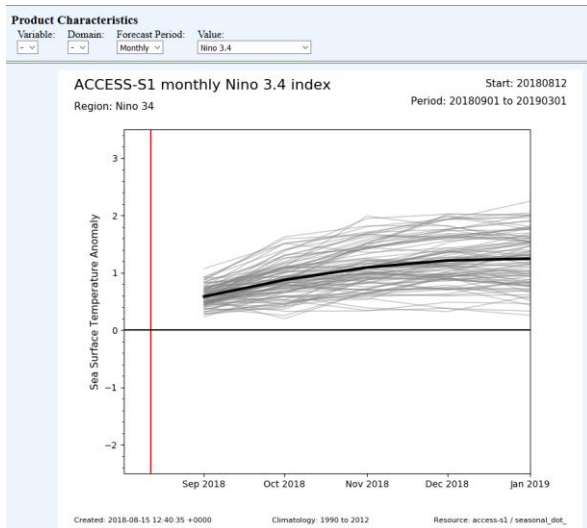
NACP FVT

- All NACP products
- All other relevant/appropriate

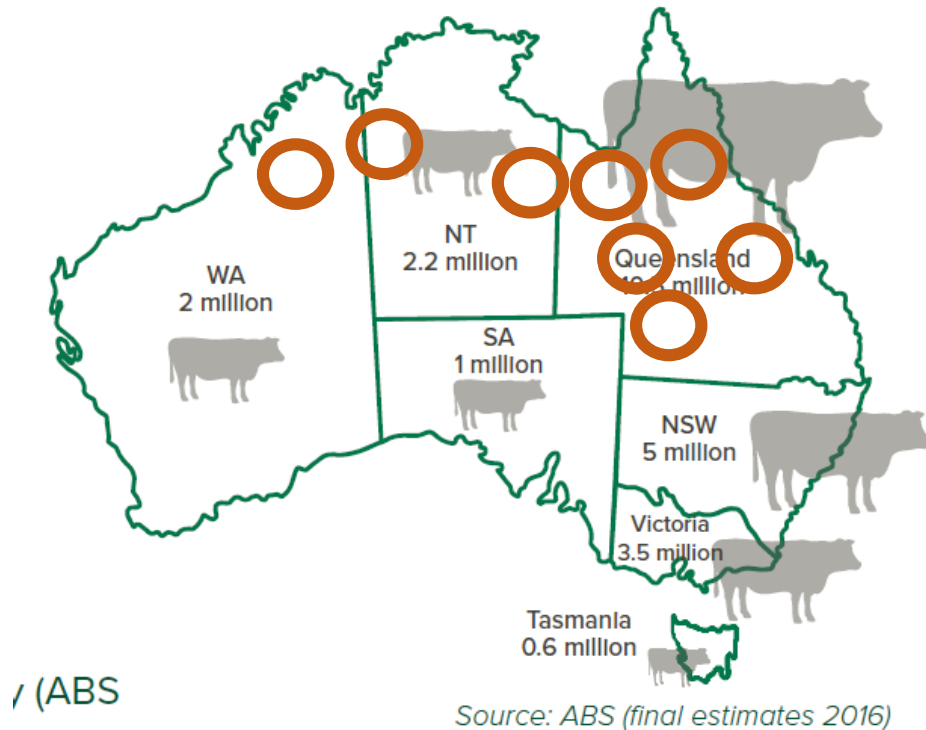


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(..more prototype products)



Locations of 'climate mates'



Need to move beyond 'passive engagement' and reliance on web sites – need to move from 'simple awareness' to 'active engagement'. Provide a climate service rather than climate information



WHAT ARE THE USERS' NEEDS?

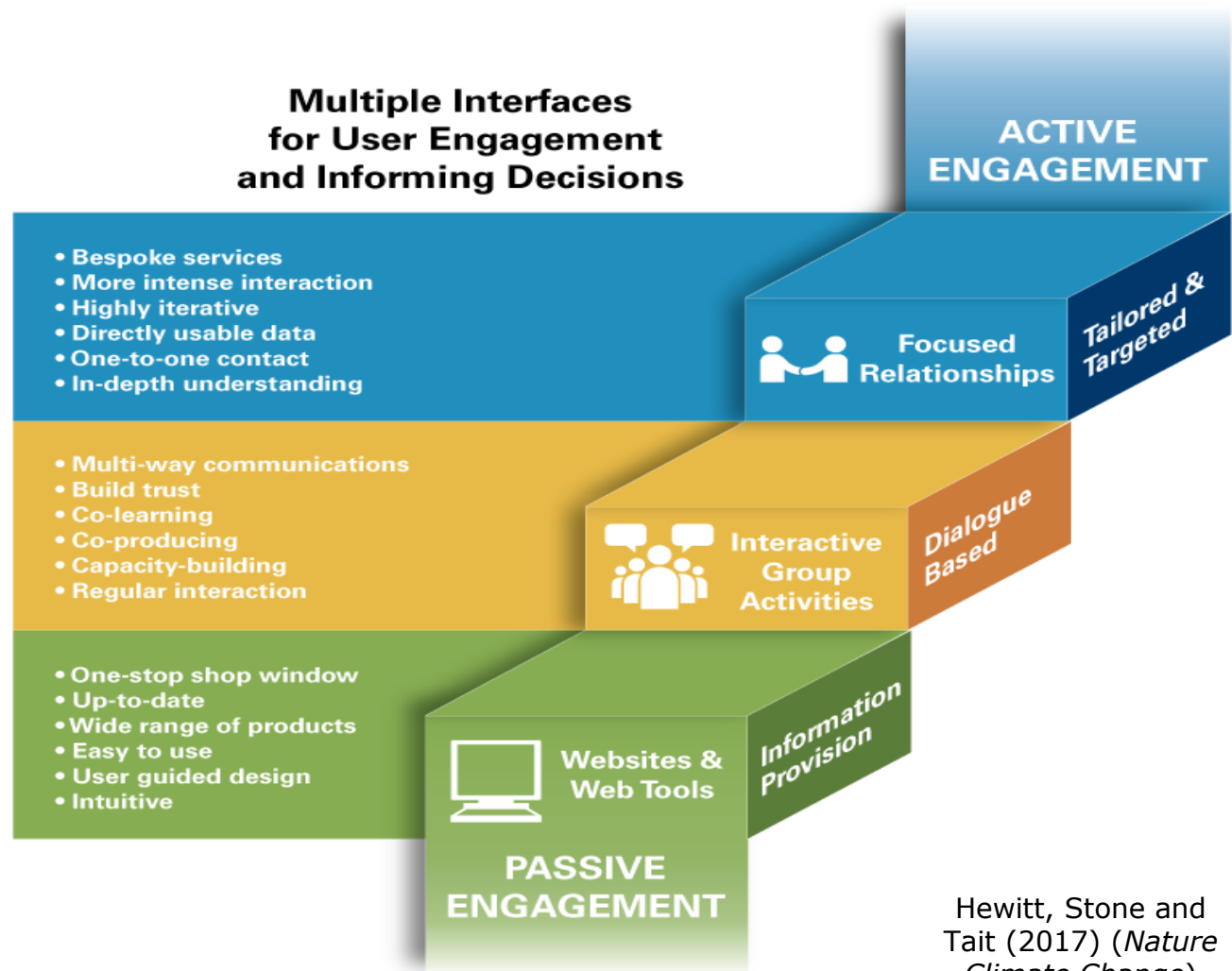
MERI – NACP

Category:

**C – Practice
change**

**B – KASA
change**

A - Awareness



Hewitt, Stone and
Tait (2017) (*Nature
Climate Change*)

NACP to deliver!

- Better forecast accuracy – multi week to multi year timescales
- Customised products for regions – forecasts, drought, wet season onset
- Extension service in regions
- Better understanding and use of climate information in decision making

Thanks



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NACP – industry key issues

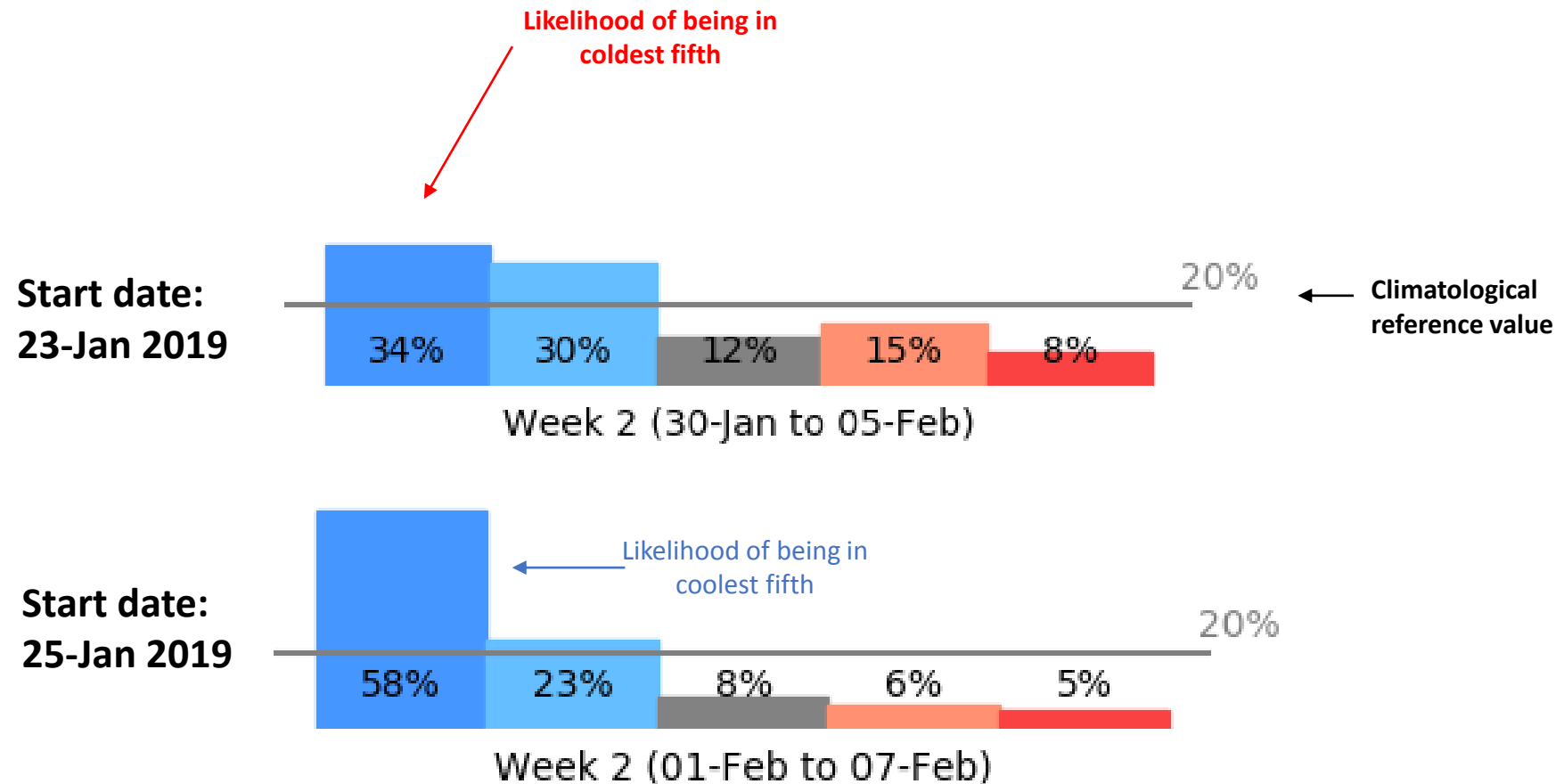
- Many regions experience low and variable forecast skill,
- Low relevance of existing forecast systems and technologies to key management decisions,
- Lack of understanding on how to use climate resources and the technologies within these resources,
- Lack of support from climate experts, and
- Lack of proof of value.

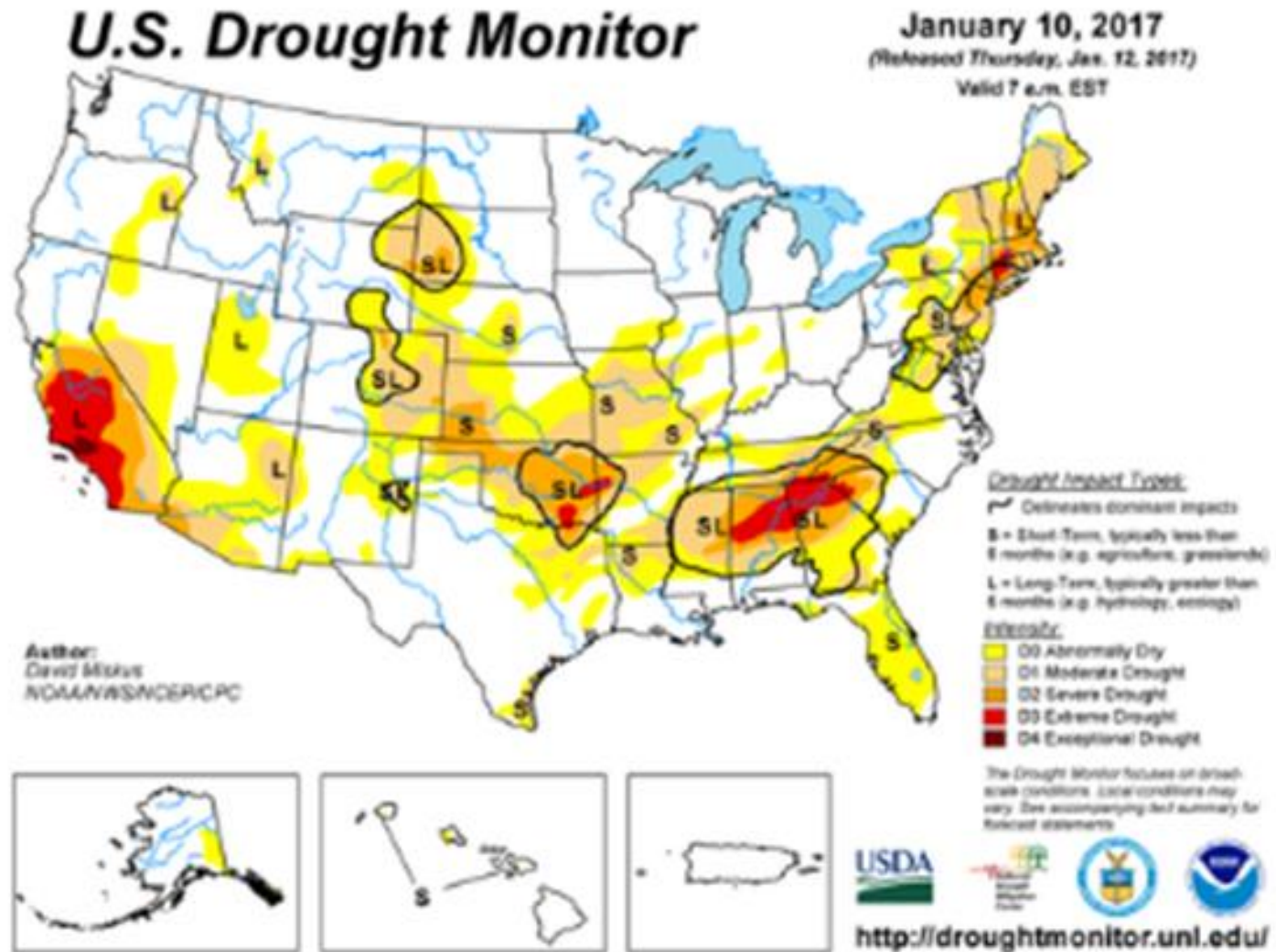
NACP - RD&E Action

| Climate issue | RD&E action |
|---|--|
| Low and variable forecast skill | <ul style="list-style-type: none"> • Improve climate model skill at multiple timescales • Mapping forecast skill (region*season) |
| Relevance of existing forecast systems and technologies | <ul style="list-style-type: none"> • Longer forecast lead times (seasonal) • Drought forecasts (multi-year) • Forecasts of summer wet season • Forecasts of onset, delays and end of wet season • Region and local scale forecast products • Forecasts of unseasonal rain in dry season • Forecasts of extreme heat |
| Use of climate resources and the technologies | <ul style="list-style-type: none"> • Trained and supported local climate advisers • Provide an integrated 'end to end' climate service targeted for the region • Targeted, relevant and updated tools • Climate advice by local advisers • Integrating forecasts into management |
| Support from climate experts | <ul style="list-style-type: none"> • Provide an integrated 'end to end' climate service with two way flow of engagement, information and evaluation |
| Proof of value | <ul style="list-style-type: none"> • Case studies with producers (post-drought assessments, innovative management for reducing drought vulnerability, use of critical indicators and triggers for drought planning and the use of forecasts in better decision making) • Integrated climate, biophysical and herd modelling to show forecast value. |

Forecast prototype products showing Julia Creek Airport

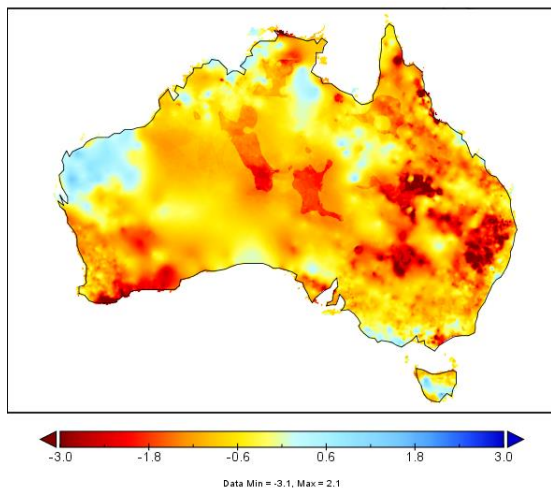
Maximum temperature decile bars



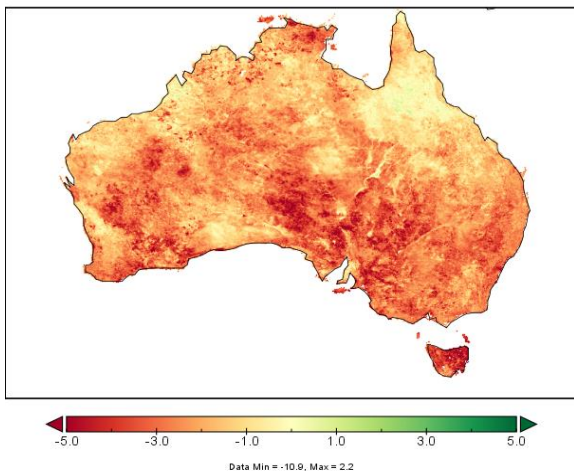


Drought Monitor

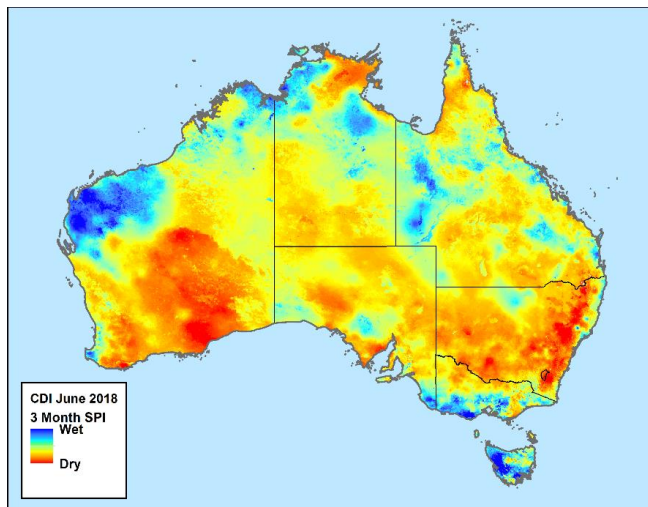
June 2018 - Standardized Precipitation Index (SPI), 3-month



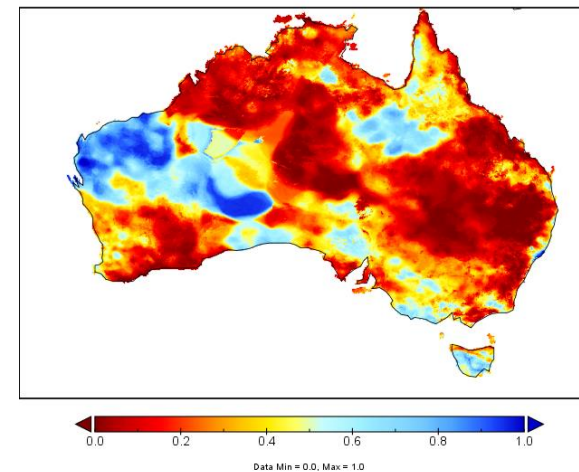
June 2018 NDVI Anomaly



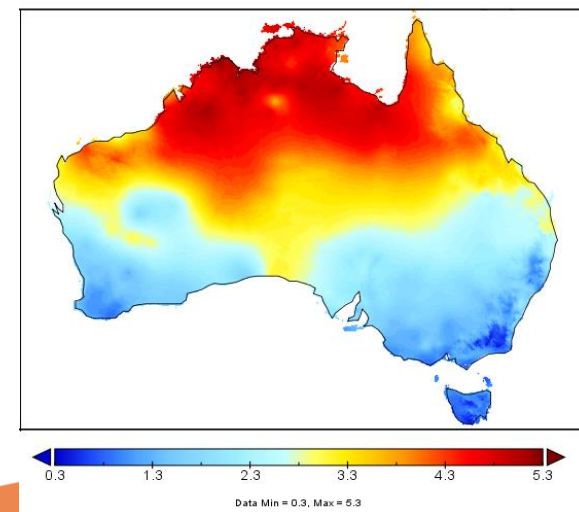
June 2018 CDI Map



June 2018 Rootzone Soil Moisture Anomaly (0-100 cm)

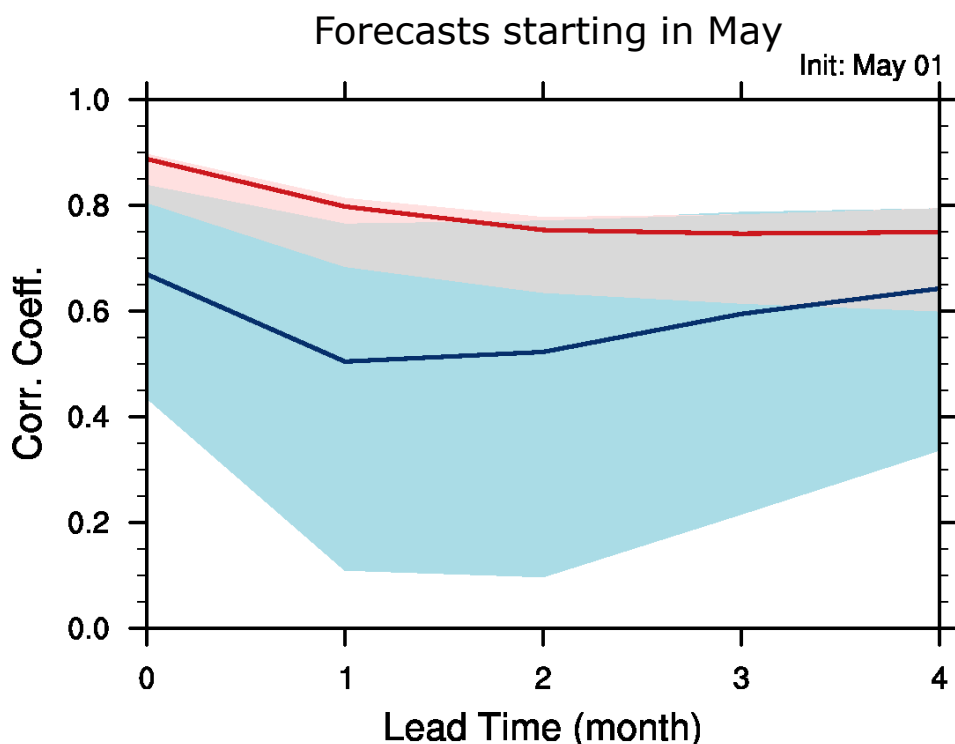
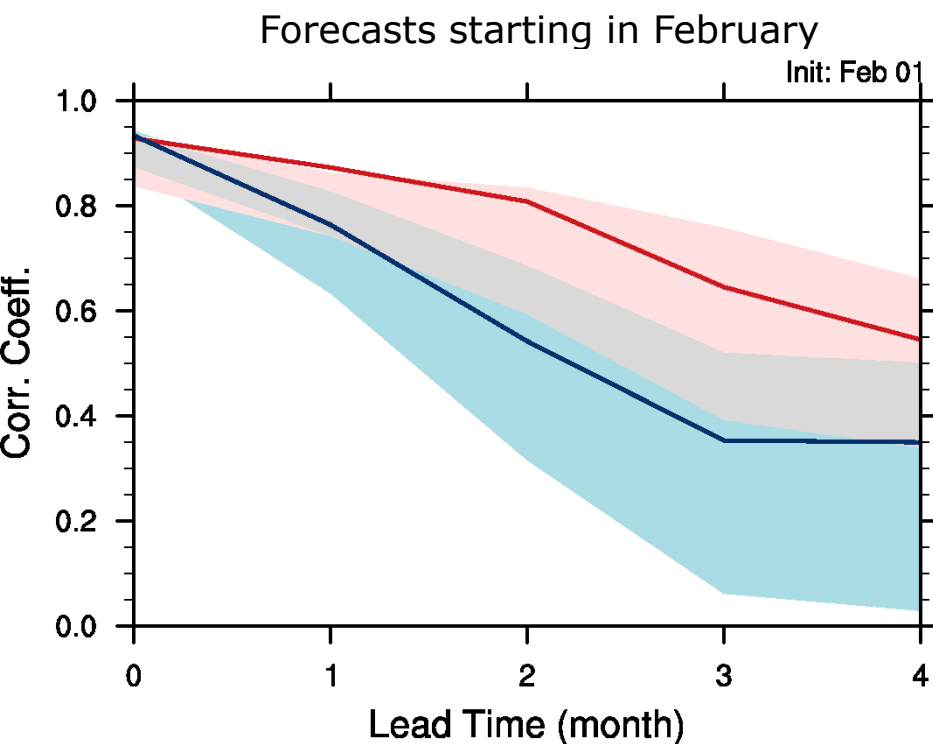


June 2018 Evapotranspiration



Prediction of ENSO

Correlation skill of forecasts of sea surface temperature in the eastern Pacific (NINO3)



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Prediction of Australian Climate

Multi-week: Weeks 2+3

Rainfall

TMAX

TMIN

