

New Australian climate developing

Written by Tony Malkovic, Maps by Dr David Stephens. Reproduced with approval by Australian Export Grains Innovation Centre (AEGIC).

Summary

- For regions with a Mediterranean climate, winter (and winter dominant) rainfall zones are contracting in a south-westerly direction.
- In northern and eastern areas, summer (and summer dominant) rainfall zones are expanding southward.
- Between these regions, there is a uniform rainfall zone where summer and winter rainfall are similar. The southern boundary of this zone has shifted from southern/central New South Wales down into central Victoria and the Mallee region of south-east South Australia.
- In the south-west of Western Australia, a uniform rainfall zone has appeared along the eastern edge of the wheat-belt from Beacon to Southern Cross to Grass Patch.
- Most rainfall zone boundaries have typically shifted 100-400km over the last 16 years. The only expansion of the winter rainfall zone has occurred in southeast Tasmania where winter rainfall has become more reliable.



A new climate is emerging in Australia, according to new maps released by the Australian Export Grains Innovation Centre (AEGIC). AEGIC analysed data from more than 8000 Bureau of Meteorology stations around the country and discovered that traditional rainfall zones have changed significantly since 2000.

These findings were presented by AEGIC agro-meteorologist Dr David Stephens at the 2016 GRDC Perth Grains Research Update (Perth Convention Centre, 29 February-1 March 2016).

Dr Stephens said the new analysis revealed striking changes to the Australian climate over the past 16 years.

"Since 2000, there has been a general increase in summer rainfall across Australia, and a corresponding decrease in winter rainfall, leading to shifts in rainfall zones extending for hundreds of kilometres," Dr Stephens said.

"Rainfall between May to October over much of the heavily populated regions of southern Australia has decreased 10-30%, while summer rain has increased up to 40% in some areas.

The analysis revealed significant shifts in rainfall zones since 2000, which can be seen in the maps above. Dr Stephens said the analysis highlighted that the shift to earlier sowing of winter crops measured recently by AEGIC should continue because early sown crops take advantage of any additional summer soil moisture.

"They also experience a lower evaporative demand through the growing season, and are less affected by declining rain in October and rising spring temperatures," he said.

More information

These changes appear to be related to changes in barometric pressure, sea surface temperatures and upper level westerly winds.

- In the mid-1970s, there was a weakening of the Indian Ocean Trough to the west of Perth which appears to be related to a decline in winter rainfall since then. In the 2000s, this trough has weakened further in conjunction with strengthening high pressures over Australia.
- In addition, sea surface temperatures have warmed in all seasons, which is beneficial for summer rainfall.
- However, a more marked warming in oceans west of Perth in winter has an inverse relationship to rainfall and has contributed to weaker cloud-band activity in recent years.
- At a Hemispheric scale, one of the drivers of weather is the temperature gradient between the equator and the South Pole. This gradient dropped at the beginning of the 2000s as westerly winds in May-July weakened over Australia."
- The variability in annual rainfall across Australia has changed since 2000. Reduced variability in some regions is due to the loss of wet years, as in south-west Australia,

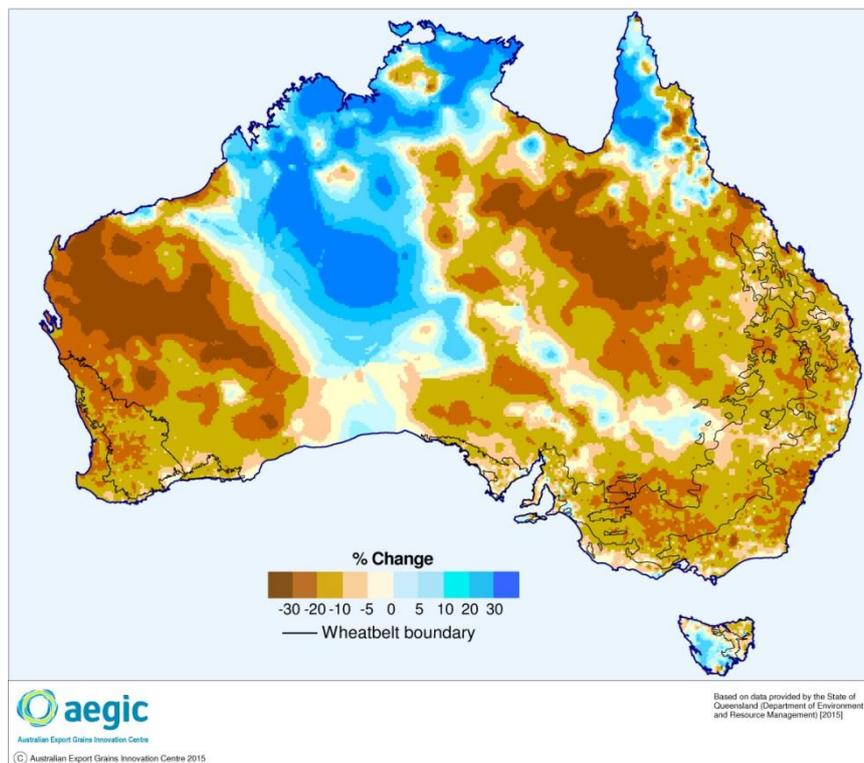
or more consistent average to above average rain, as in the north-western parts of the country and southern South Australia.”

- In contrast variability in annual rainfall has increased in inland Victoria, southern New South Wales and much of central Queensland.

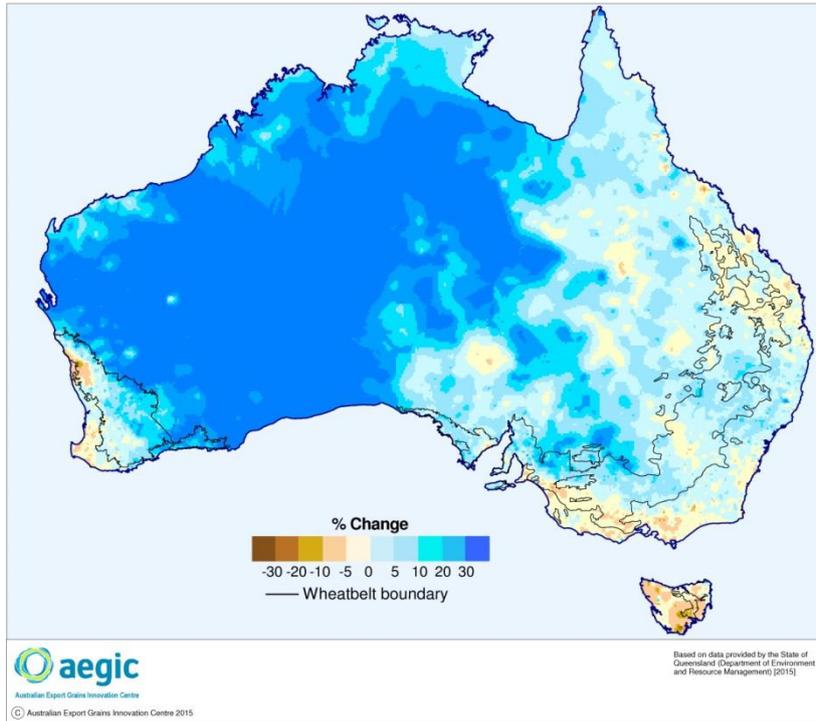
The maps below show the change in seasonal rainfall zones based on the ratio of summer (Nov-April) to winter (May-Oct.) rainfall and April and May percentage change rainfall compared to the previous century. The change in these two seasons has been quite significant along the south coast from Albany to Esperance.

This demonstrates regionally what is changing. This highlights that the May-July rainfall has decreased the most. Also, April Rain has increased which lengthens the growing season, but May has been much drier since 2000 which puts pressure on early germinated pastures and crops.

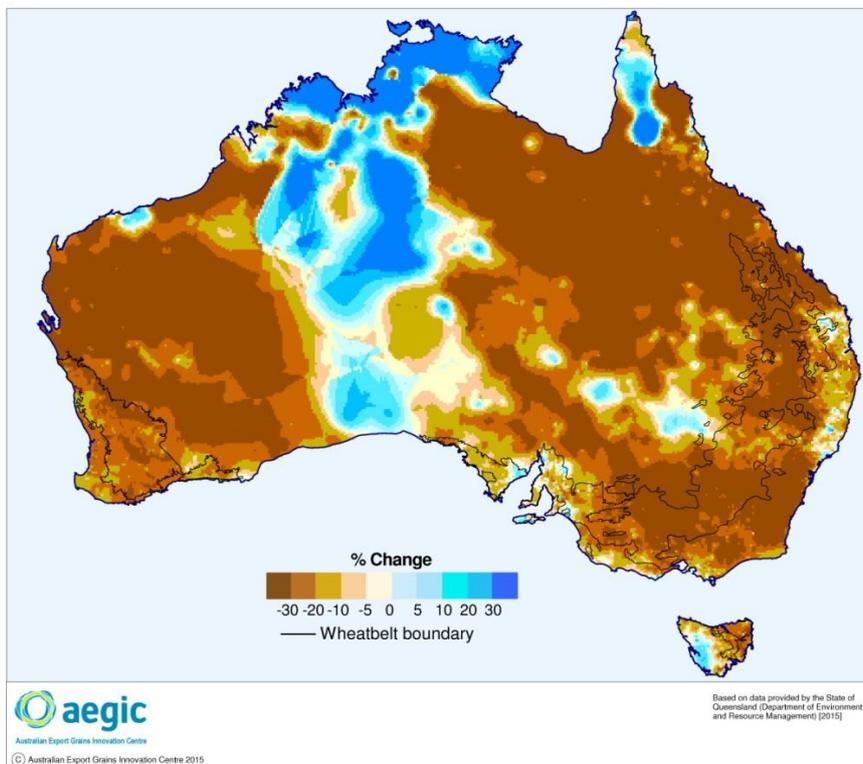
**Change in Average May - October Rainfall:
2000-2015 compared to 1910-1999**



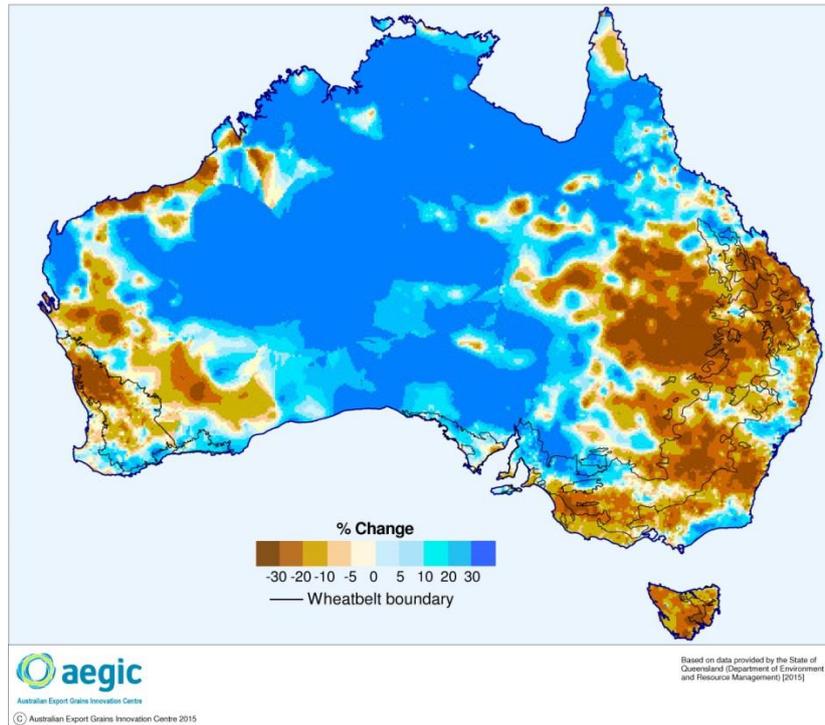
Change in Average November - April Rainfall: 2000-2015 compared to 1910-1999



Change in Average May Rainfall: 2000-2015 compared to 1910-1999



**Change in Average April Rainfall:
2000-2015 compared to 1910-1999**



Further information from:

<http://www.aegic.org.au/programs/strategic-agro-climatic-modelling.aspx>