

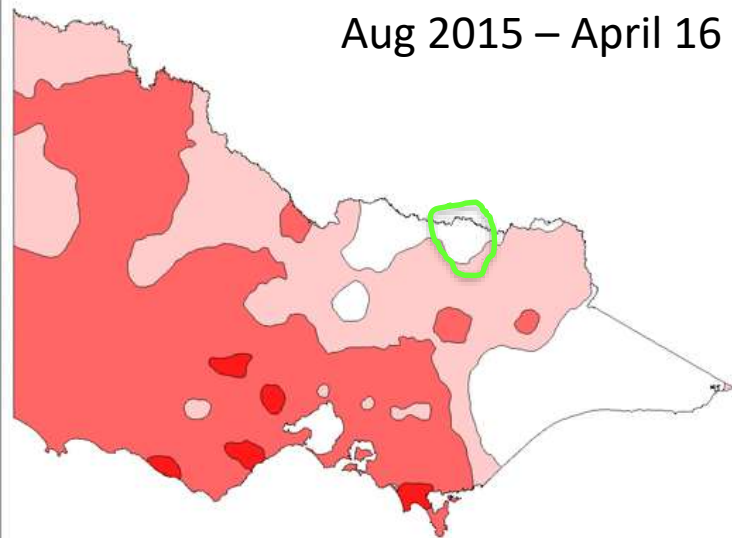
2015 and 16, what
happened?

2017, what might happen?



Dale Grey
Seasonal Risk Agronomist
Bendigo

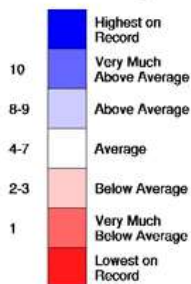
Aug 2015 – April 16



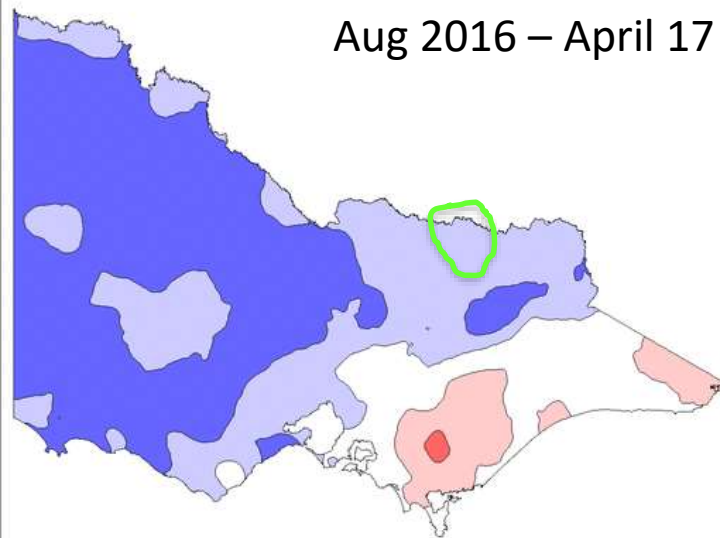
<http://www.bom.gov.au>

© Commonwealth of Australia 2016, Australian Bureau of Meteorology ID code: AWAP

Rainfall Decile Ranges



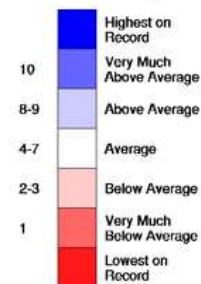
Aug 2016 – April 17



<http://www.bom.gov.au>

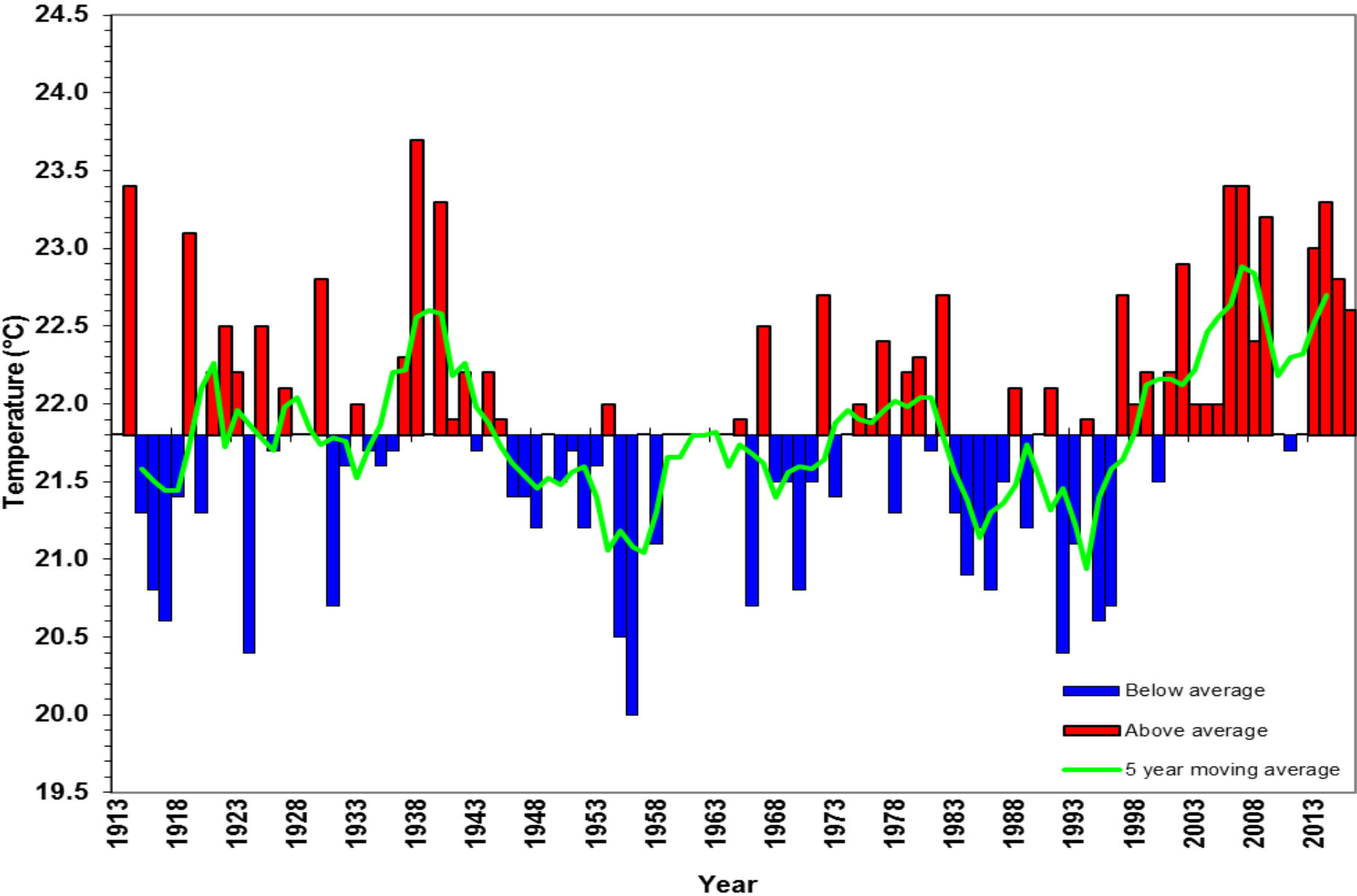
Issued: 22/12/2016 © Commonwealth of Australia 2017, Australian Bureau of Meteorology ID code: AWAP

Rainfall Decile Ranges

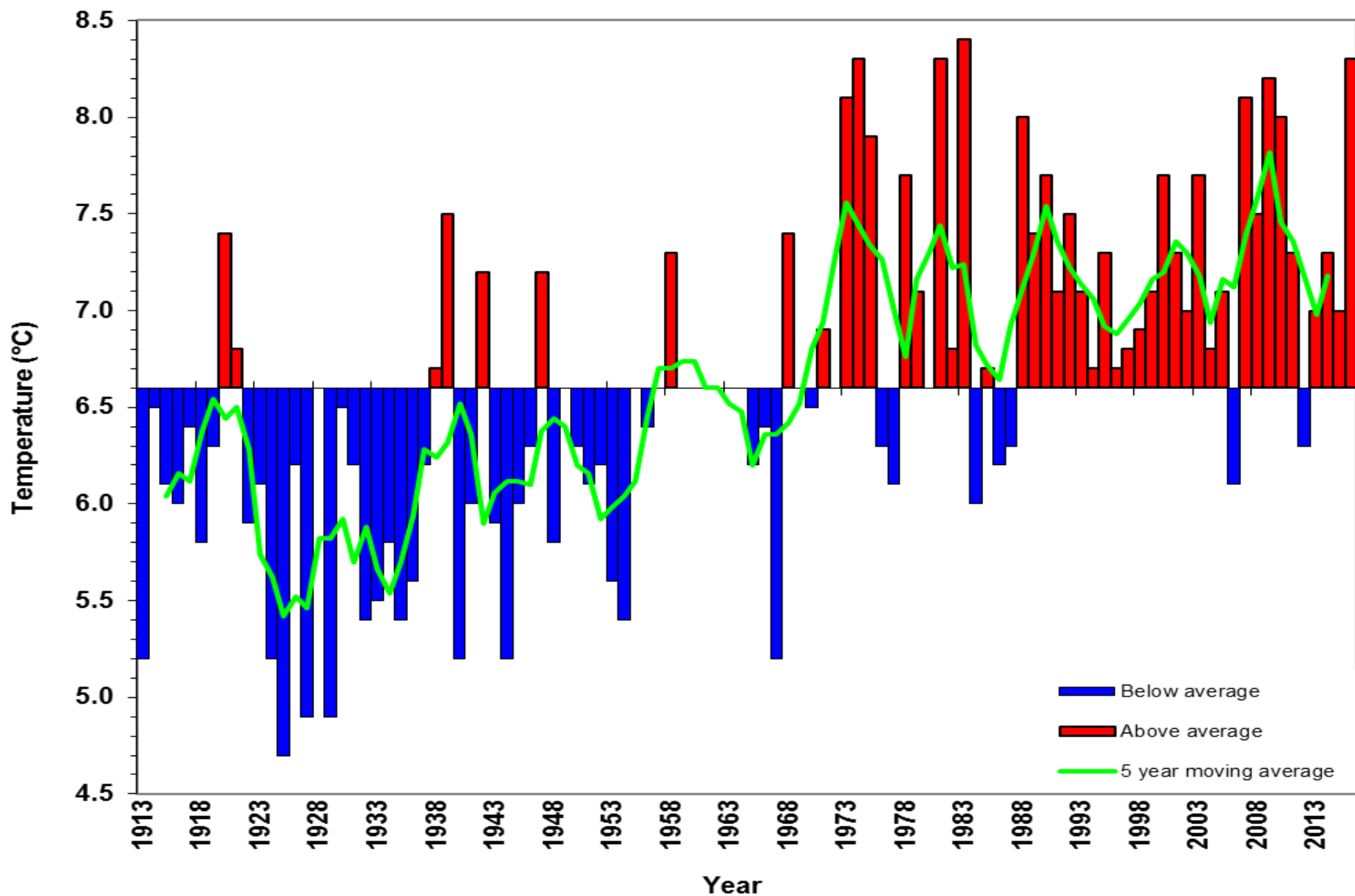


Issued: 21/05/2017

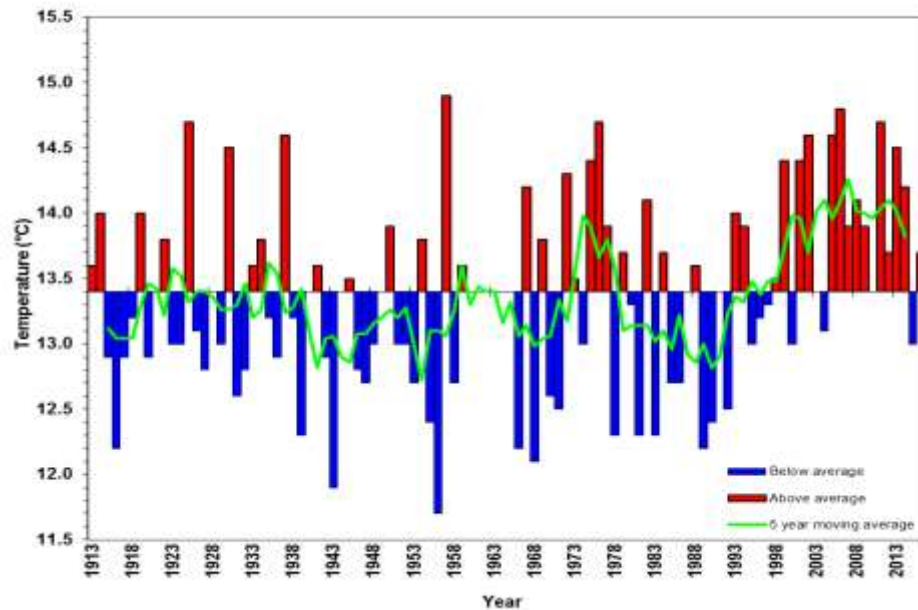
Annual Maximum Temperature at Rutherglen



Annual Minimum Temperature at Rutherglen

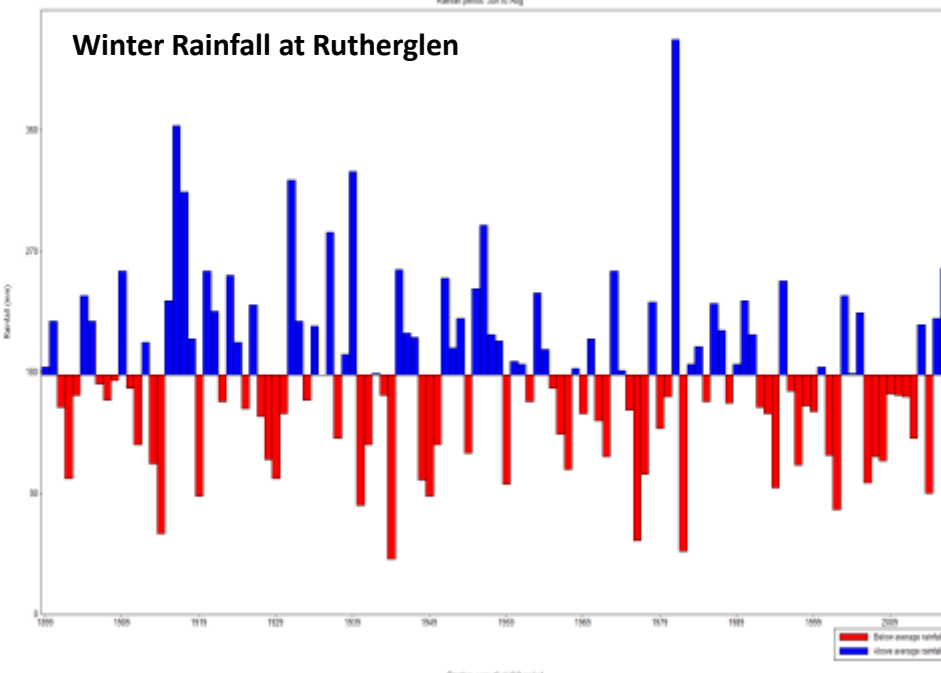


Winter Maximum Temperature at Rutherglen



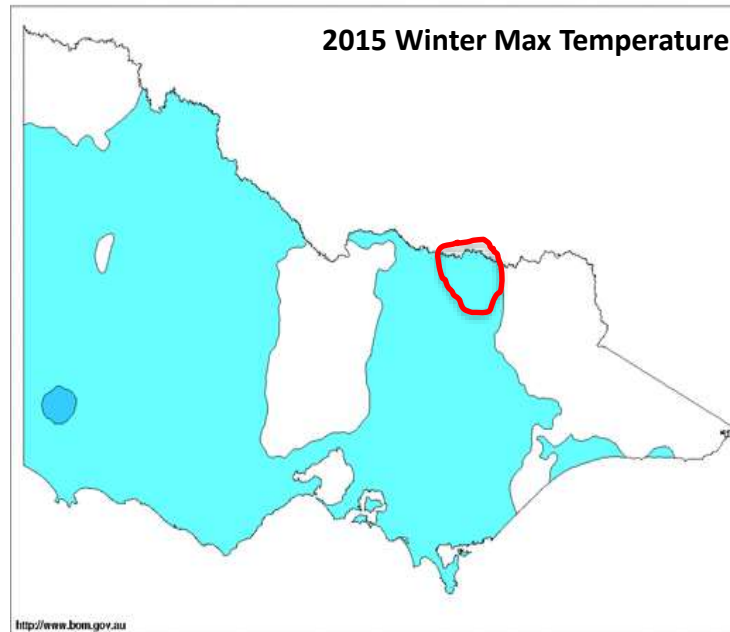
Historical record of seasonal rainfall (mm) at RUTHERGLEN POST OFFICE
Long-term average rainfall (Jun to Aug) is 170 mm
Rainfall period: Jun to Aug

Winter Rainfall at Rutherglen



Source: Rainfall Observations

2015 Winter Max Temperature



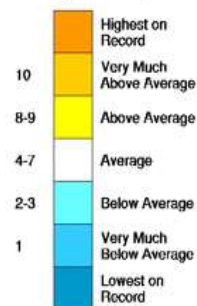
<http://www.bom.gov.au>

© Commonwealth of Australia 2016, Australian Bureau of Meteorology ID code: AWAP
Victorian Rainfall Deciles

1 June to 31 August 2015

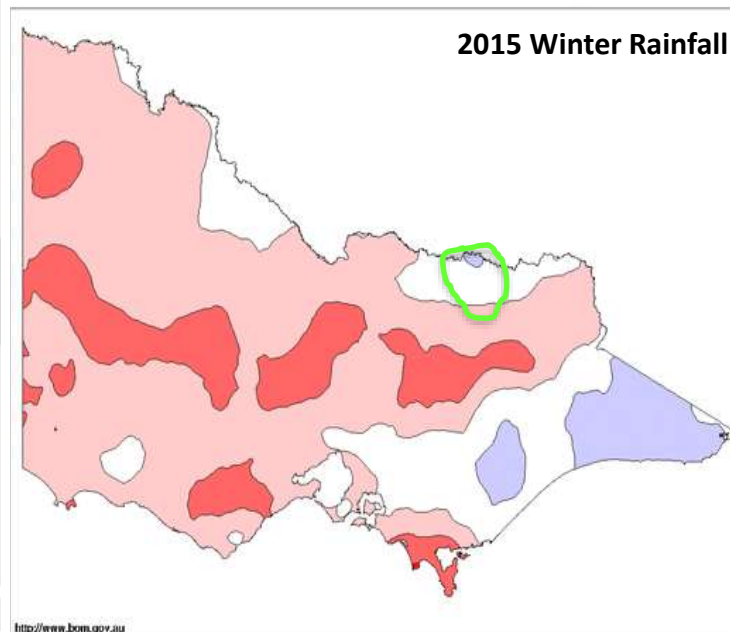
Distribution Based on Gridded Data
Australian Bureau of Meteorology

Temp. Decile Ranges



Issued: 24/02/2016

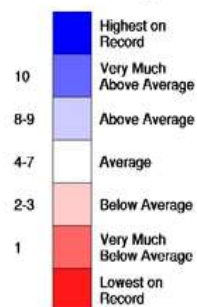
2015 Winter Rainfall



<http://www.bom.gov.au>

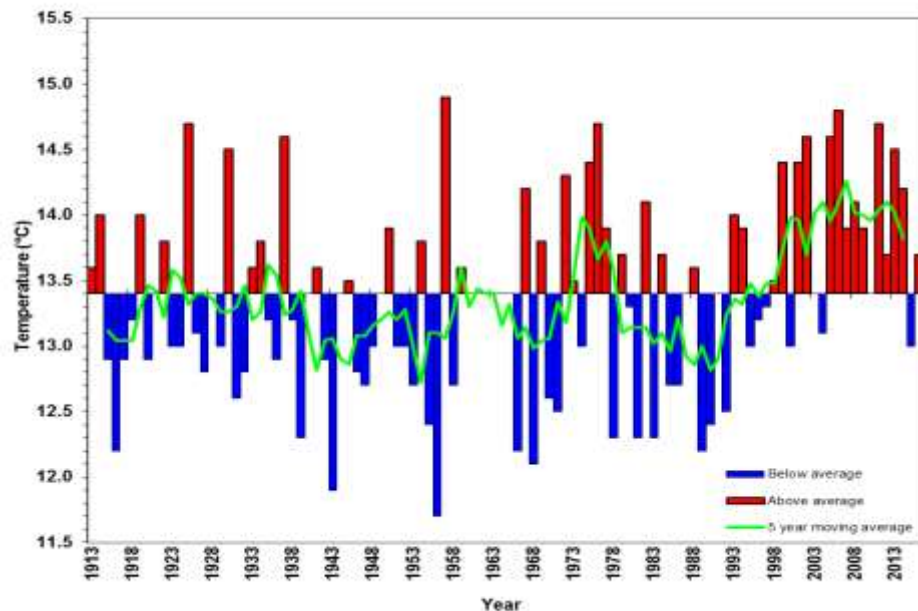
© Commonwealth of Australia 2016, Australian Bureau of Meteorology ID code: AWAP

Rainfall Decile Ranges



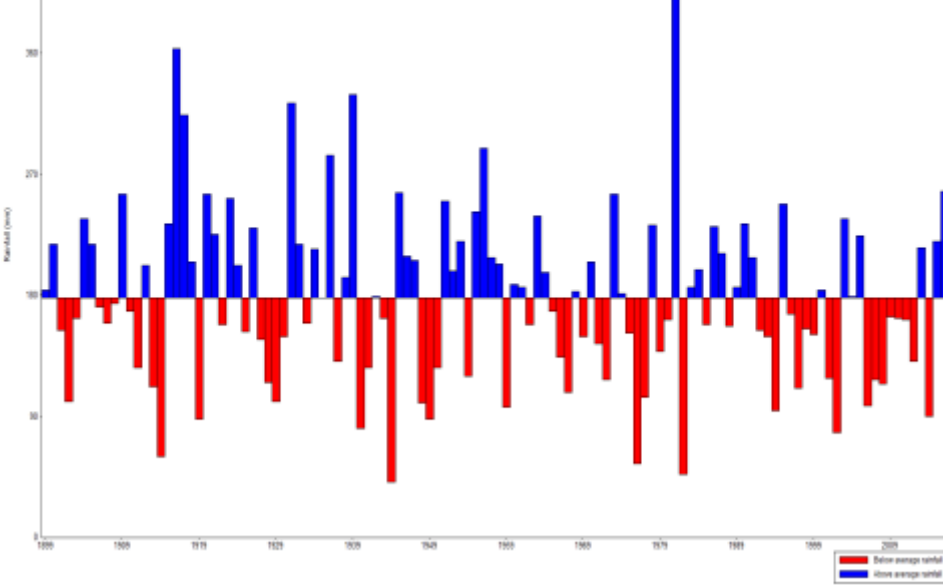
Issued: 25/02/2016

Winter Maximum Temperature at Rutherglen



Historical record of seasonal rainfall (mm) at RUTHERGLEN POST OFFICE
Long term average rainfall (Jun to Aug) is 170 mm
Rainfall period: Jun to Aug

Winter Rainfall at Rutherglen



Source: Rainfall Observations

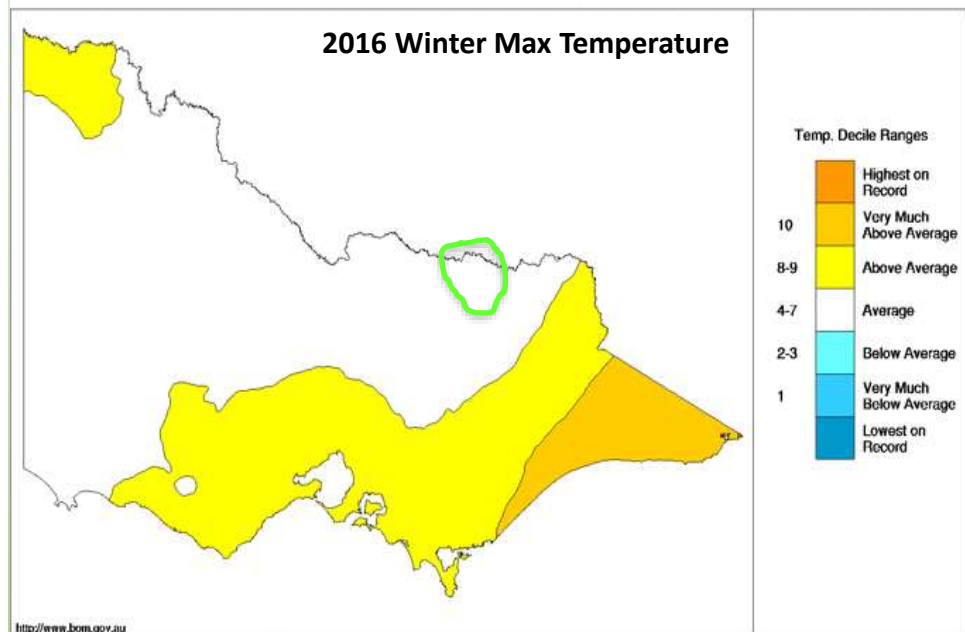
© Commonwealth of Australia 2017, Australian Bureau of Meteorology

Maximum Temperature Deciles

1 June to 31 August 2016

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2016 Winter Max Temperature



© Commonwealth of Australia 2017, Australian Bureau of Meteorology

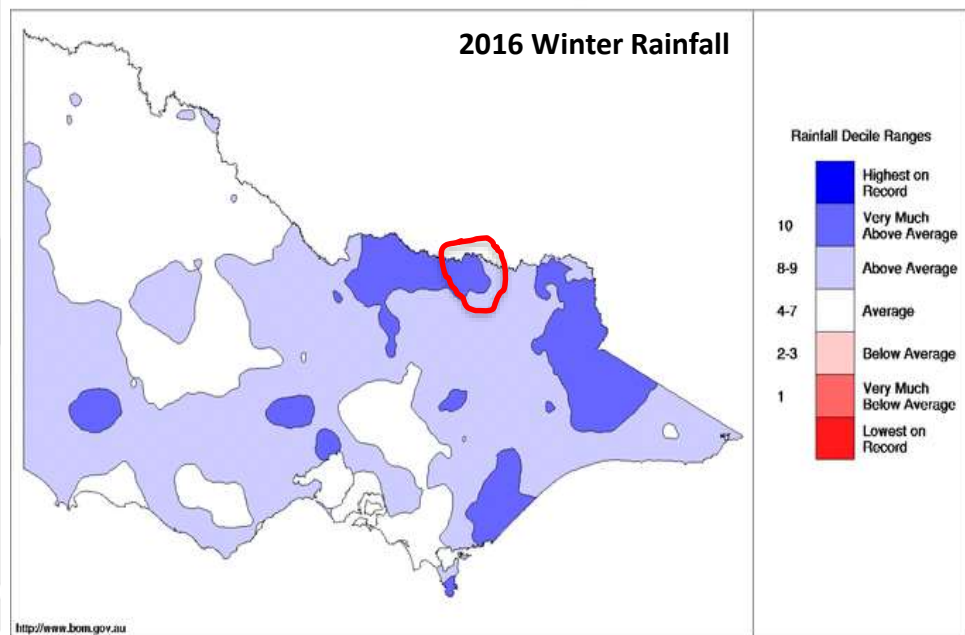
ID code: AWAP

Victorian Rainfall Deciles

1 June to 31 August 2016

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2016 Winter Rainfall



© Commonwealth of Australia 2017, Australian Bureau of Meteorology

ID code: AWAP

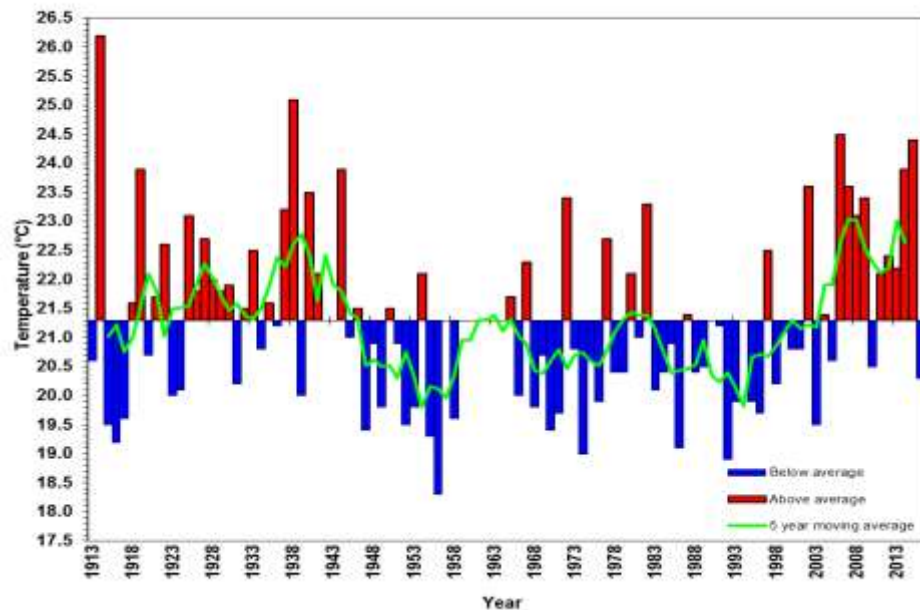
Issued: 23/02/2017

Relationship between viticultural climatic indices and grape maturity in Australia

C. Jarvis¹  · E. Barlow¹ · R. Darbyshire^{1,2} · R. Eckard^{1,3} · I. Goodwin³

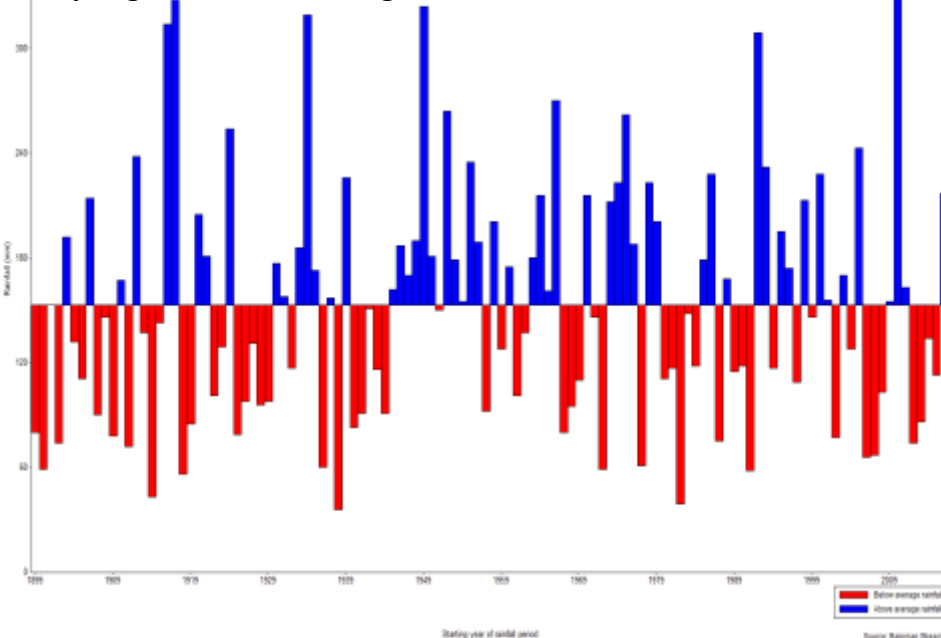
Abstract Historical temperature data and maturity records were analyzed for 45 vineyard blocks in 15 winegrowing regions across Australia in order to evaluate the suitability of common viticultural indices to estimate date of grape maturity. Five temperature-based viticultural indices (mean January temperature, mean growing season temperature, growing degree days, biologically effective degree days, Huglin Index) along with four springtime temperature indices (mean and maximum temperature summations for September, October, and November; growing degree days and biologically effective degree days modified to include September) were compared to maturity data in order to investigate index relationship to observed maturity timing. Daily heat summations for the months of September, October, and November showed the best correlation to day of year of maturity, suggesting that springtime temperatures are important relative to the timing of grape maturity. Mean January temperature, a commonly used index, had the poorest correlation with day of year of maturity of all the indices included in this study. Indices that included the month of April had poorer correlation than indices that shifted the months included in the growing season to

Spring Maximum Temperature at Rutherglen



Historical record of seasonal rainfall (mm) at RUTHERGLEN POST OFFICE
Long-term average rainfall (Sep to Nov) is 152 mm
Rainfall period: Sep to Nov

Spring Rainfall at Rutherglen



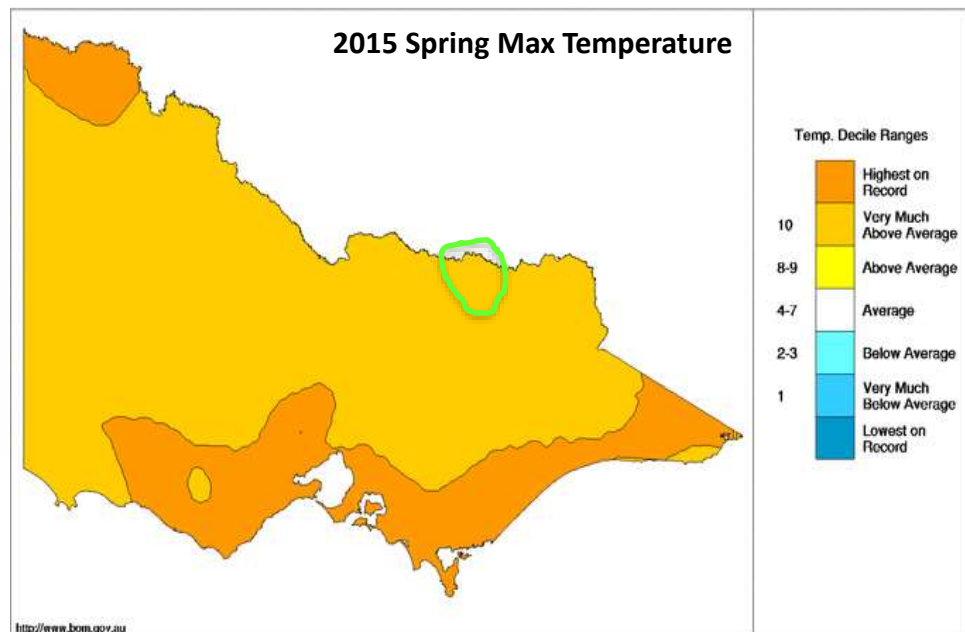
Source: Rainfall Observations

Maximum Temperature Deciles

1 September to 30 November 2015

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2015 Spring Max Temperature



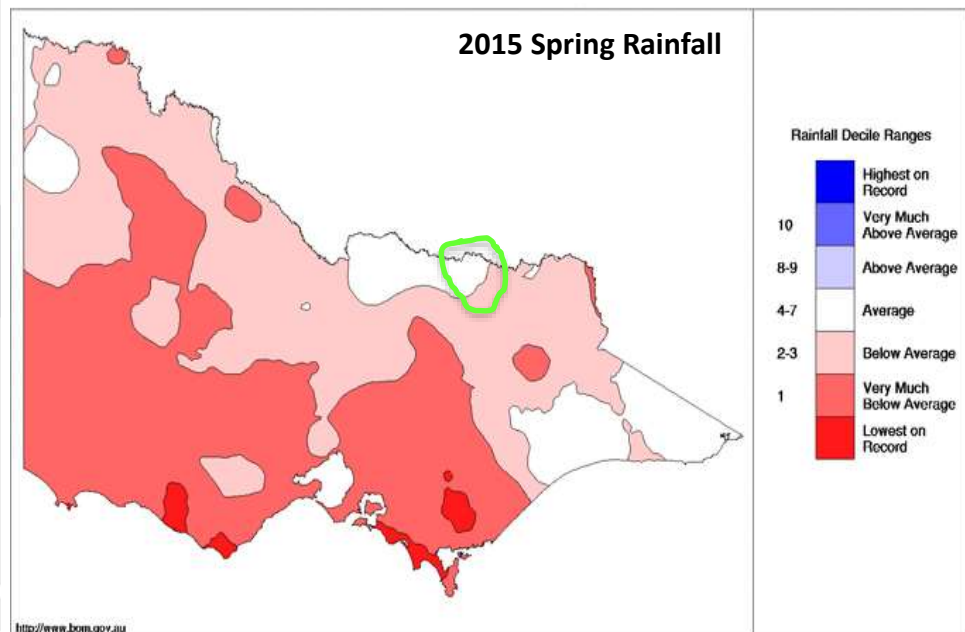
© Commonwealth of Australia 2016, Australian Bureau of Meteorology ID code: AWAP
Victorian Rainfall Deciles

1 September to 30 November 2015

Issued: 25/05/2016

Distribution Based on Gridded Data
Australian Bureau of Meteorology

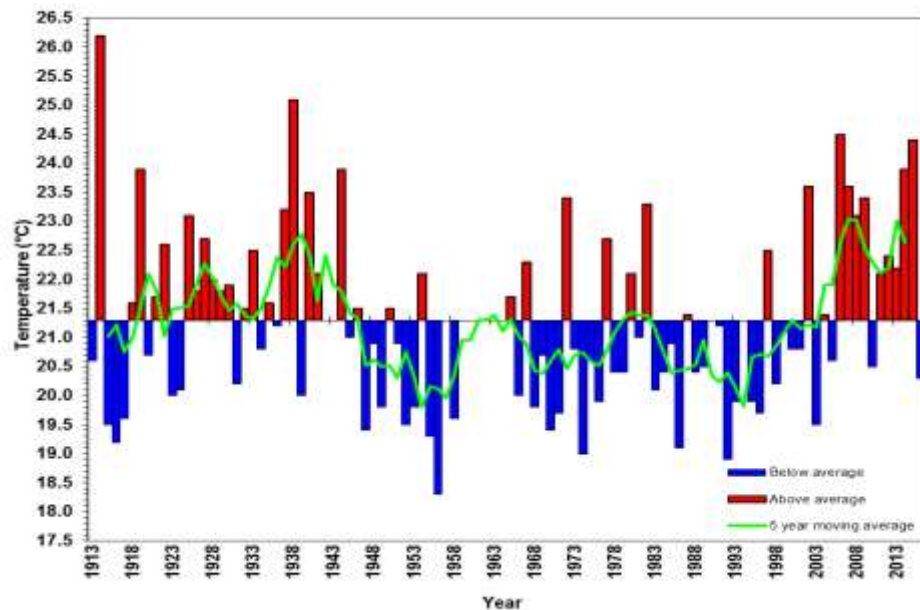
2015 Spring Rainfall



© Commonwealth of Australia 2016, Australian Bureau of Meteorology ID code: AWAP

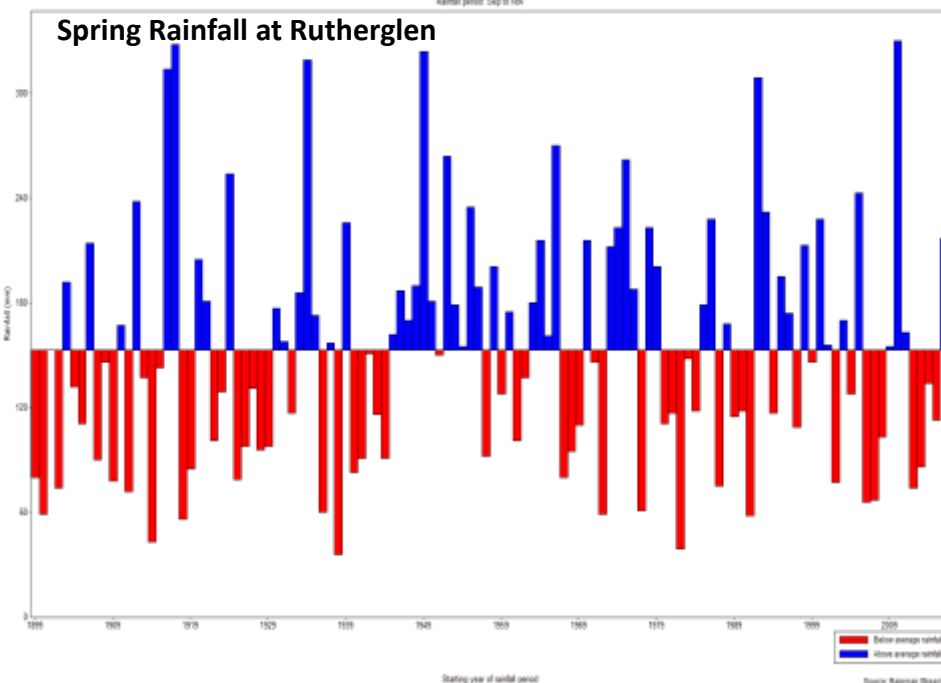
Issued: 26/05/2016

Spring Maximum Temperature at Rutherglen



Historical record of seasonal rainfall (mm) at RUTHERGLEN POST OFFICE
Long-term average rainfall (Sep to Nov) is 152 mm
Rainfall period: Sep to Nov

Spring Rainfall at Rutherglen



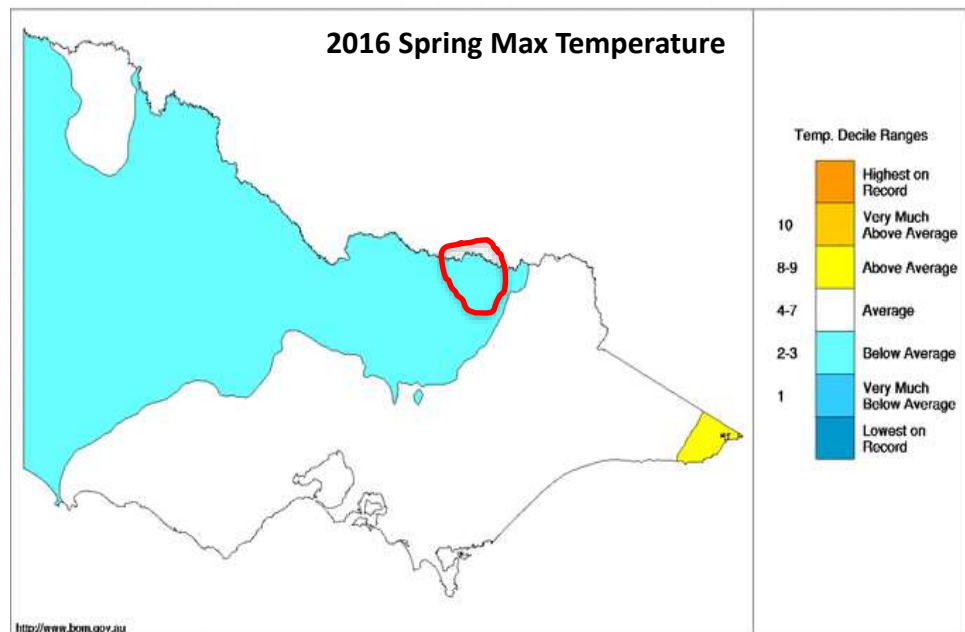
Source: Rainfall Observations

Maximum Temperature Deciles

1 September to 30 November 2016

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2016 Spring Max Temperature



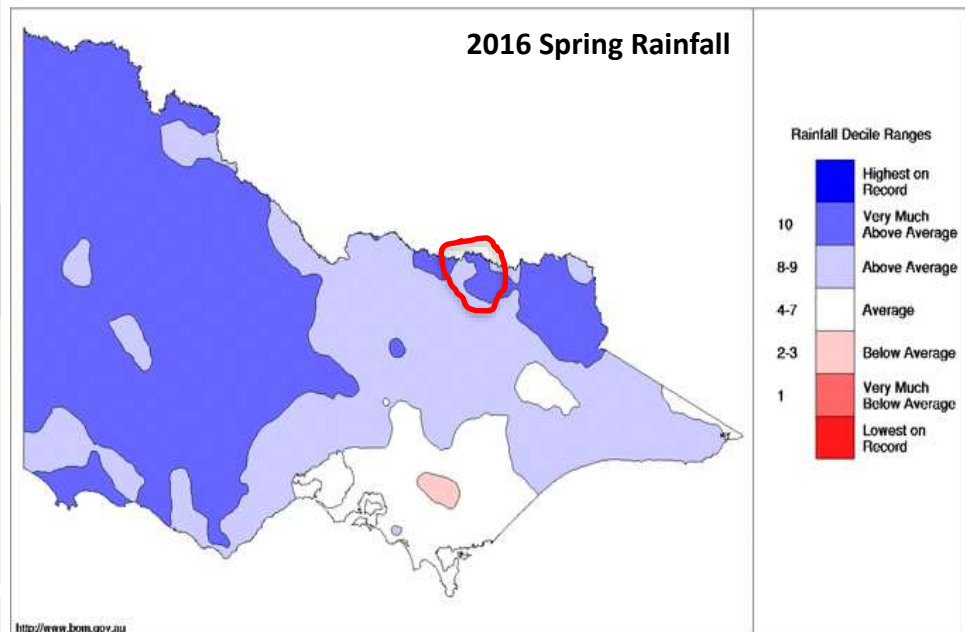
© Commonwealth of Australia 2017, Australian Bureau of Meteorology ID code: AWAP
Victorian Rainfall Deciles

1 September to 30 November 2016

Issued: 31/05/2017

Distribution Based on Gridded Data
Australian Bureau of Meteorology

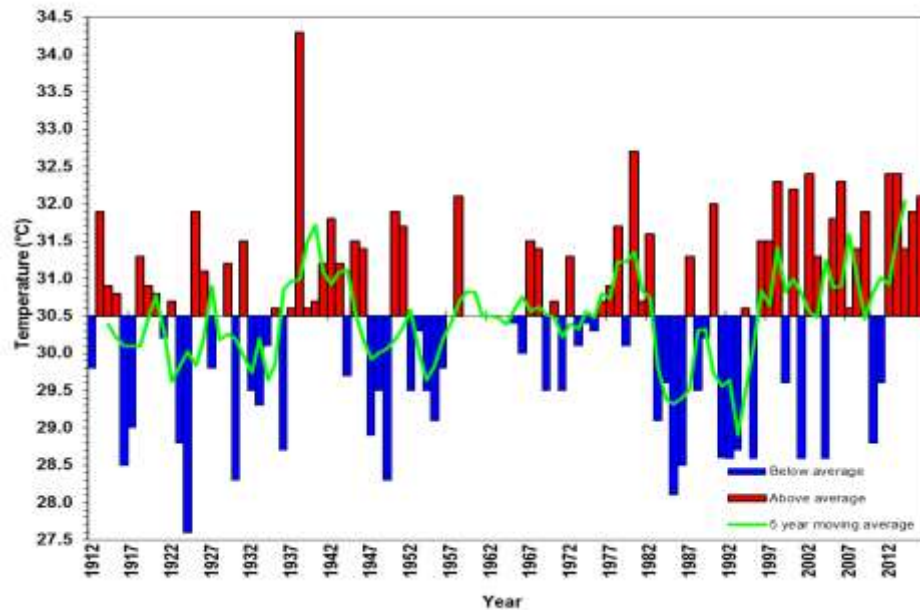
2016 Spring Rainfall



© Commonwealth of Australia 2017, Australian Bureau of Meteorology ID code: AWAP

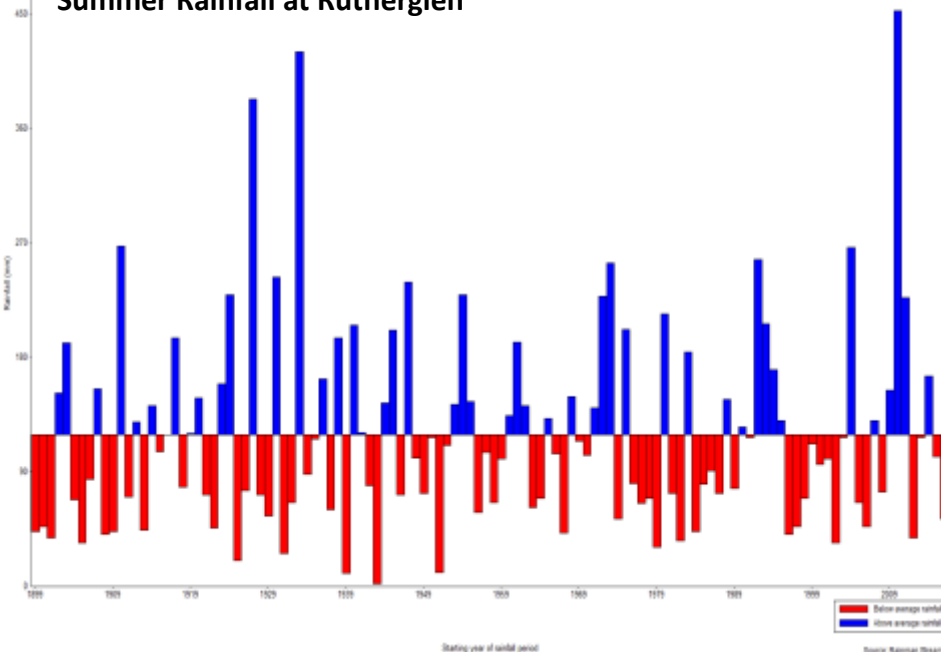
Issued: 25/05/2017

Summer Maximum Temperature at Rutherglen

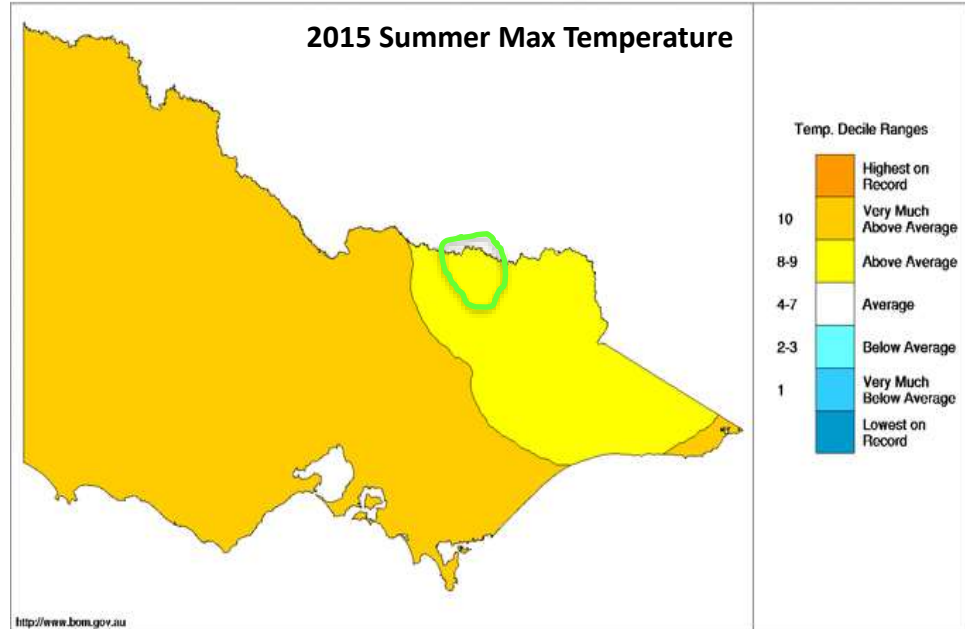


Historical record of seasonal rainfall (mm) at RUTHERGLEN POST OFFICE
Long-term average rainfall (Dec to Feb) is 110 mm
Rainfall period: Dec to Feb

Summer Rainfall at Rutherglen



2015 Summer Max Temperature



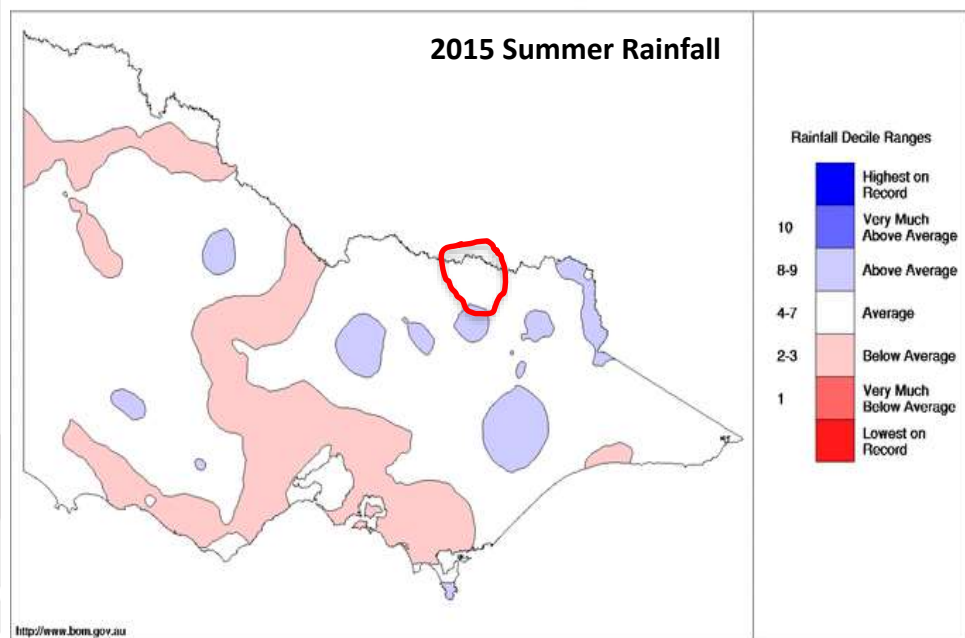
© Commonwealth of Australia 2016, Australian Bureau of Meteorology ID code: AWAP
Victorian Rainfall Deciles

1 December 2015 to 29 February 2016

Issued: 31/08/2016

Distribution Based on Gridded Data
Australian Bureau of Meteorology

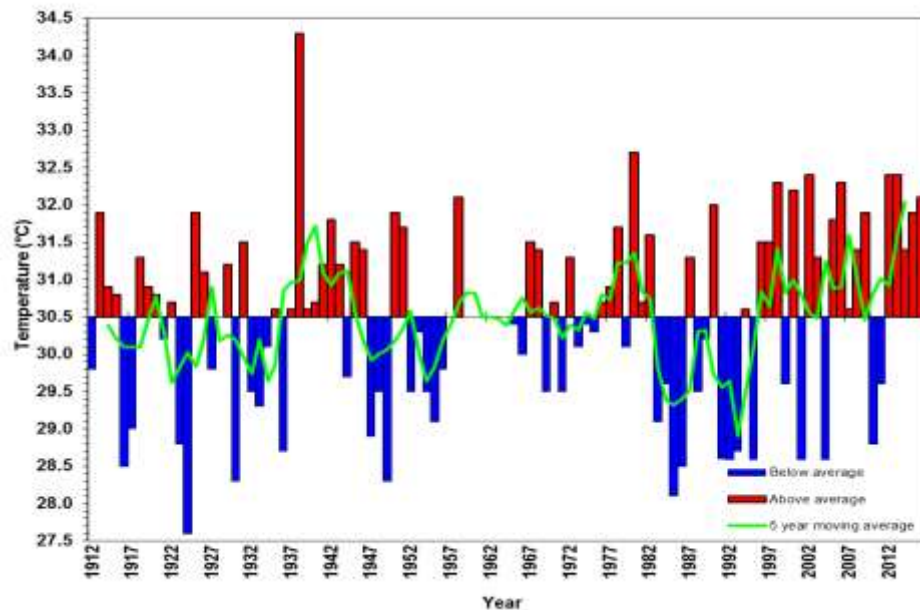
2015 Summer Rainfall



© Commonwealth of Australia 2016, Australian Bureau of Meteorology ID code: AWAP

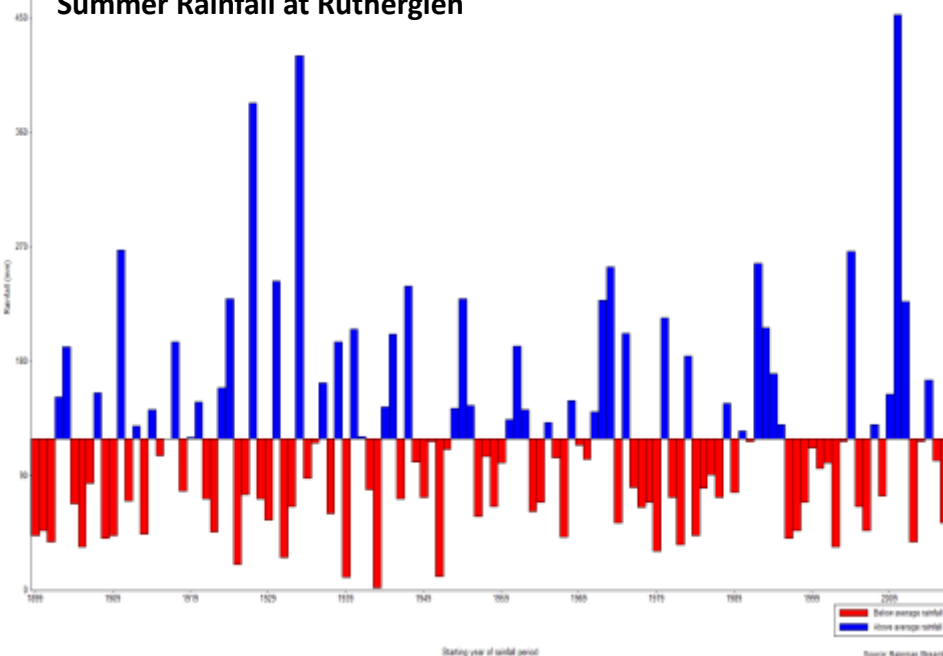
Issued: 22/12/2015

Summer Maximum Temperature at Rutherglen



Historical record of seasonal rainfall (mm) at RUTHERGLEN POST OFFICE
Long-term average rainfall (Dec to Feb) is 110 mm
Rainfall period: Dec to Feb

Summer Rainfall at Rutherglen

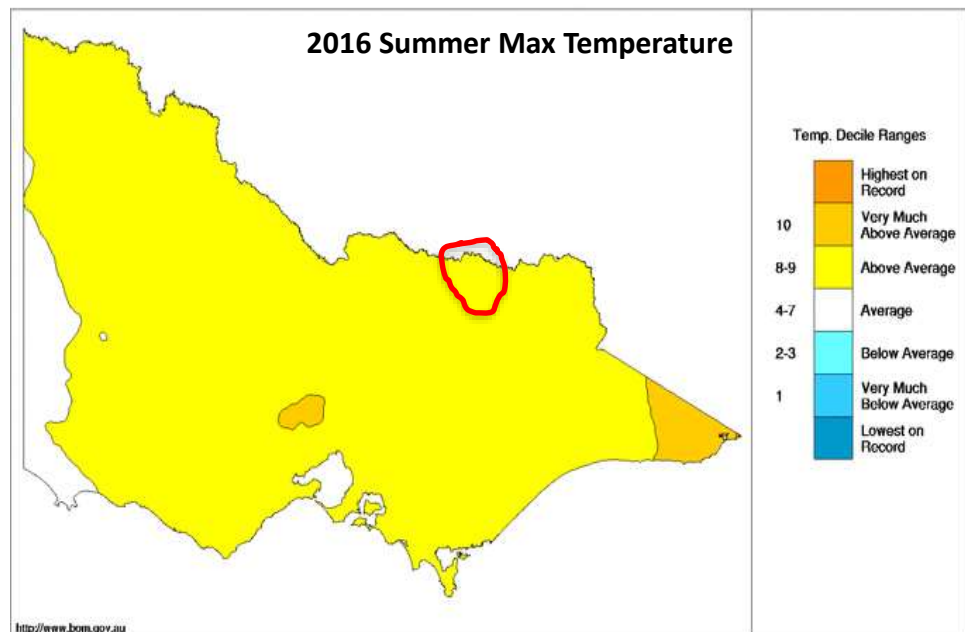


Maximum Temperature Deciles

1 December 2016 to 28 February 2017

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2016 Summer Max Temperature

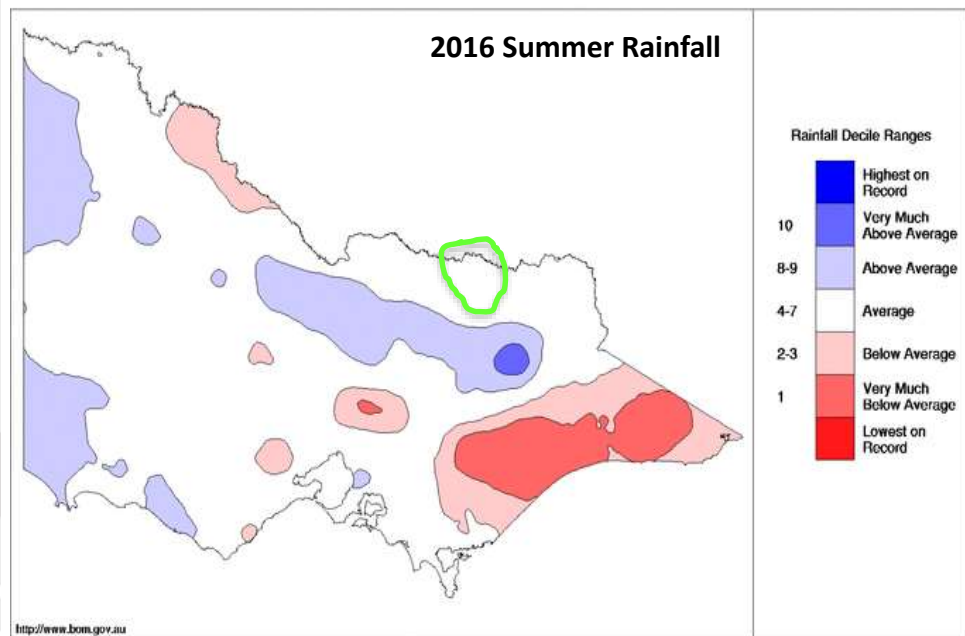


© Commonwealth of Australia 2017, Australian Bureau of Meteorology ID code: AWAP
Victorian Rainfall Deciles

1 December 2016 to 28 February 2017

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2016 Summer Rainfall

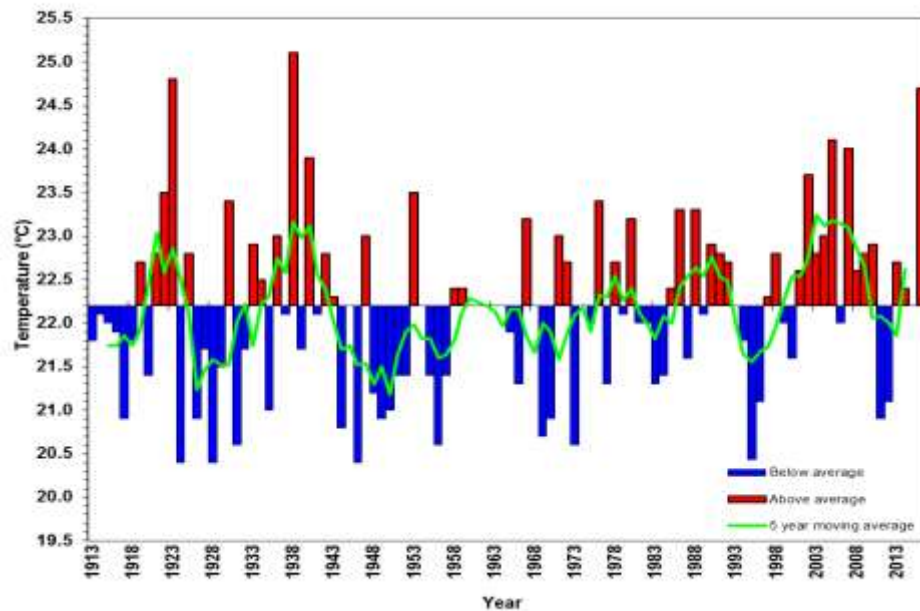


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Issued: 21/03/2017

Issued: 21/03/2017

Autumn Maximum Temperature at Rutherglen

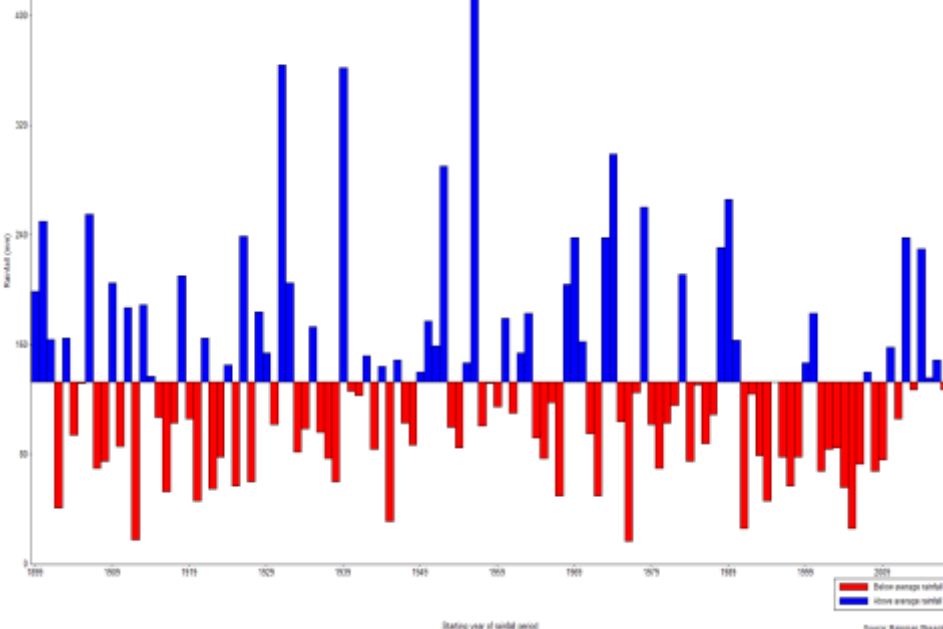


Historical record of seasonal rainfall (mm) at RUTHERGLEN POST OFFICE

Long-term average rainfall (Mar to May) is 120 mm

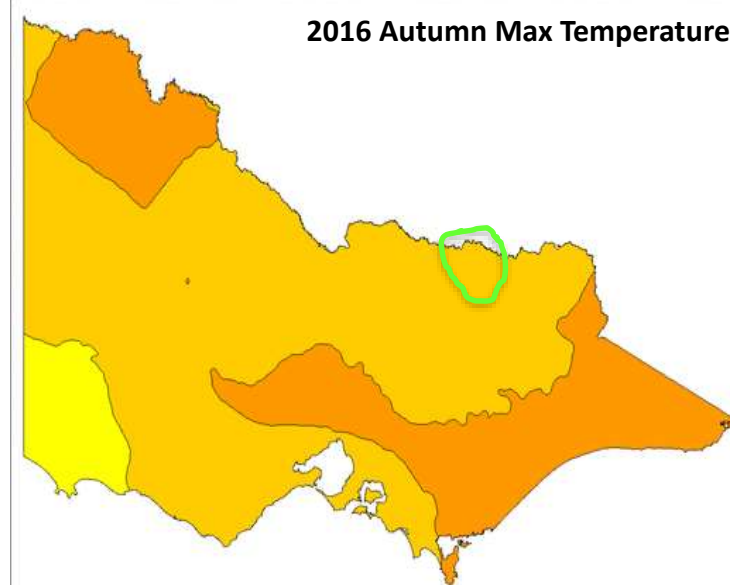
Rainfall period: Mar to May

Autumn Rainfall at Rutherglen

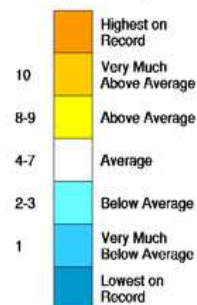


Source: Rainfall Observations

2016 Autumn Max Temperature



Temp. Decile Ranges

<http://www.bom.gov.au>

© Commonwealth of Australia 2016, Australian Bureau of Meteorology

ID code: AWAP

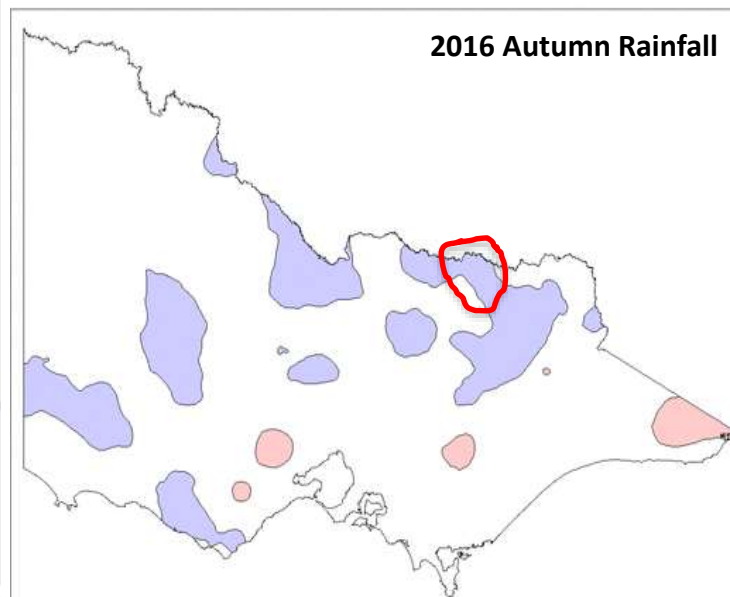
Victorian Rainfall Deciles

1 March to 31 May 2016

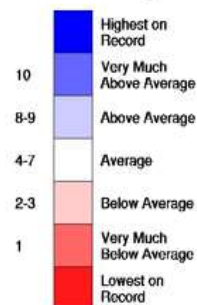
Issued: 30/11/2016

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2016 Autumn Rainfall



Rainfall Decile Ranges

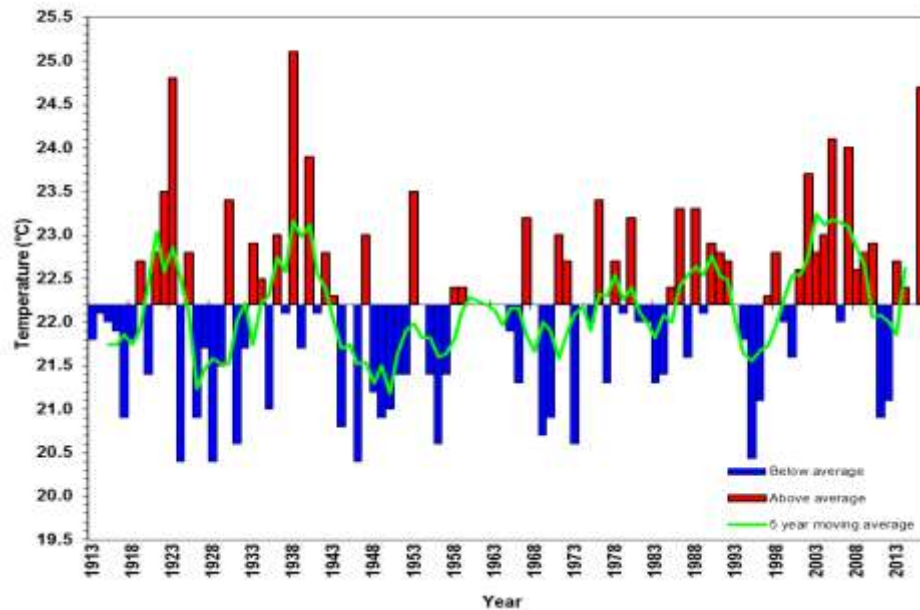
<http://www.bom.gov.au>

© Commonwealth of Australia 2016, Australian Bureau of Meteorology

ID code: AWAP

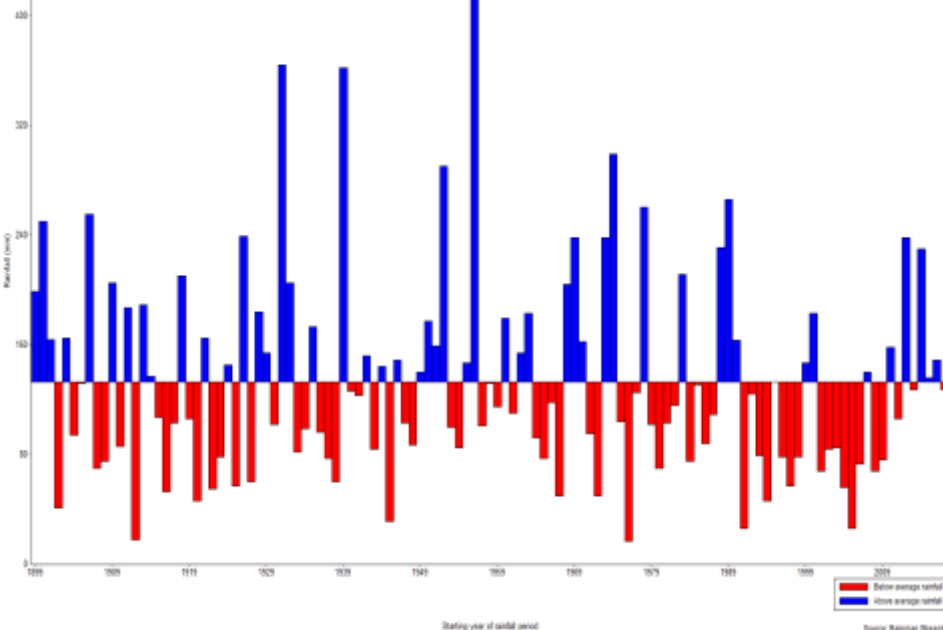
Issued: 22/12/2016

Autumn Maximum Temperature at Rutherglen



Historical record of seasonal rainfall (mm) at RUTHERGLEN POST OFFICE
Long-term average rainfall (Mar to May) is 120 mm
Rainfall period: Mar to May

Autumn Rainfall at Rutherglen



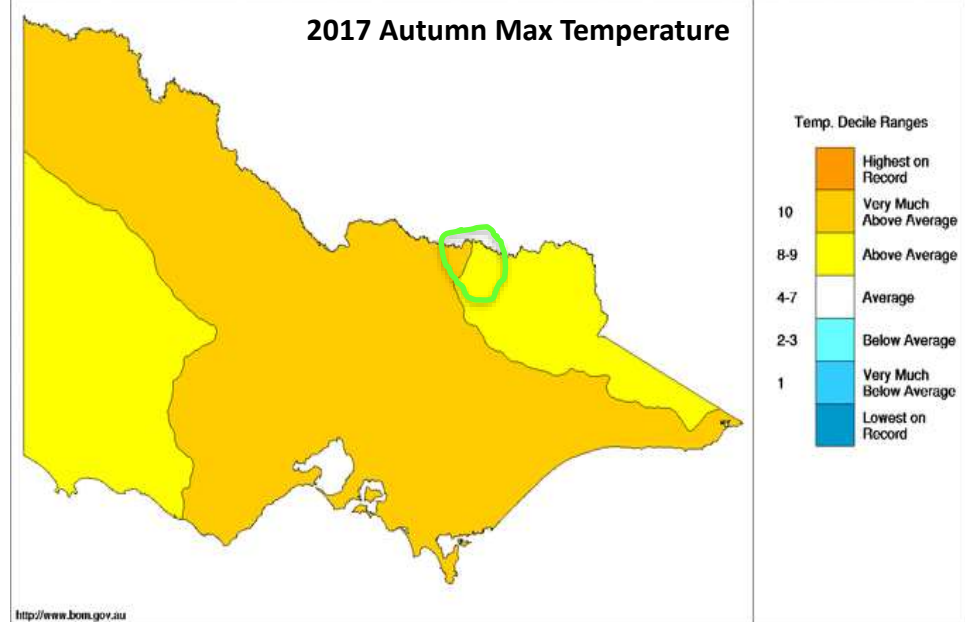
Source: Rainfall Observations

Maximum Temperature Deciles

1 March to 31 May 2017

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2017 Autumn Max Temperature



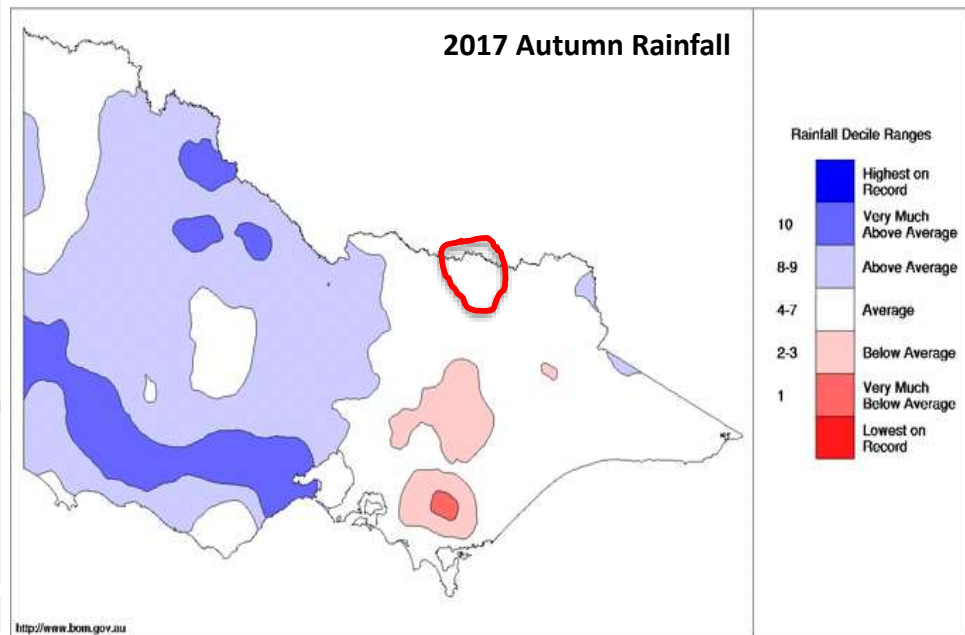
© Commonwealth of Australia 2017, Australian Bureau of Meteorology ID code: AWAP
Victorian Rainfall Deciles

1 March to 31 May 2017

Issued: 21/06/2017

Distribution Based on Gridded Data
Australian Bureau of Meteorology

2017 Autumn Rainfall



© Commonwealth of Australia 2017, Australian Bureau of Meteorology ID code: AWAP

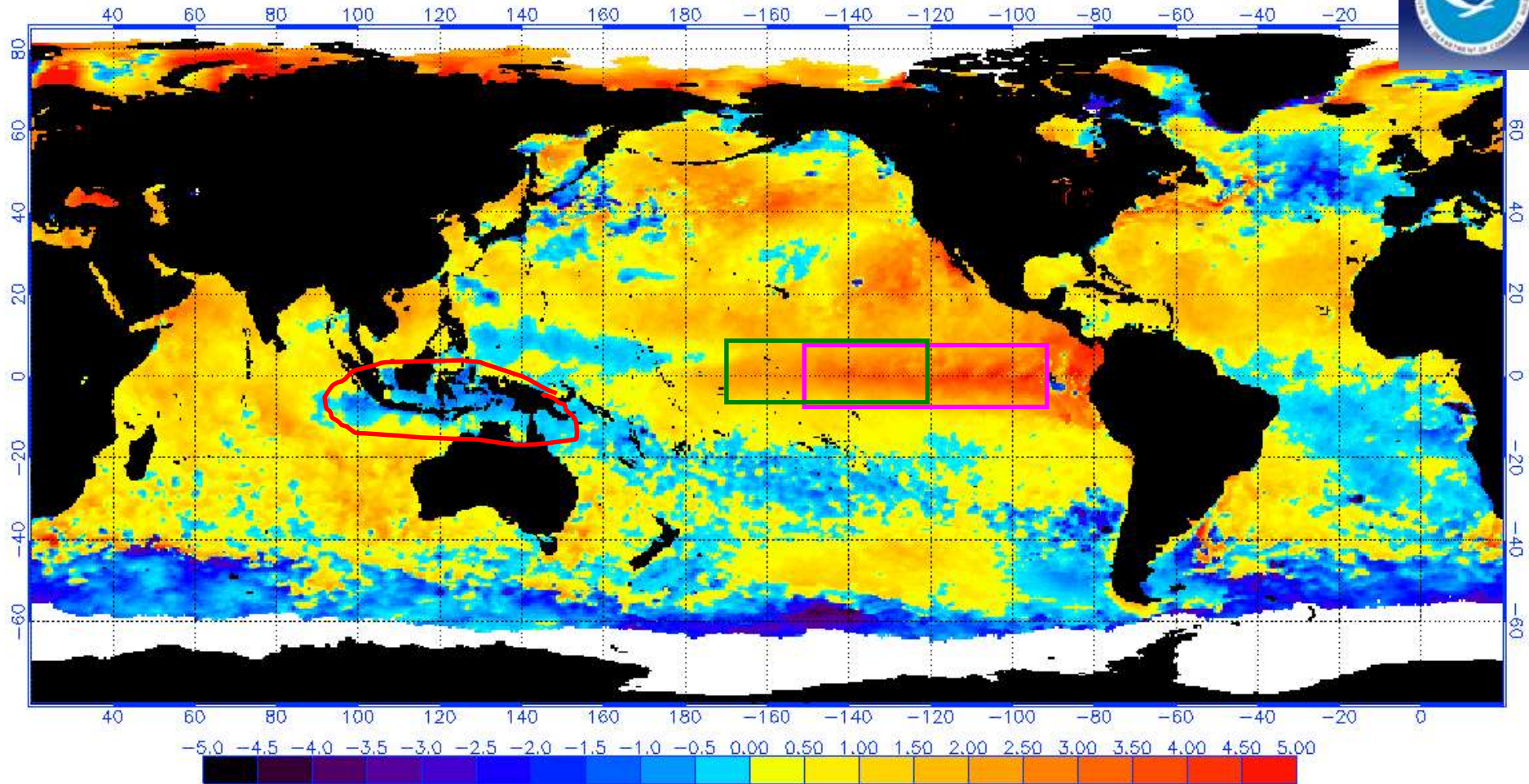
Issued: 21/06/2017



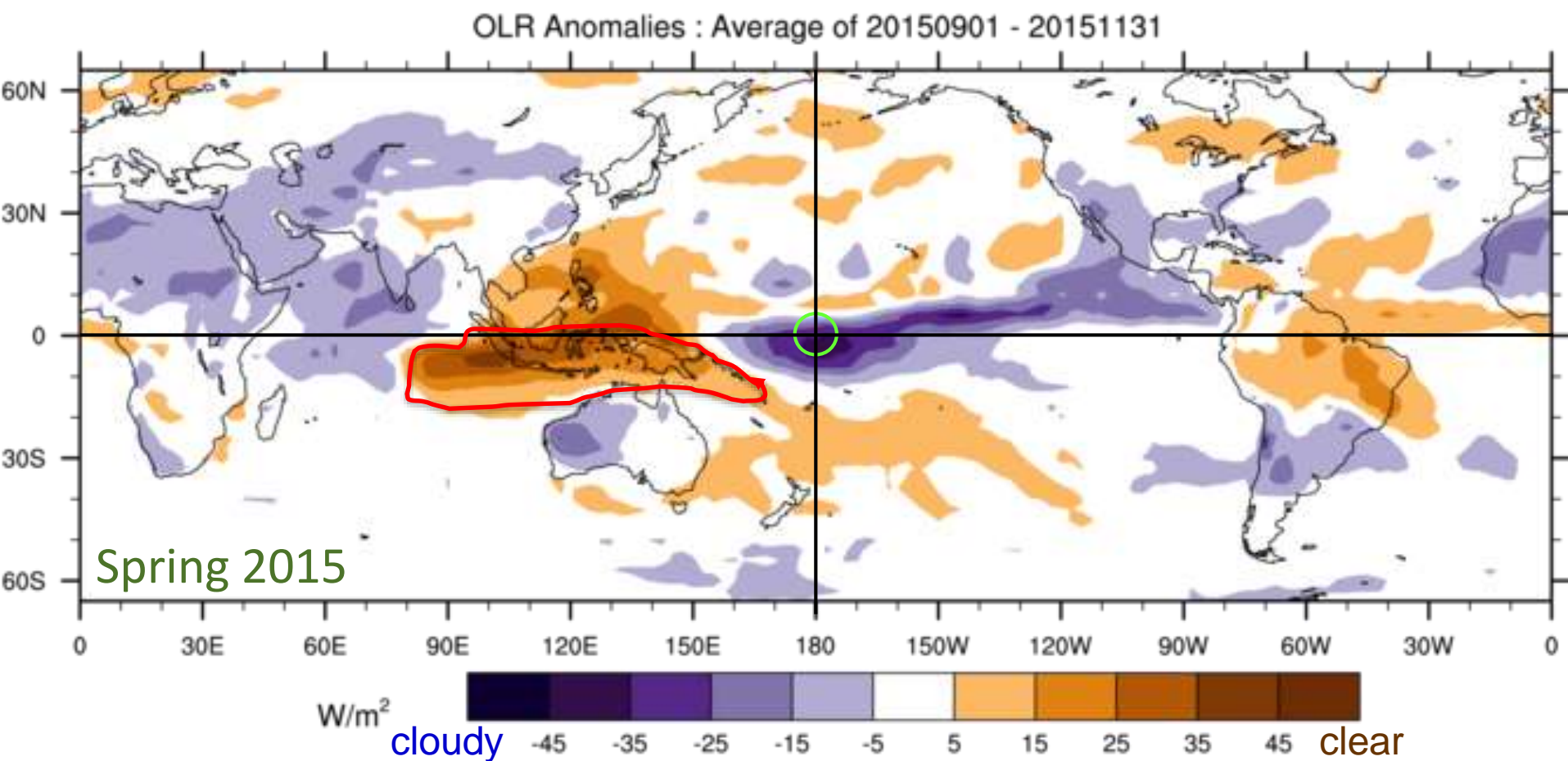
Crystal Falls, Jatbula Trail, Nitmiluk NP, NT, April 2016

1 October 2015

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 10/1/2015
(white regions indicate sea-ice)



El Niño



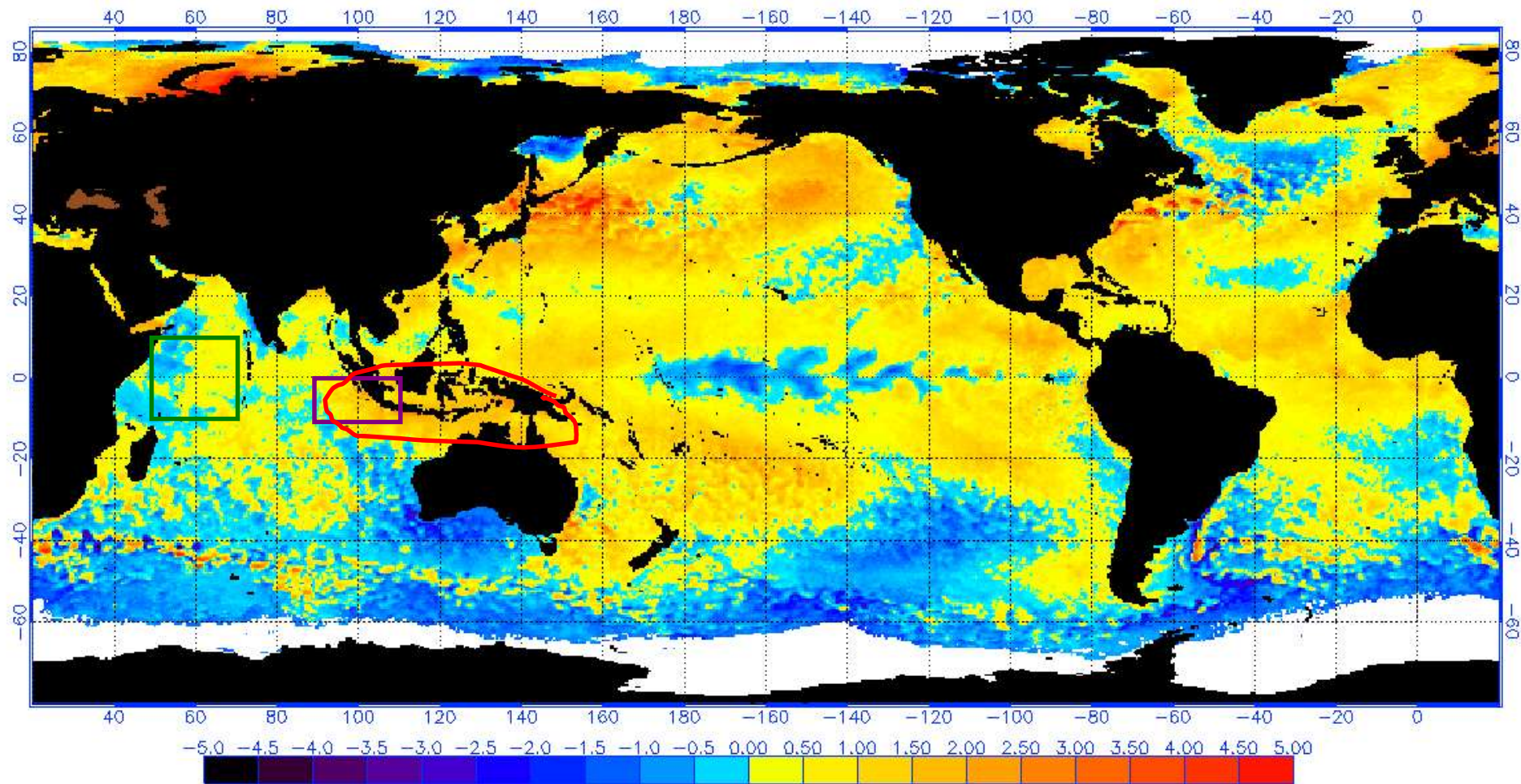
(C) Copyright Commonwealth of Australia 2015. Bureau of Meteorology

In the last 90 days Cloud at the International Date Line was normal = El Nino.

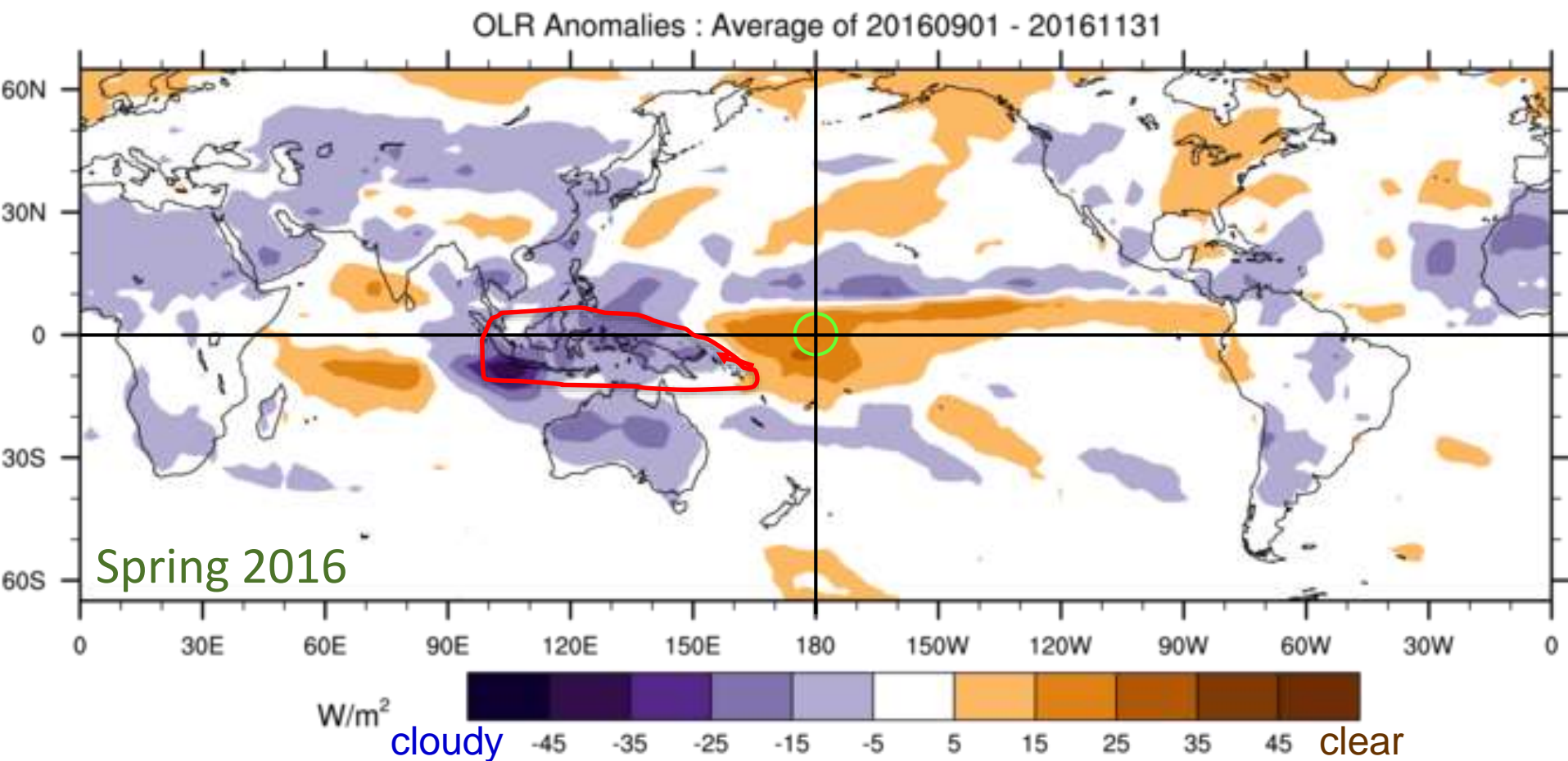
Less cloud in the tropical north

3 October 2016

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 10/3/2016
(white regions indicate sea-ice)



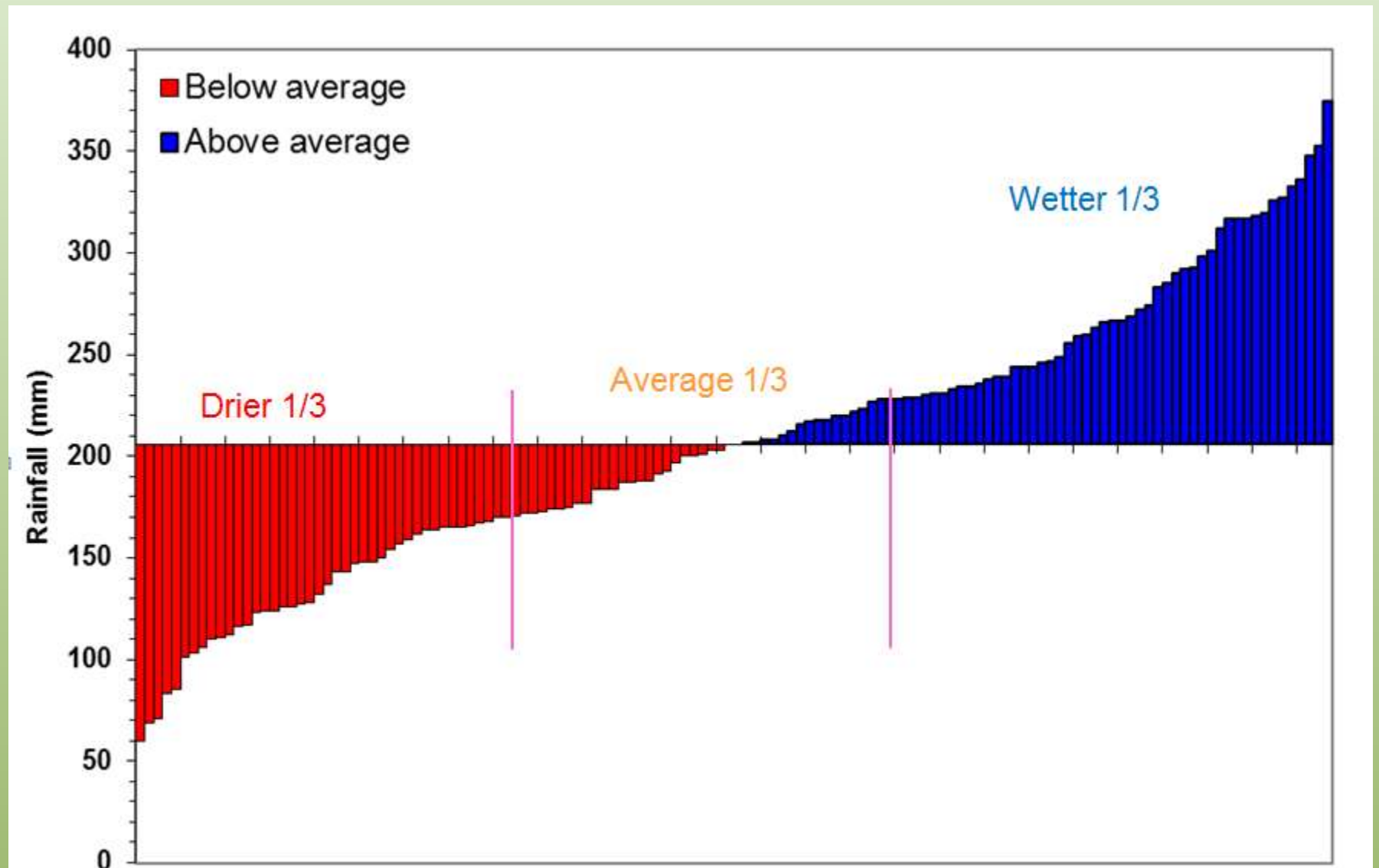
Negative Indian Ocean Dipole

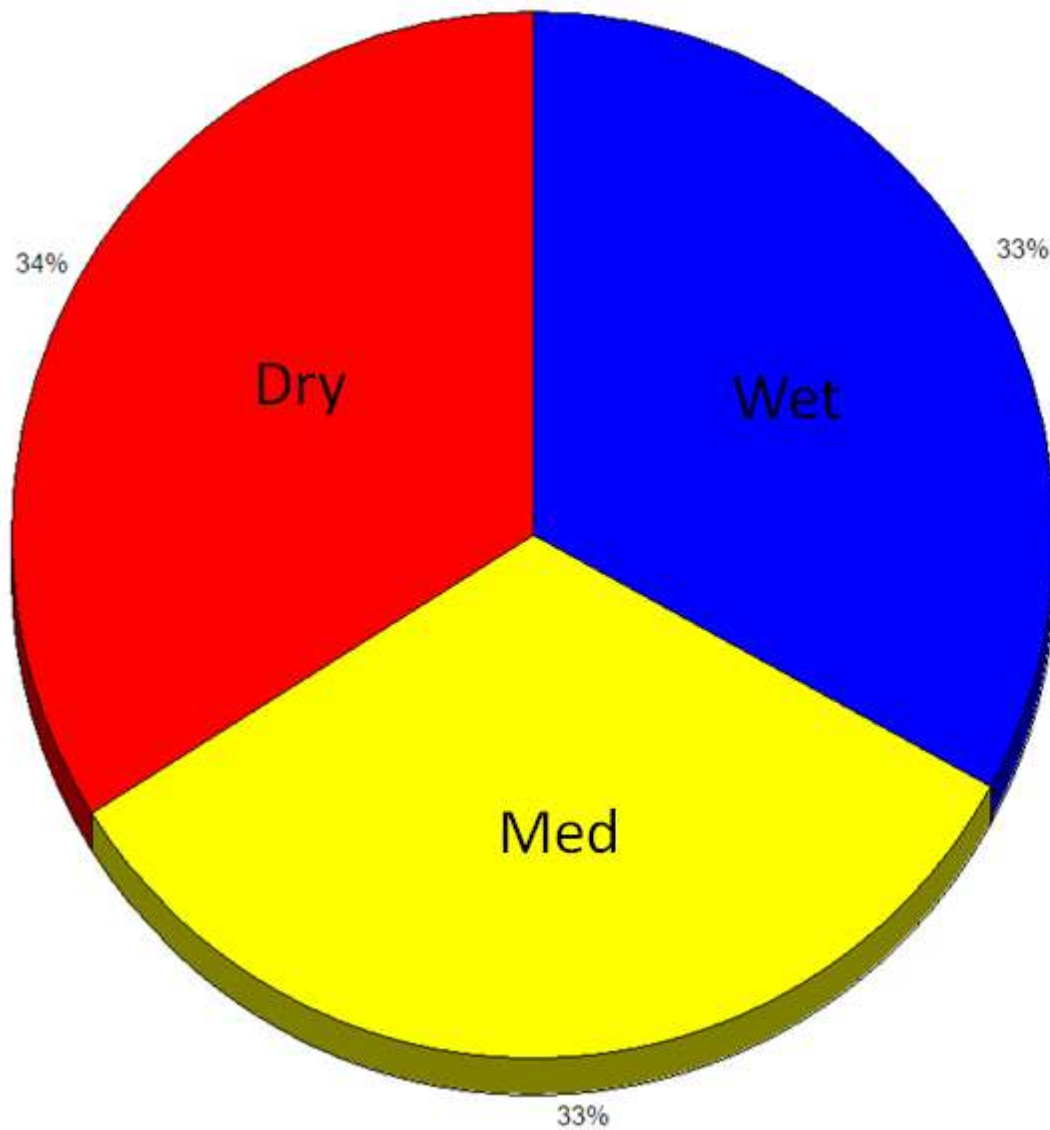


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In the last 90 days Cloud at the International Date Line was less = La Nina.

More cloud in the tropical north and over the interior





Historical rainfall

Third = Wet

Third = Medium

Third = Dry

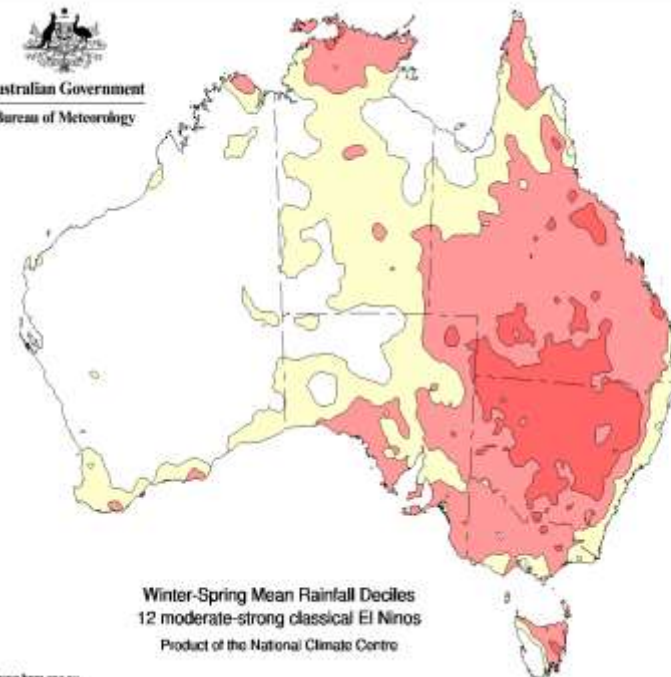
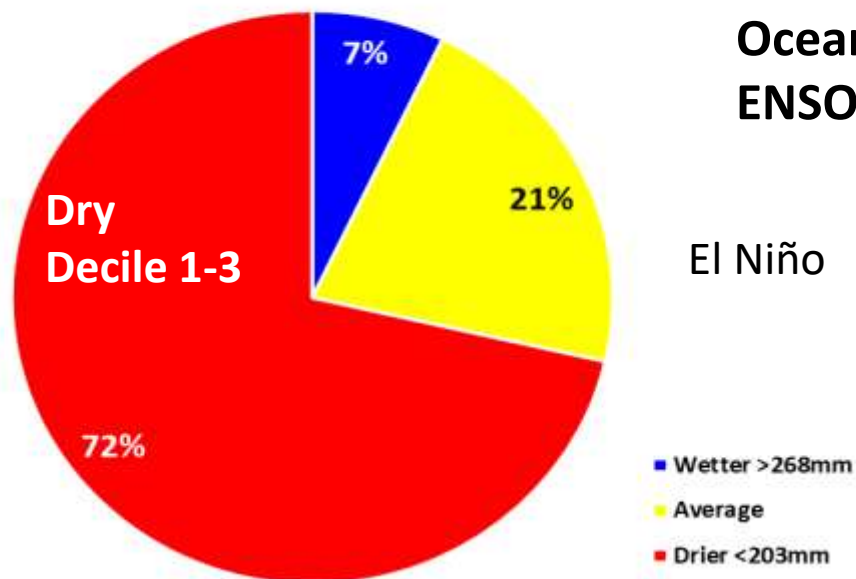


Milawa Aug-Nov Rainfall in 28 Years Since 1903

El Niño

Pacific
Ocean
ENSO

El Niño



<http://www.bom.gov.au>

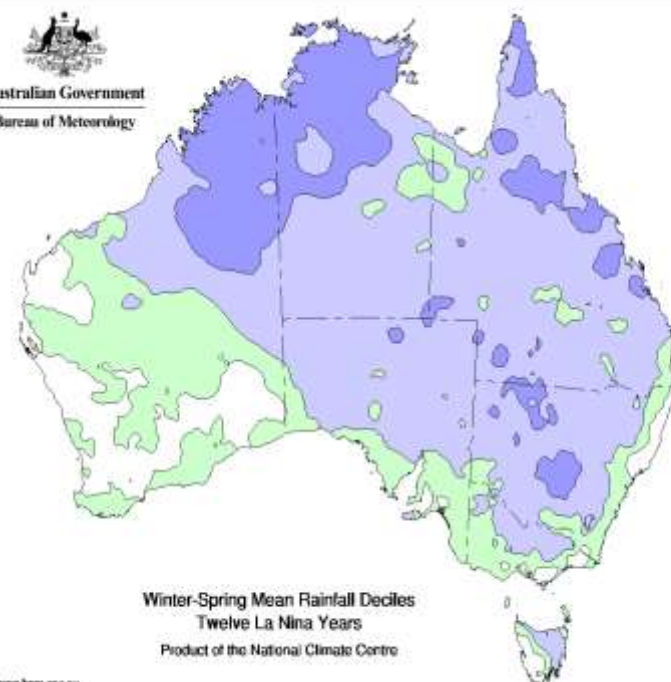
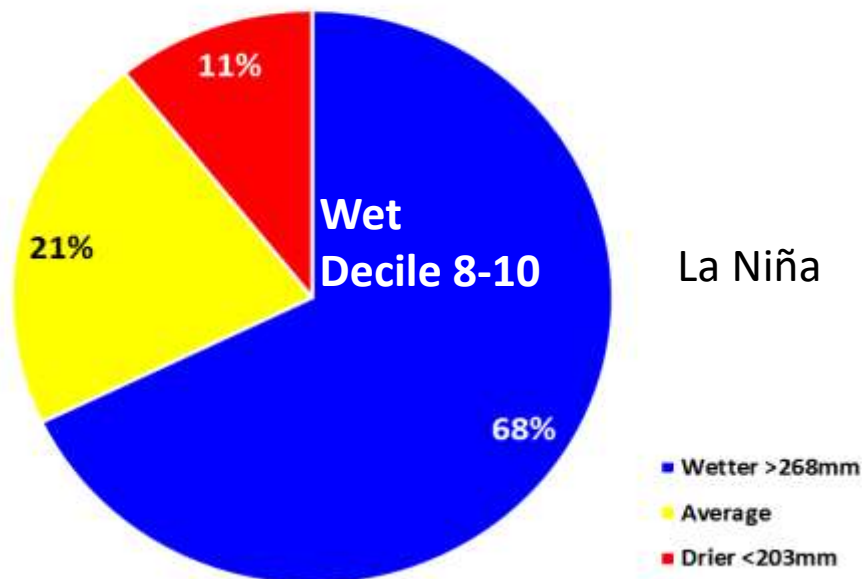
© Commonwealth of Australia 2005, Australian Bureau of Meteorology

Issued: 22/09/2005

Milawa Aug-Nov Rainfall in 28 Years Since 1903

La Niña

La Niña



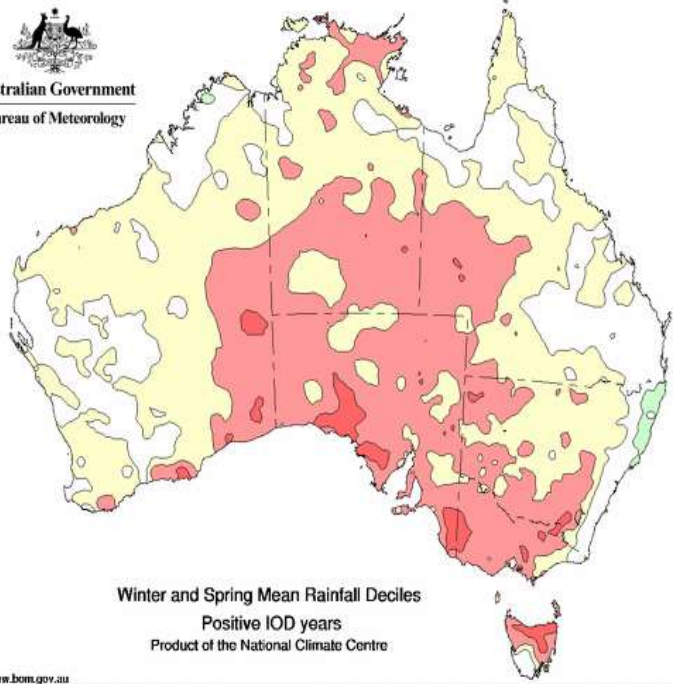
<http://www.bom.gov.au>

© Commonwealth of Australia 2004, Australian Bureau of Meteorology

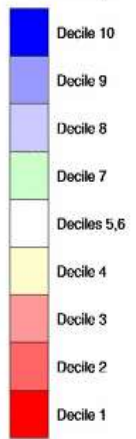
Issued: 22/11/2004



Australian Government
Bureau of Meteorology



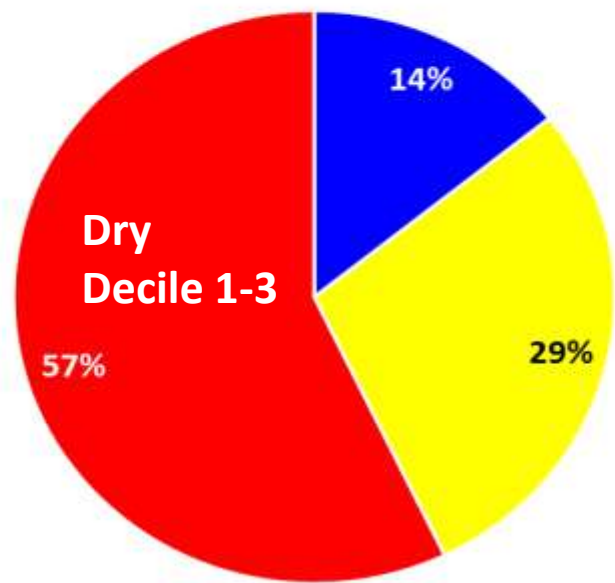
Mean Rainfall Decile Ranges



Milawa Aug-Nov Rainfall in 21 Years Since 1903

IOD+

Indian
Ocean
Dipole

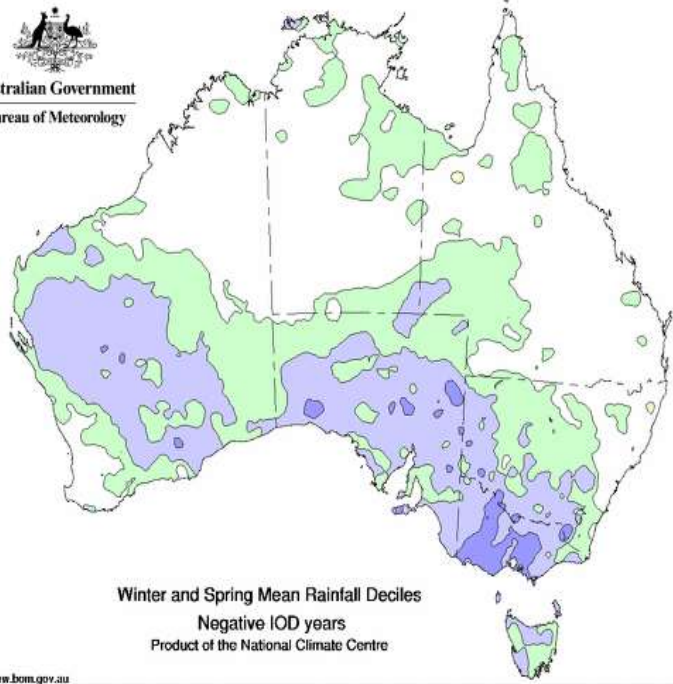


IOD+

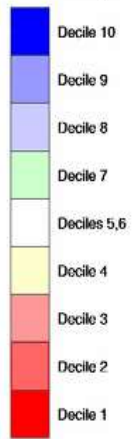
- Wetter >268mm
- Average
- Drier <203mm



Australian Government
Bureau of Meteorology



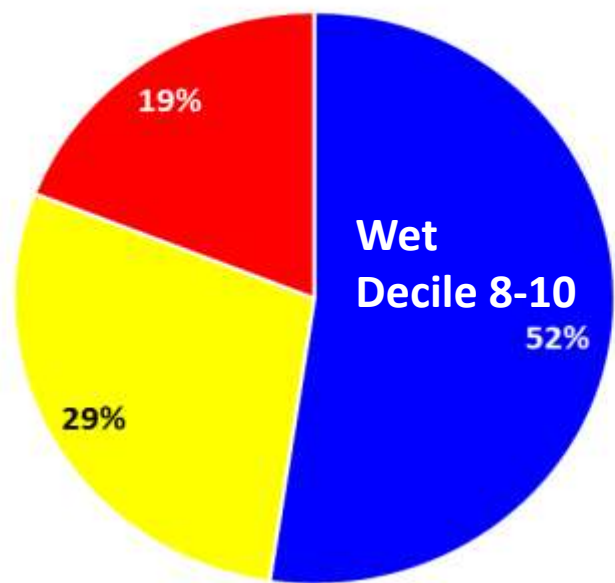
Mean Rainfall Decile Ranges



Milawa Aug-Nov Rainfall in 21 Years Since 1903

IOD-

IOD-



- Wetter >268mm
- Average
- Drier <203mm

<http://www.bom.gov.au>

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Issued: 06/10/2008

<http://www.bom.gov.au>

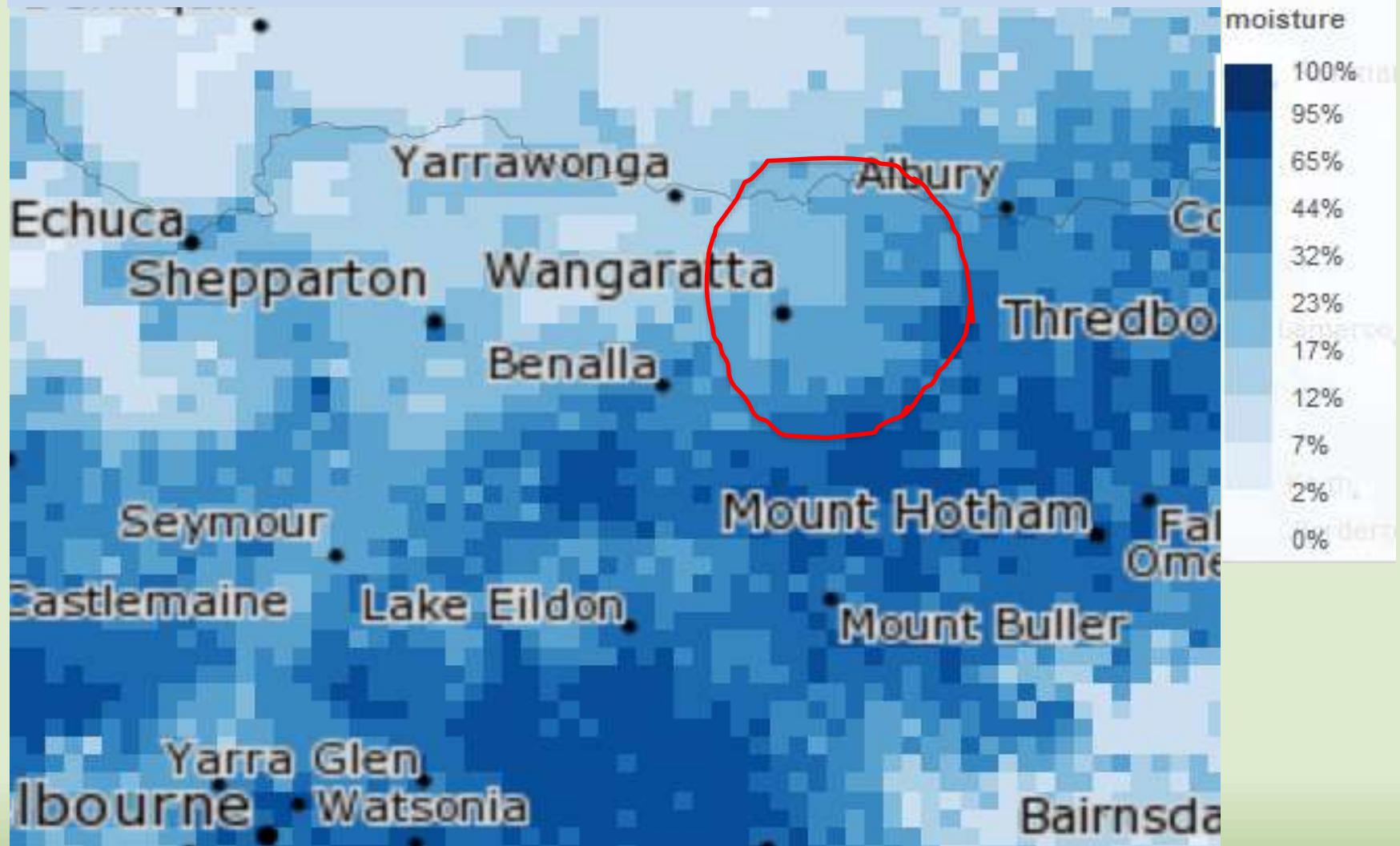
© Commonwealth of Australia 2006, Australian Bureau of Meteorology

Issued: 06/10/2008

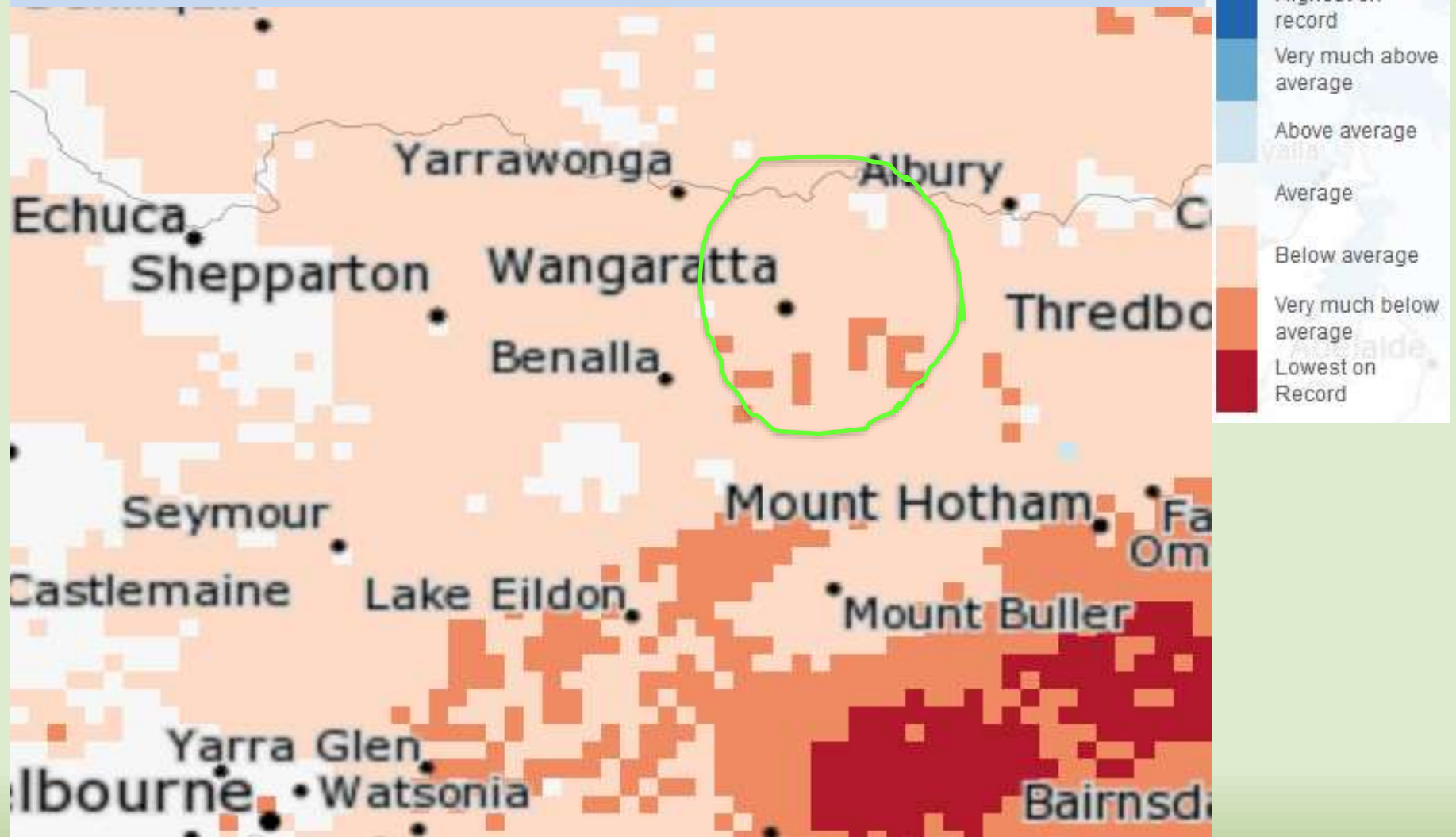


BSM Ski lodge, Falls Creek, August 2015

BoM AWRA modelled plant available water %10-100cm 23 July 2017

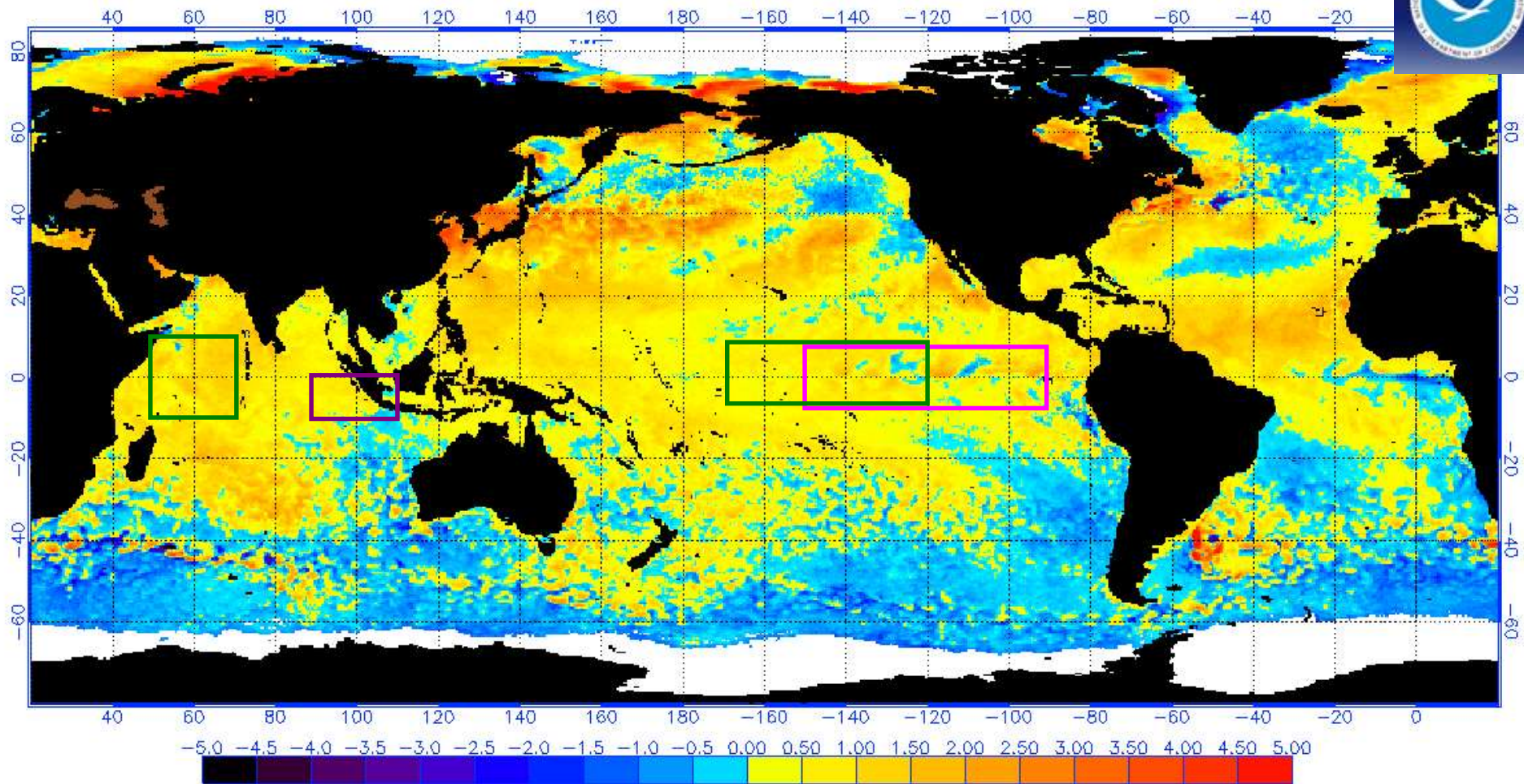


BoM AWRA modelled plant available water decile 10-100cm 23 July 2017



24 July 2017

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 7/24/2017
(white regions indicate sea-ice)

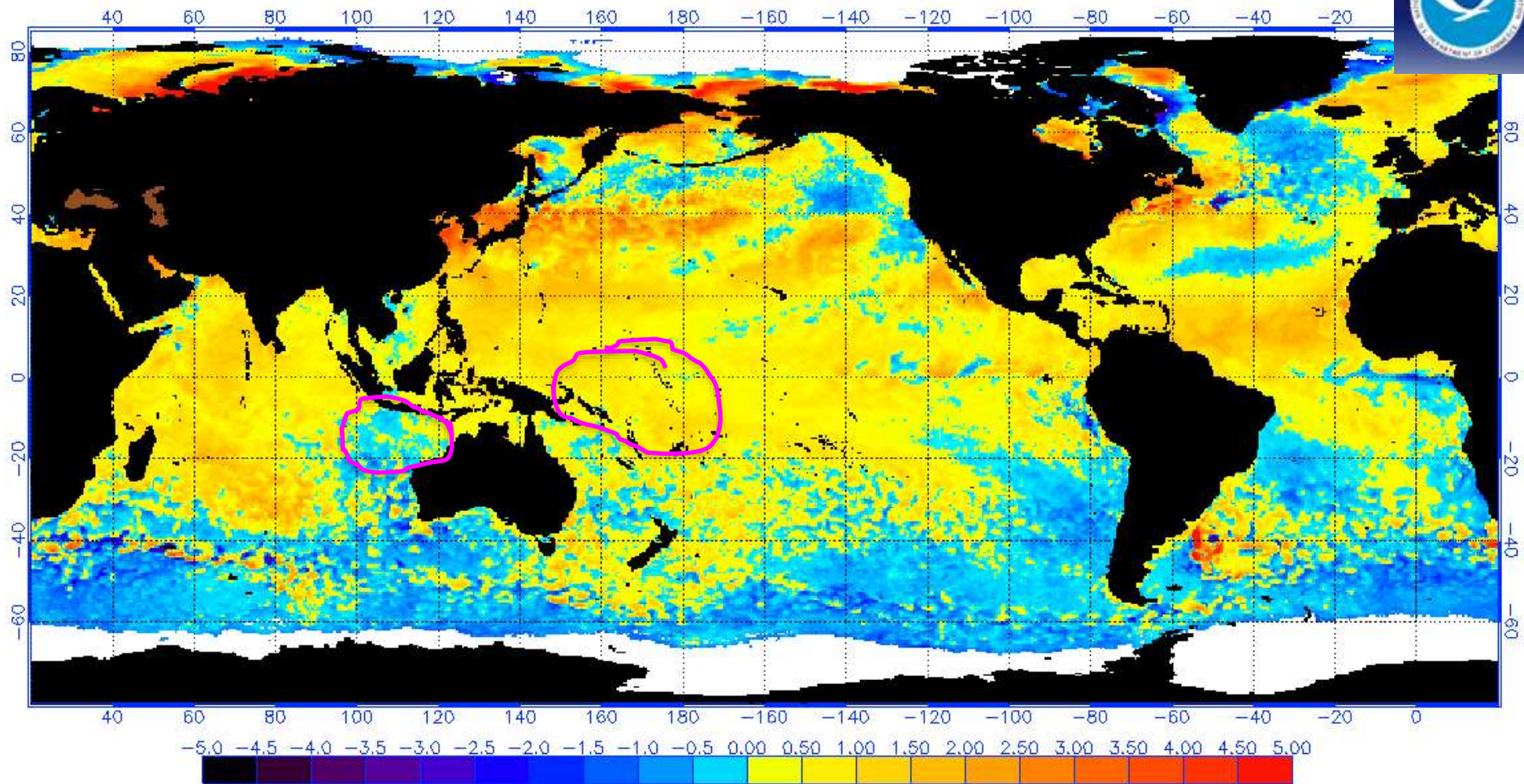


Currently the Nino 3 and 3.4 areas of the Pacific are $+0.42^{\circ}\text{C}$, $+0.47^{\circ}\text{C}$, both neutral and stable

The DMI measurement of the IOD is -0.14 , neutral

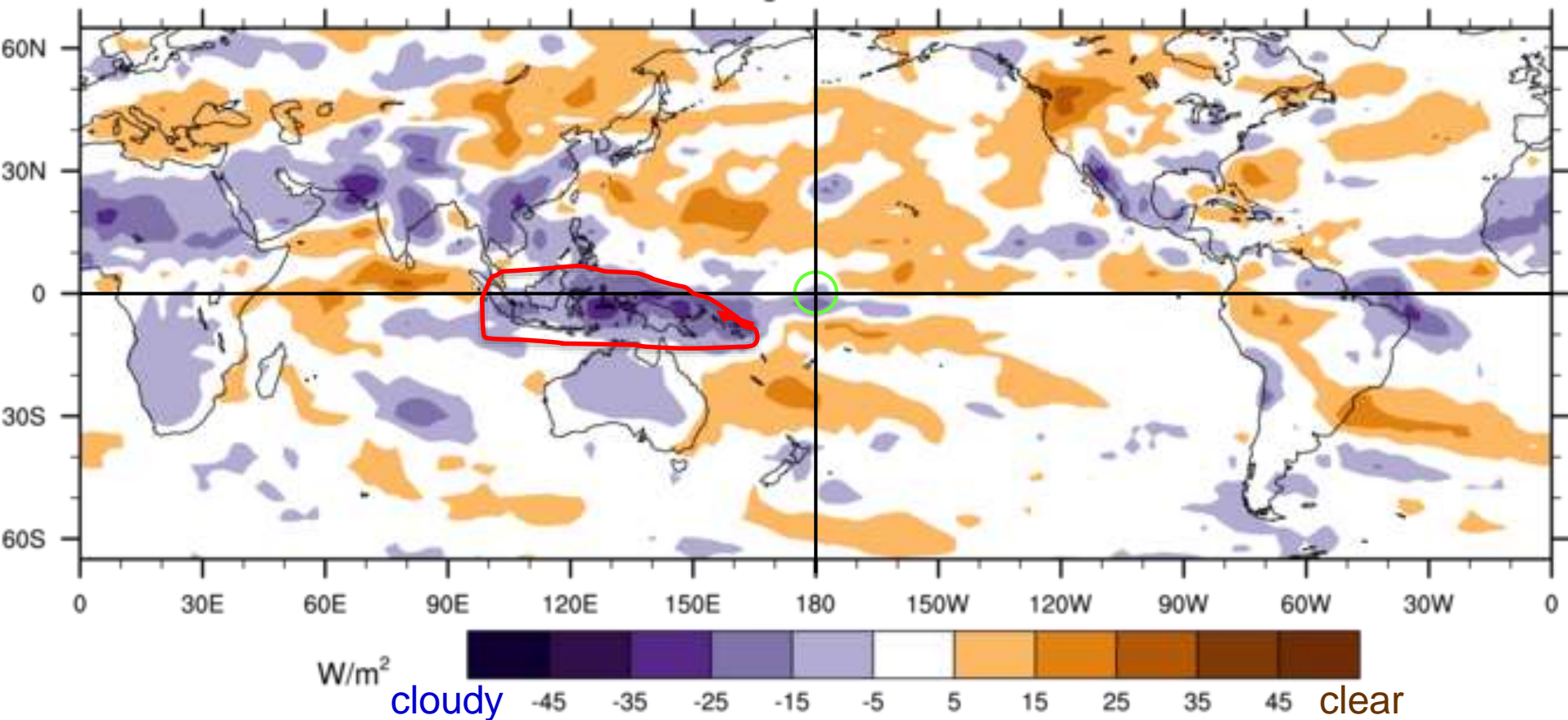
24 July 2017

NOAA/NESDIS 50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 7/24/2017
(white regions indicate sea-ice)



Coral Sea is warmer = more moisture available
Whole Indian Ocean is warmer, bar the Timor Sea upwelling cool, as a result of stronger East winds in May.

OLR Anomalies : Average of 22 Jun 2017 : 22 Jul 2017



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In the last 30 days Cloud at the International Date Line was normal = Neutral.

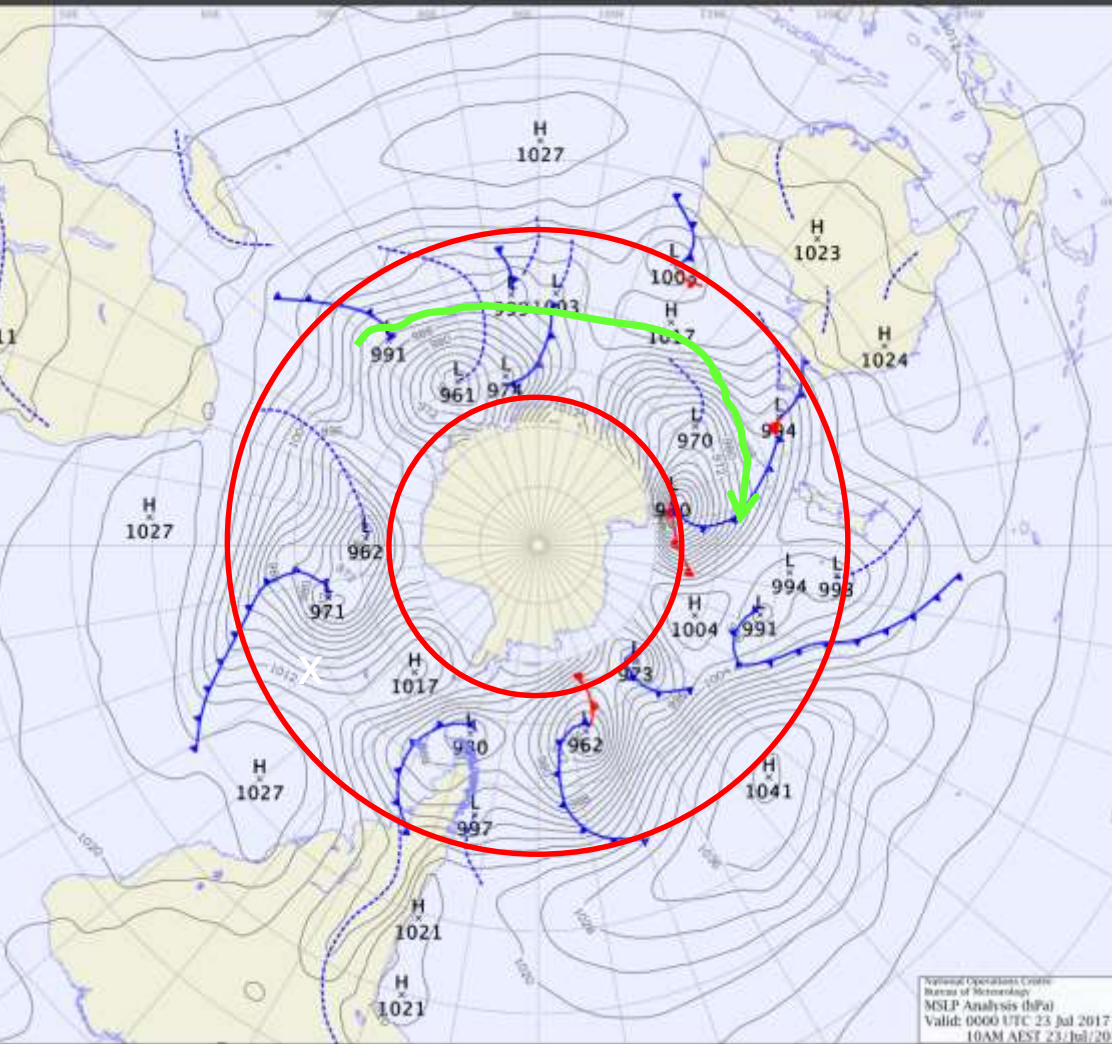
More cloud in the tropical north and over the interior

Southern Annular Mode, SAM or AAO

A crude measure of the strength of polar westerlies in the Southern Ocean.

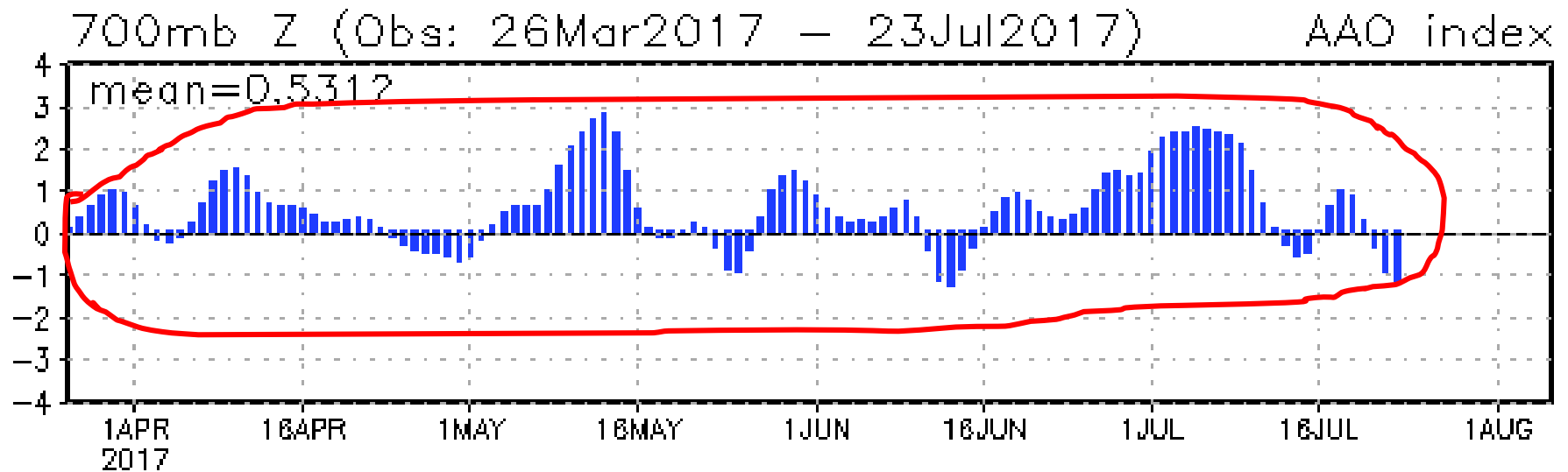
The SAM index is calculated by the differences in pressure between 40° and 65° degrees latitude

Pushes or pulls rain bearing triggers away from southern Victoria.



Southern Annular Mode

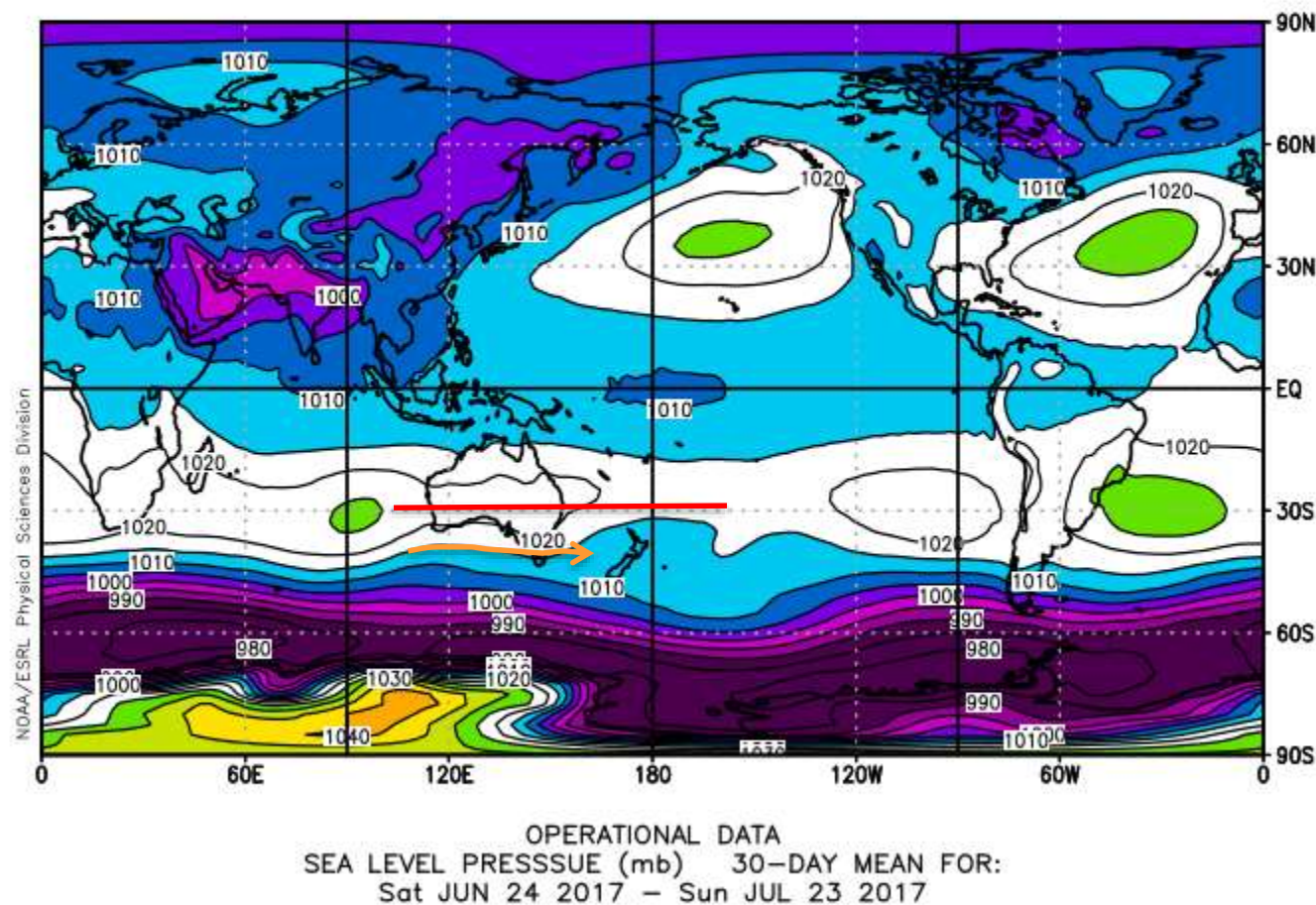
AAO: Observed & GFS forecasts



The Southern Annular Mode (SAM) has been positive for the growing season so far. Pulling rain triggers away from Victoria,

BoM and NOAA predict a return from weak negativity to neutrality in the next 14 days.

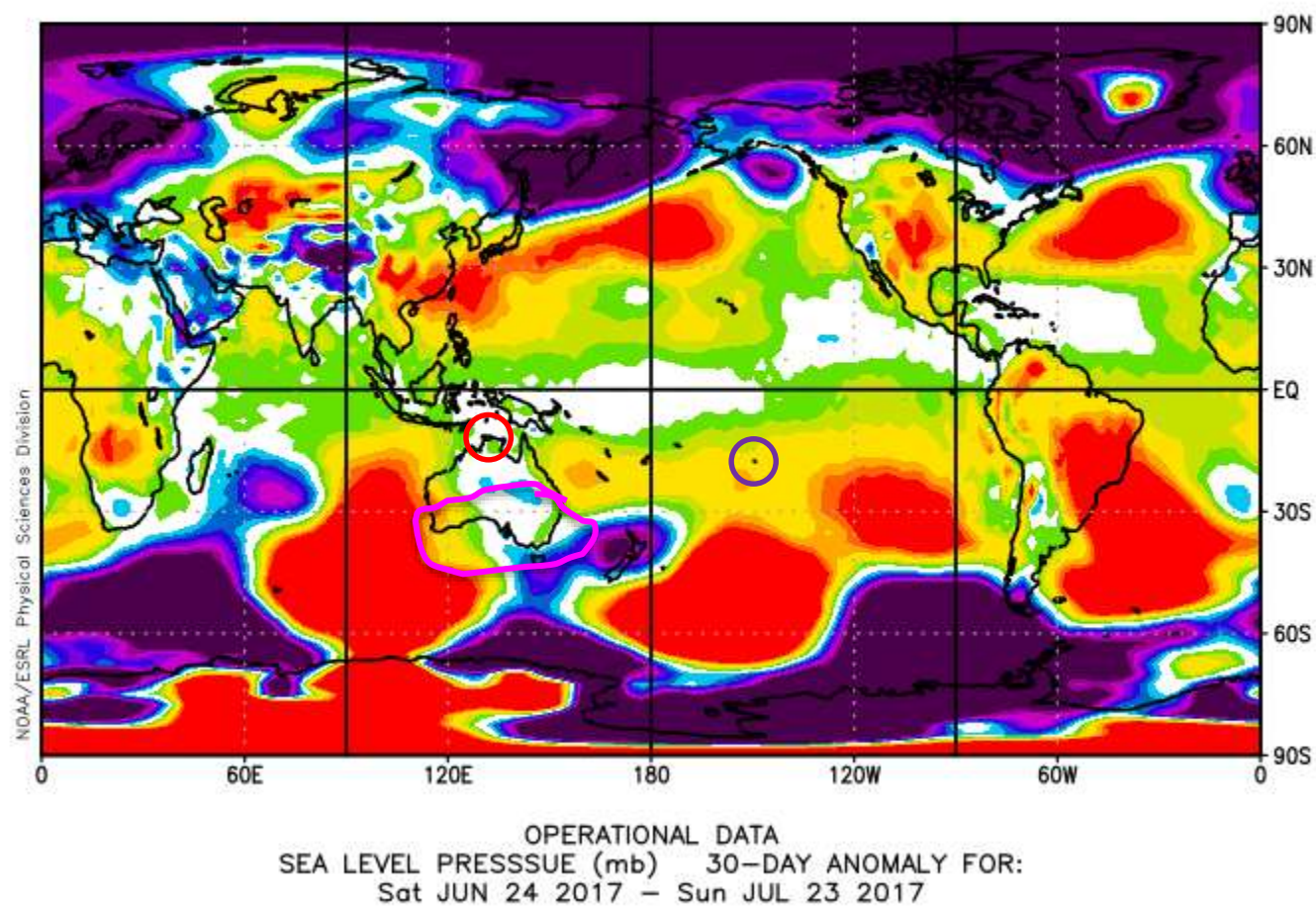
Last 30 days Air Pressure



Source = NOAA

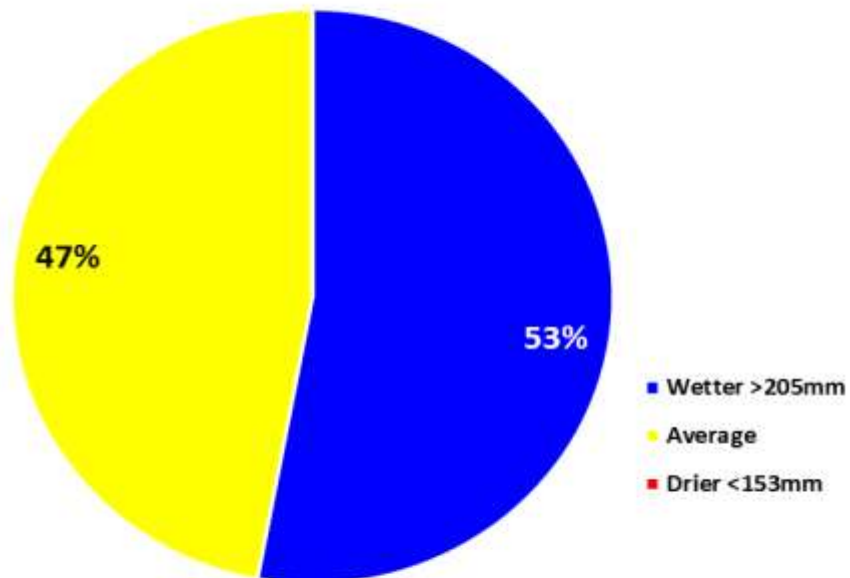
Centre of high pressure is at a slightly higher position
High is in a blocking position for northern Victoria.

Last 30 days Air Pressure Anomaly

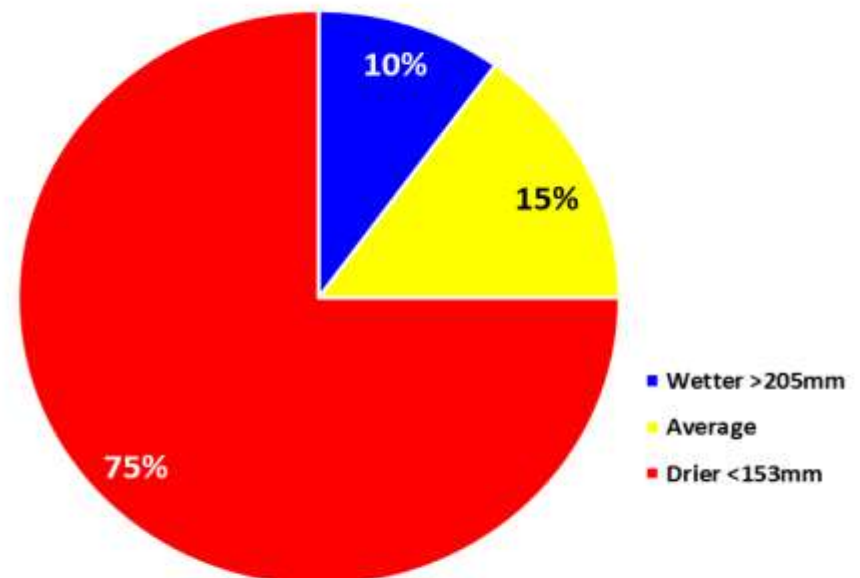


Pressure had been higher over southern Australia in June now normal
Darwin pressure normal, Tahiti higher = SOI positive, more La Nina-ish.

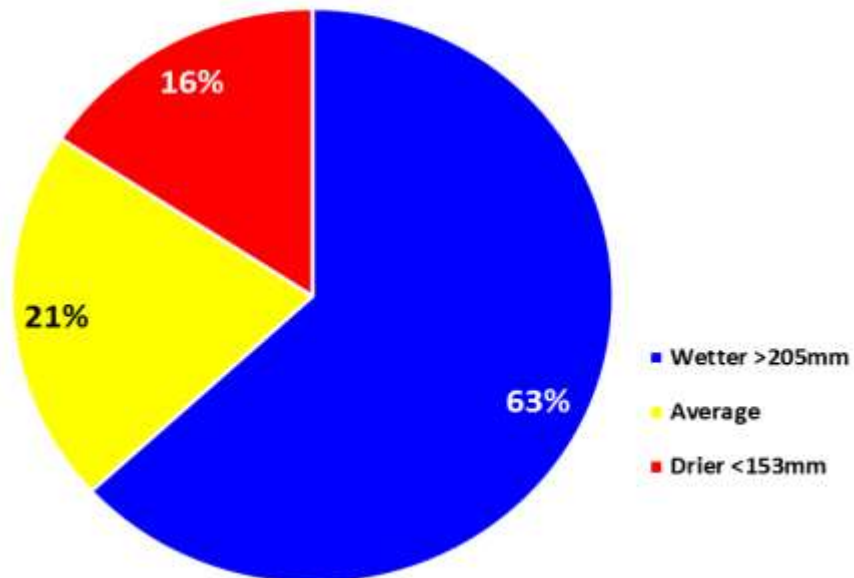
**Rutherglen Jun-Aug Rainfall in 17 Years Since
1899 pressure low**



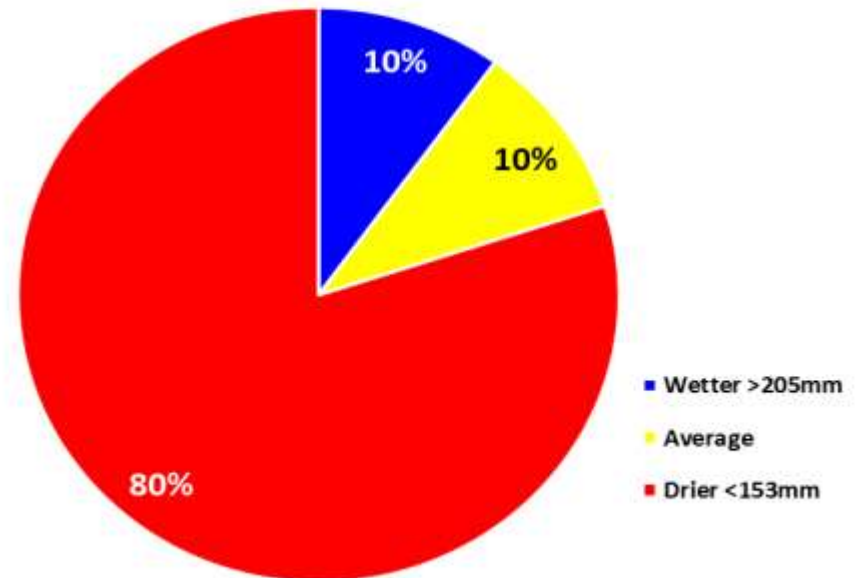
**Rutherglen Jun-Aug Rainfall in 20 Years Since
1899 pressure high**



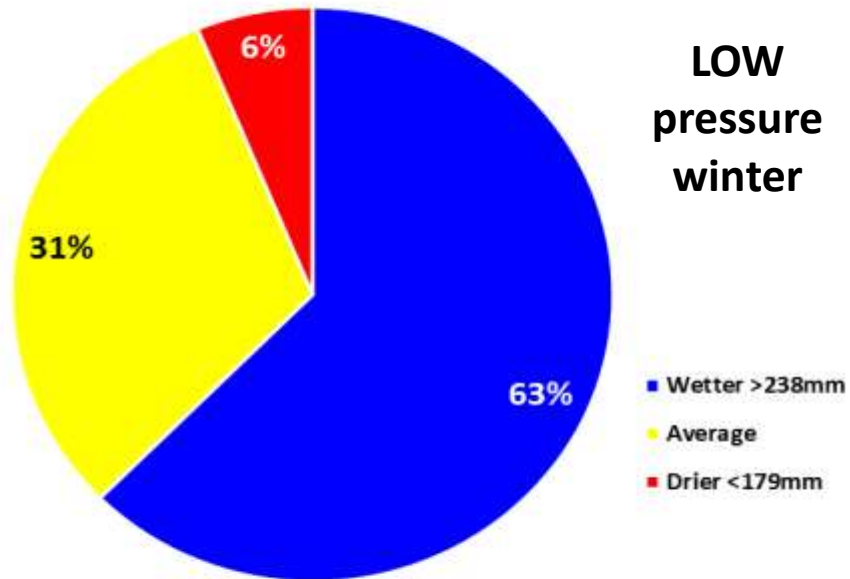
**Rutherglen Jun-Aug Rainfall in 19 Years Since
1899 position high**



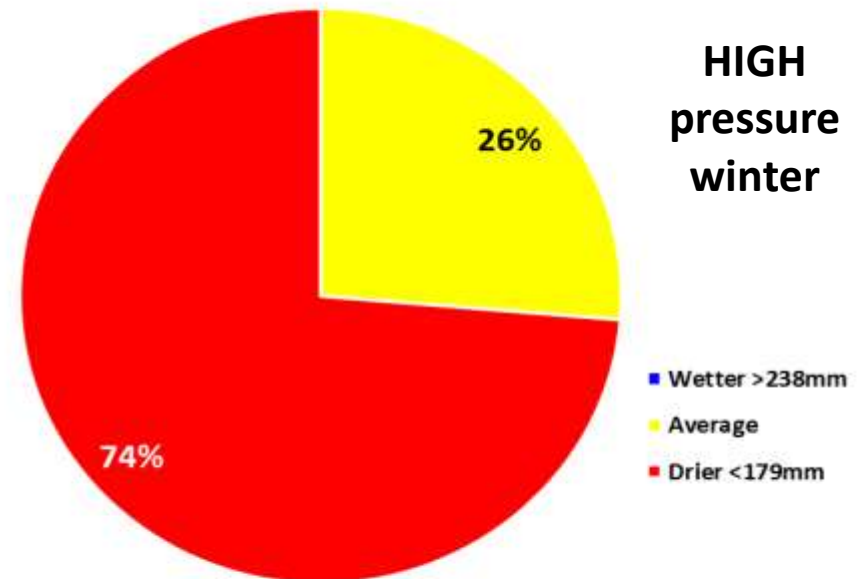
**Rutherglen Jun-Aug Rainfall in 20 Years Since
1899 position low**



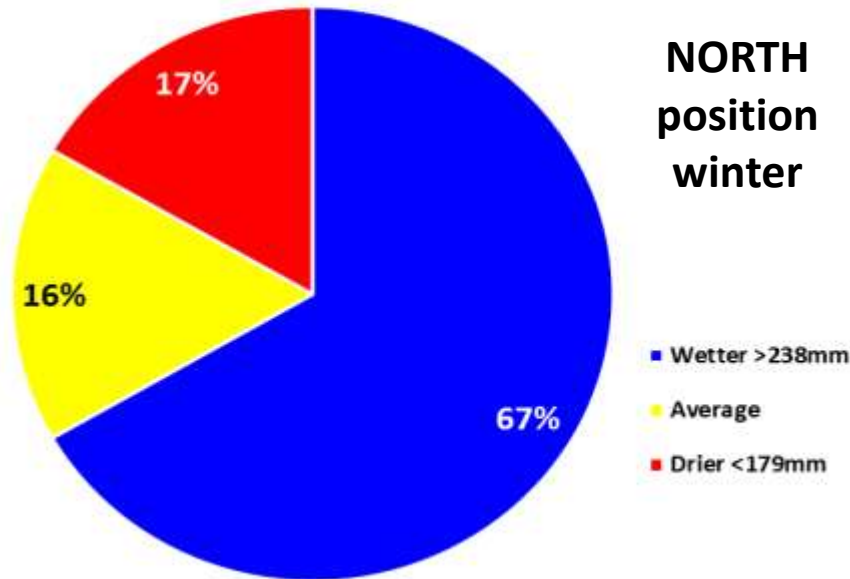
Milawa Jun-Aug Rainfall in 16 Years Since 1903
pressure low



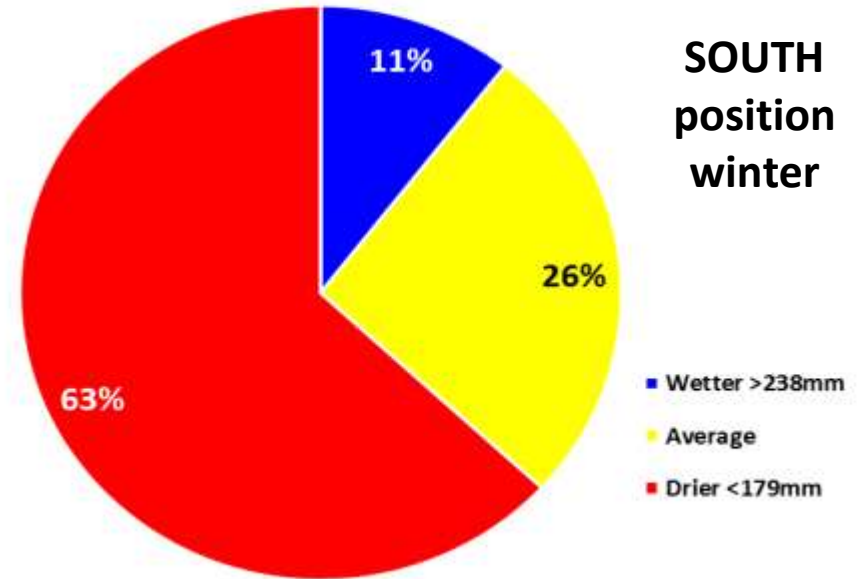
Milawa Jun-Aug Rainfall in 19 Years Since 1903
pressure high



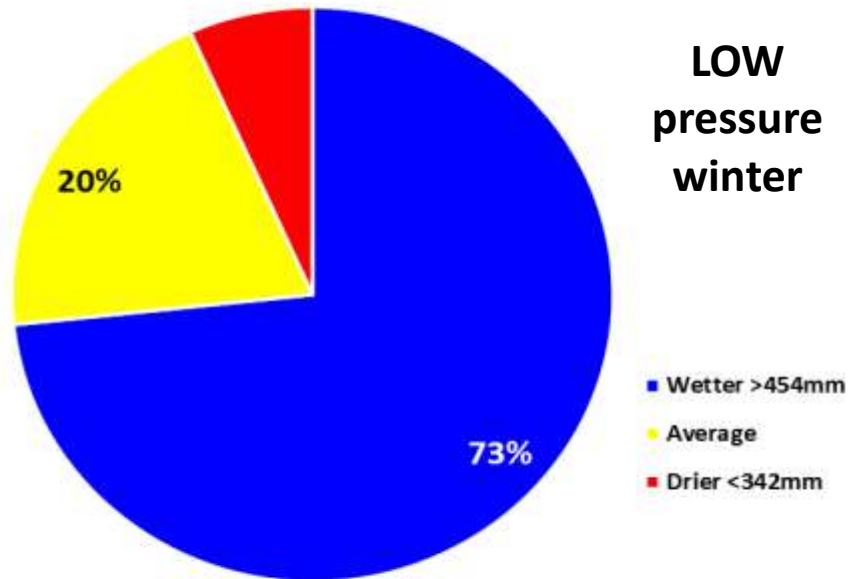
Milawa Jun-Aug Rainfall in 18 Years Since 1903
position high



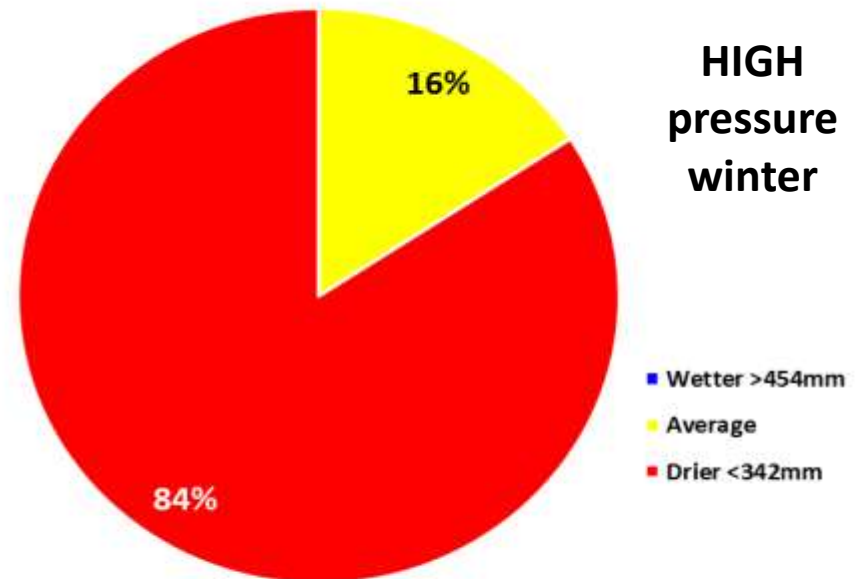
Milawa Jun-Aug Rainfall in 19 Years Since 1903
position low



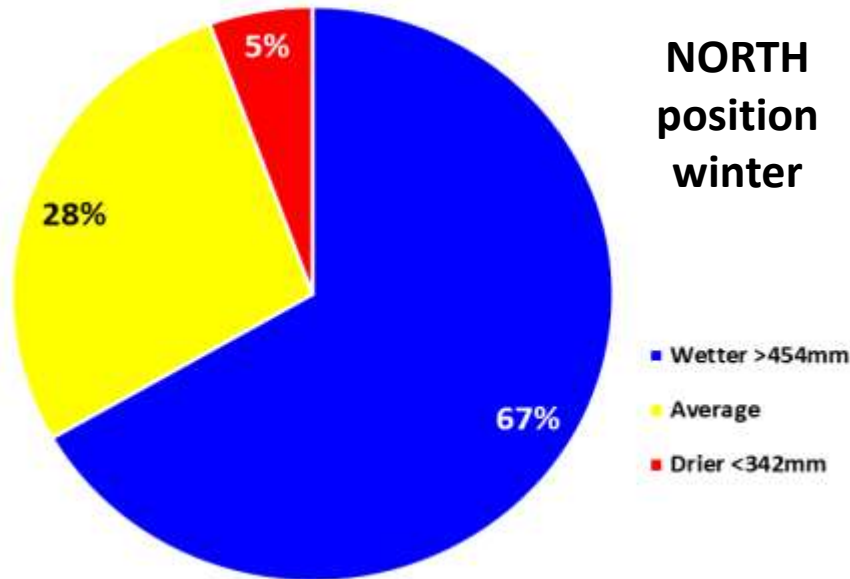
Whitfield Jun-Aug Rainfall in 15 Years Since 1904
pressure low



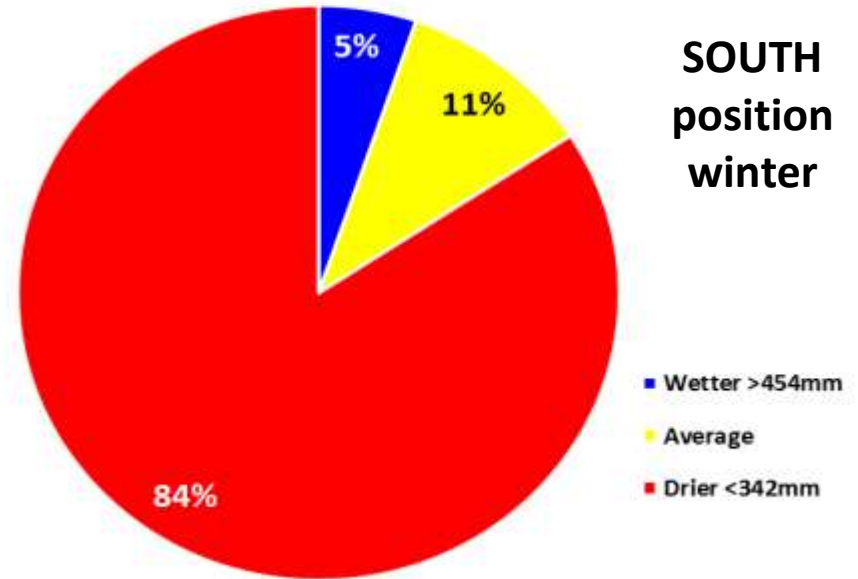
Whitfield Jun-Aug Rainfall in 19 Years Since 1904
pressure high



Whitfield Jun-Aug Rainfall in 18 Years Since 1904
position high



Whitfield Jun-Aug Rainfall in 19 Years Since 1904
position low

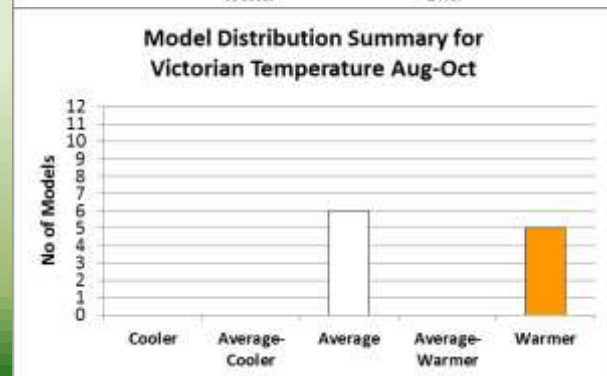
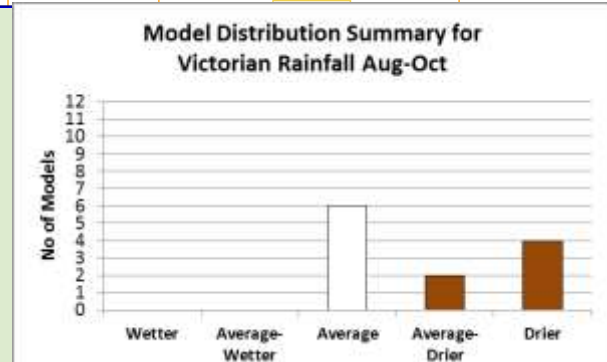


Modelled Climate and Ocean Predictions for Victoria from July 2017 run models

	Ocean-Atmosphere Coupled Models								Multi Model Ensembles			Statistical
	System 4 ECMWF Europe	POAMA2 BoM Australia	SINTEX-F JAMSTEC Japan	CFSv2 NCEP USA	GEOS-5 NASA USA	ENS JMA Japan	CSM1.1 BCC China	UKMO GloSea5 UK	IRI USA	APCC Korea	EUROSIP Europe	SOI phase USQ/Qld Australia
Month of Run	July	July	July	July	July	July	July	July	July	July	July	July
Forecast months	ASO	ASO	SON	ASO	ASO	ASO	ASO	ASO	ASO	ASO	ASO	ASO
Rainfall Skill	High	Moderate	NA	Moderate N, low S	Moderate	Moderate	NA	Moderate	Moderate E, low W	NA	NA	NA
Spring Pacific Ocean NINO3.4	Slightly warm	Slightly cool	Slightly warm	Neutral	Slightly warm	Neutral	Slightly warm	Slightly cool	Slightly warm	Neutral	Slightly warm	
Spring Eastern Indian Ocean	Slightly warm	Neutral	Cool (+IOD)	Neutral	Neutral	Slightly cool	Slightly cool (weak +IOD)	Neutral	Neutral	Neutral	Neutral	
Spring Rainfall	Average, slightly drier NW	Slightly drier	Slightly drier	Average, slightly drier SW	Average	Average	Slightly drier	Average	Slightly drier	Average	Average	Average
Spring Temperature	Slightly warmer	Slightly warmer, warmer NE	Slightly warmer	Average	Slightly warmer	Average	Average	Average	Average	Slightly warmer	Average	

August-October

Pacific Ocean- Mixed but still neutral
 Indian Ocean- Neutral
 Rainfall- Average/slightly drier
 Temperature- Average/slightly warmer



Modelled Climate and Ocean Predictions for Victoria from July 2017 run models

	Ocean-Atmosphere Coupled Models								Multi Model Ensembles			Statistical
	System 4 ECMWF Europe	POAMA2 BoM Australia	SINTEX-F JAMSTEC Japan	CFSv2 NCEP USA	GEOS-5 NASA USA	ENS JMA Japan	CSM1.1 BCC China	UKMO GloSea5 UK	IRI USA	APCC Korea	EUROSIP Europe	SOI phase USQ/Qld Australia
Month of Run	July	July	July	July	July	July	July	July	July	July	July	July
Forecast months	NDJ	NDJ	DJF	NDJ	NDJ		NDJ	OND	NDJ	NDJ	OND	
Summer Pacific Ocean NINO3.4	Slightly warm	Neutral	Slightly warm	Neutral	Slightly warm		Warm (weak El Nino)	Neutral	Slightly warm	Neutral	Neutral	
Summer Eastern Indian Ocean	Slightly warm	Neutral	Neutral	Slightly warm	Slightly warm		Slightly cool	Neutral	Neutral	Neutral	Neutral	
Summer Rainfall	Slightly drier W, average E	Average, slightly wetter far E	Slightly wetter	Slightly wetter E, average W	Average		Slightly drier	Average, slightly drier Alps	Slightly drier, slightly wetter far E	Average	Average	
Summer Temperature	Slightly warmer	Slightly warmer	Average	Average N, slightly warmer S	Slightly warmer		Average	Average	Average, slightly warmer NE	Slightly warmer	Average	

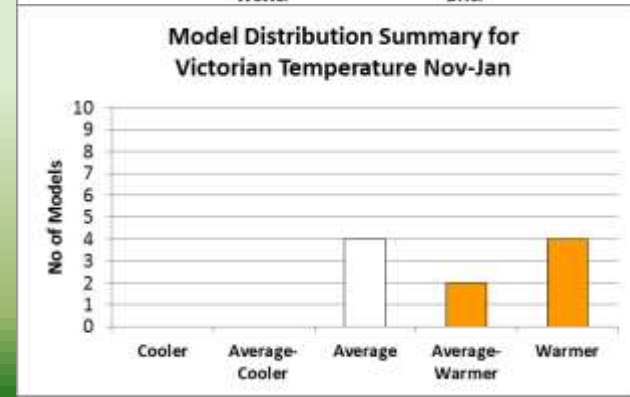
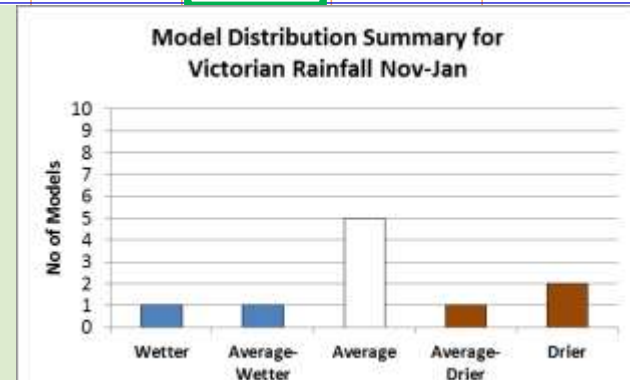
November-January

Pacific Ocean- Slightly warm/neutral

Indian Ocean- Neutral

Rainfall- Mixed, probably average

Temperature- Slightly warmer/average



- Chance of an El Niño very slim
- Chance of a +IOD fading
- Pressure patterns and +SAM probably hanging around for another two months.
- Drier to average rainfall with average temps most likely for spring

Thank you



44cm Yellowbelly, caught Easter 2017, Wemen, Victoria

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