

# Climate Observations

## Are they the truth?

**Andrew Watson**

*Regional Director*

*Bureau of Meteorology : South Australian Regional Office*

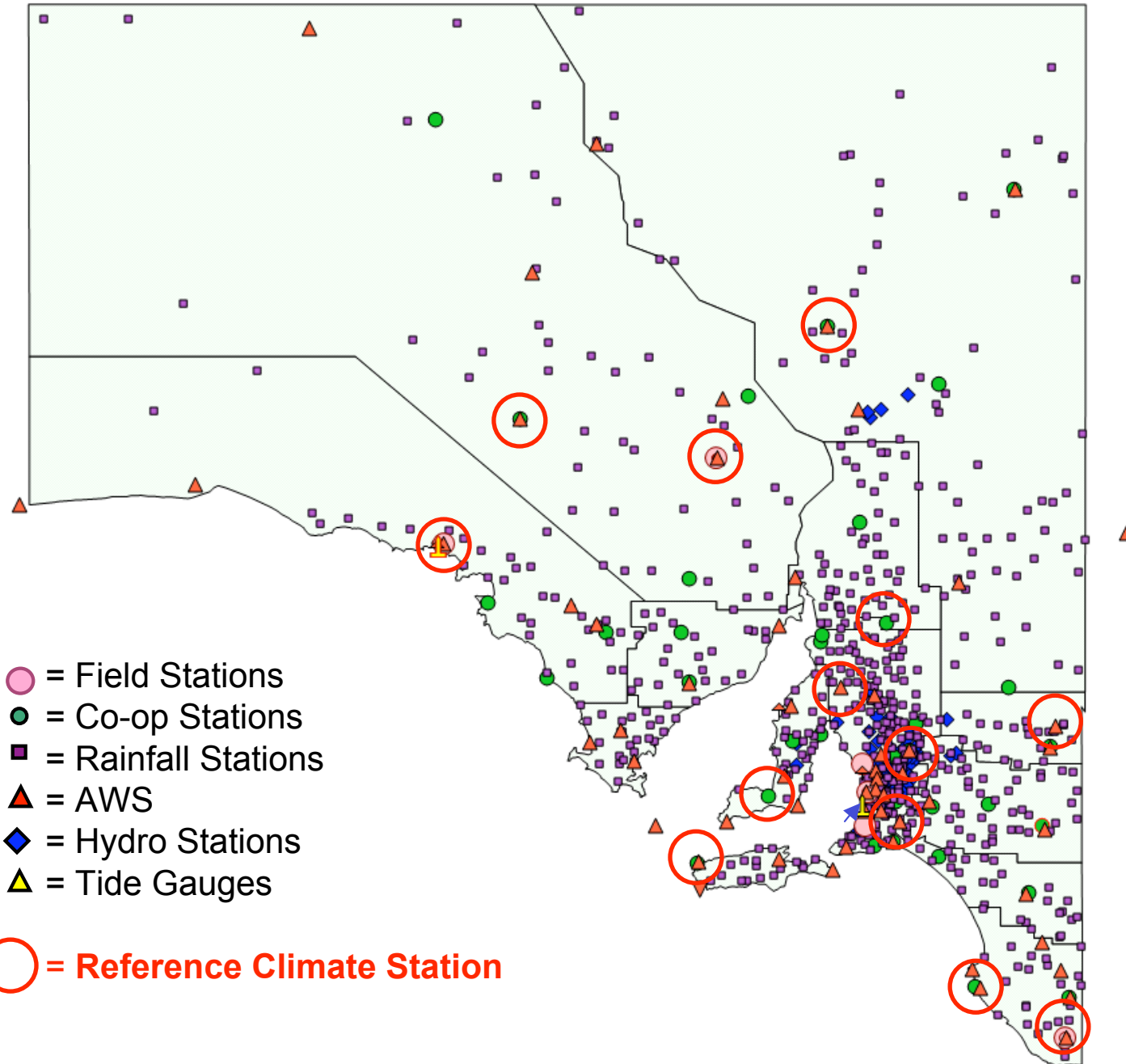
*Climate Q & A: The Skeptical Questions and Scientific Answers : 8 August 2008*

# Bureau of Meteorology

## *Australia's National Meteorological Service*

- Meteorology Act (1955) has as its highest priority ;
  - “the taking and recording of meteorological observations ... for the purposes of meteorology.”
  - Bureau holds the national climate database
- Bureau instrumentation abides by WMO standards
  - Temperature sensors (thermometers) tolerance < 0.4C
  - Rainfall sensors (rain gauges) tolerance < 6%
- All instruments are checked and re-calibrated every 6 months
- New technologies (past 10 – 15 years) are more accurate than conventional recording methods
- Instrument exposures strictly adhered to at Climate Reference Stations
  - “Stephenson Screen” at 1.2 m above ground, oriented north-south
  - No shielding by structures, trees, allowing for free air flow
  - Rain gauge at 0.3 m above ground, no obstruction within 1: 2 slope

# **South Australian Reference Climate Stations**





Ceduna Meteorological Office Instrument Enclosure



Woomera Meteorological Office Instrument Enclosure

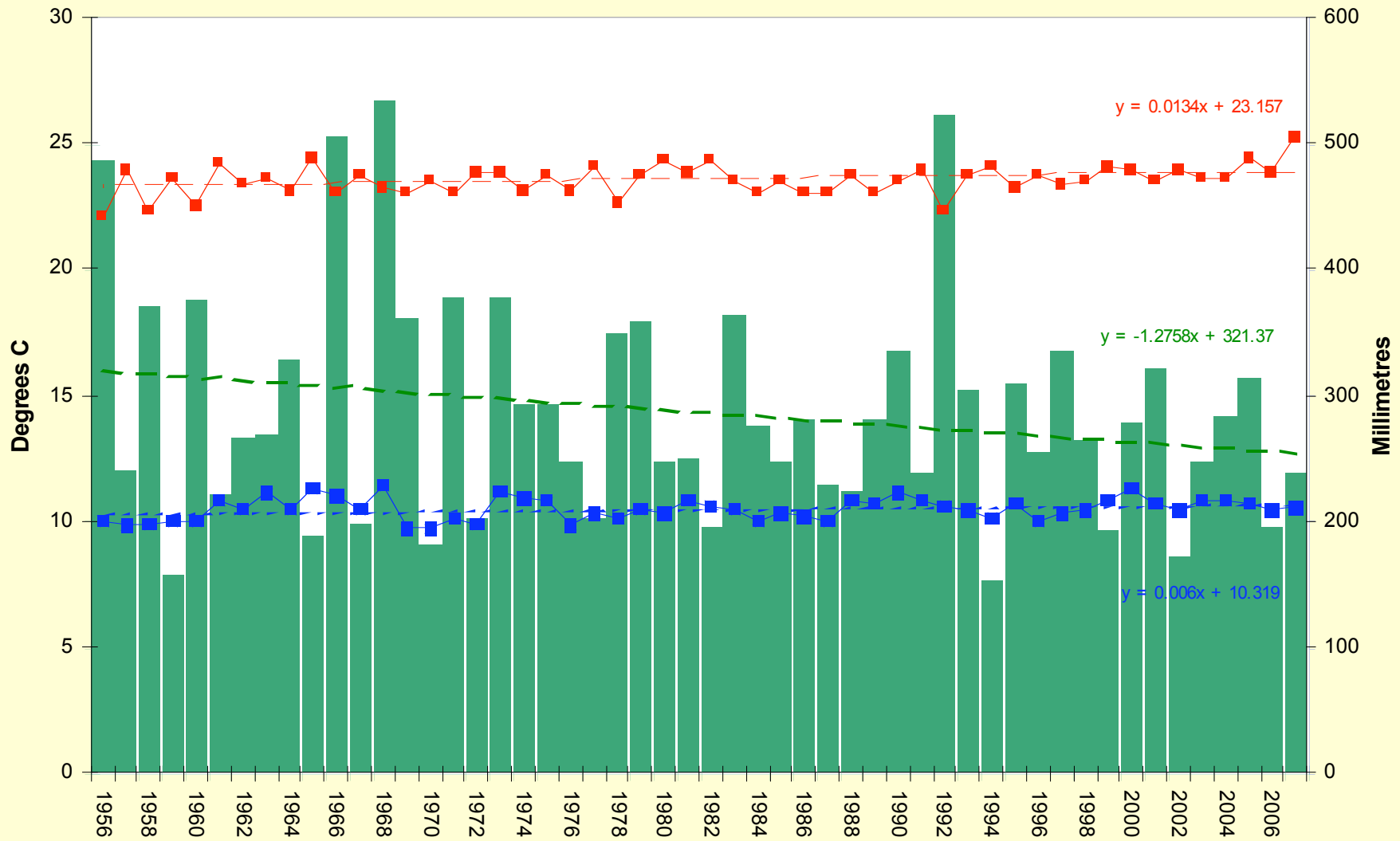


Adelaide Airport Meteorological Office Instrument Enclosure



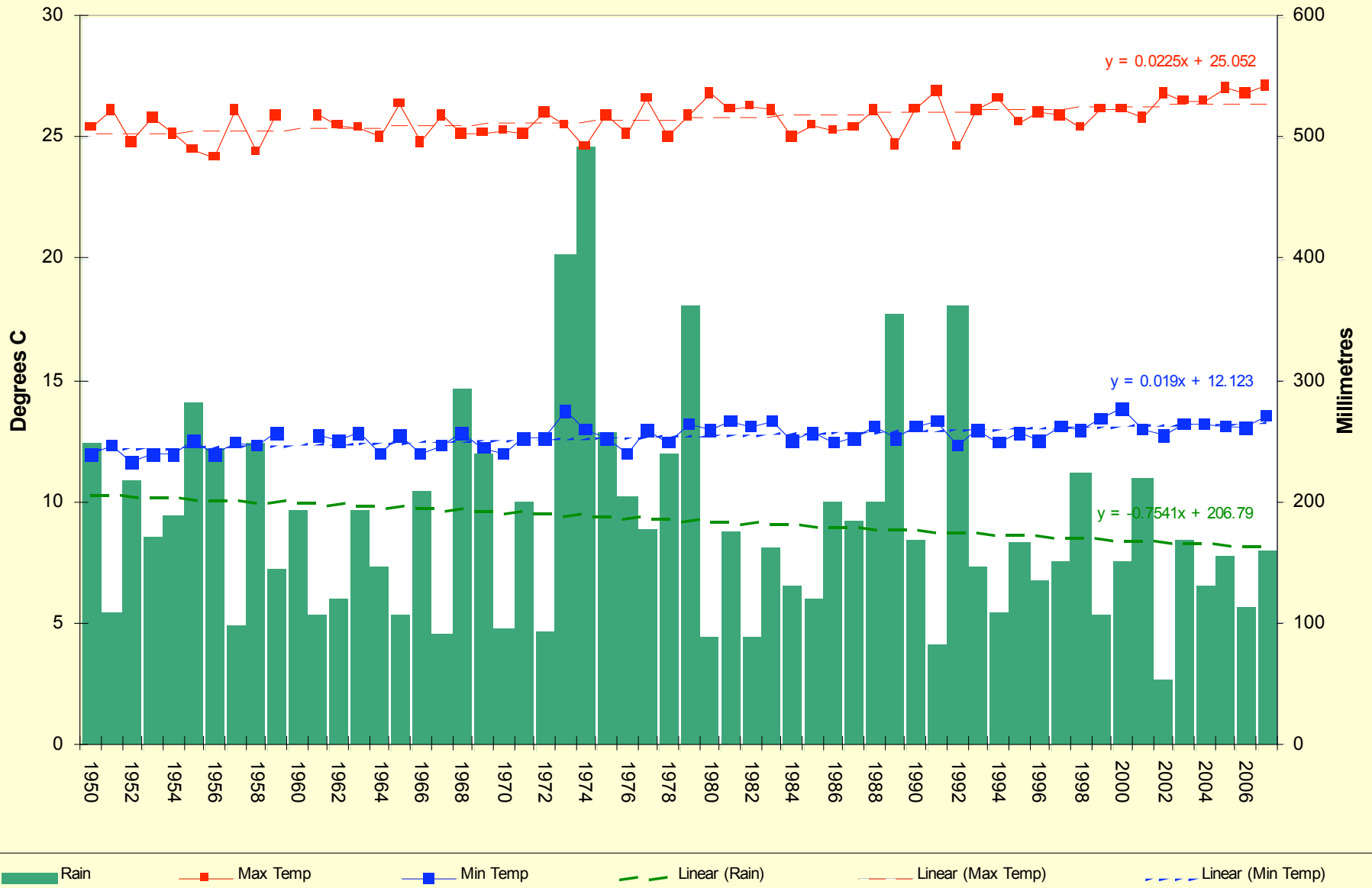
Mt Gambier Meteorological Office Instrument Enclosure



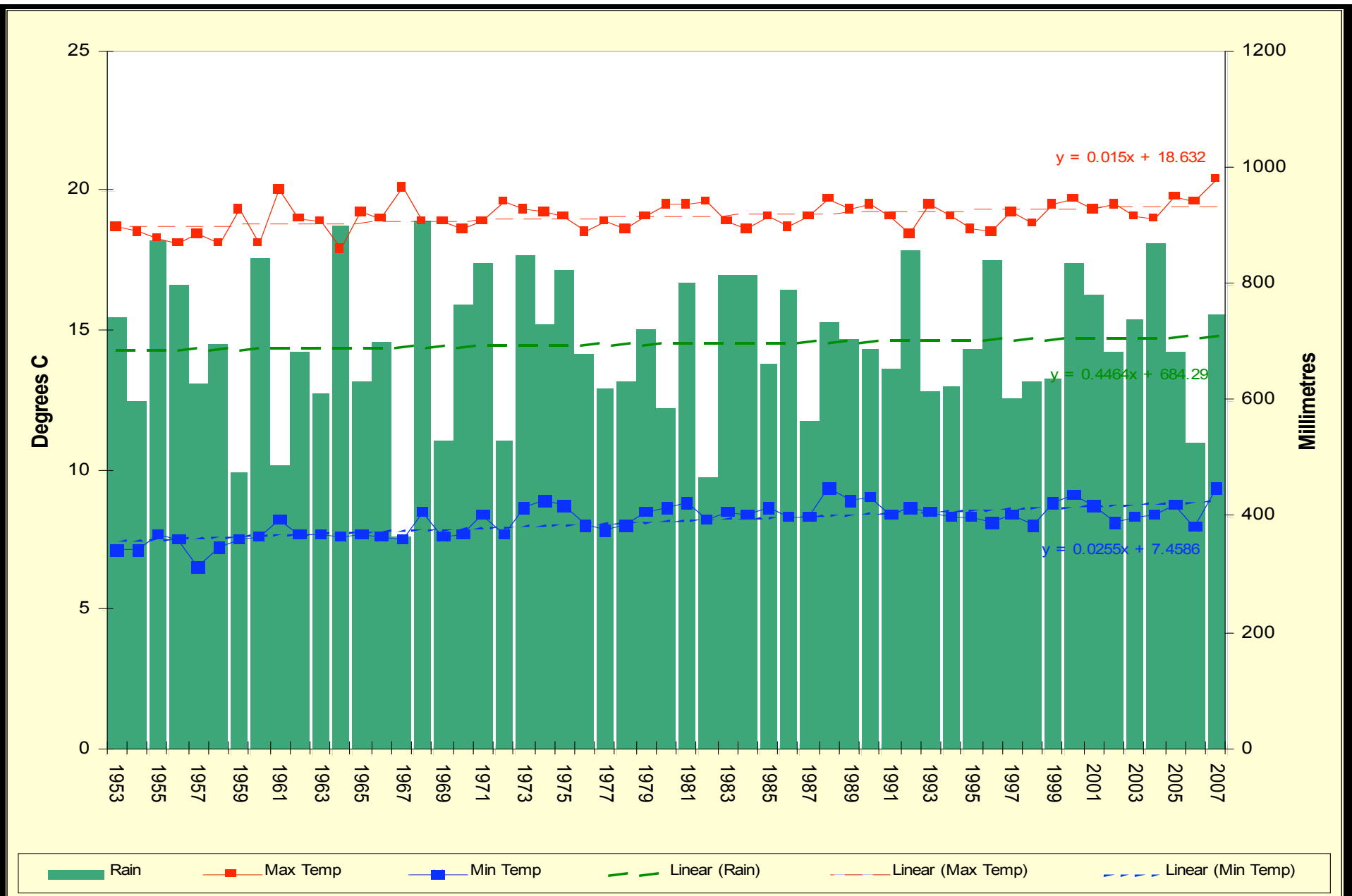


■ Rain     
 ■ Max Temp     
 ■ Min Temp     
 — Linear (Rain)     
 — Linear (Max Temp)     
 - - - Linear (Min Temp)

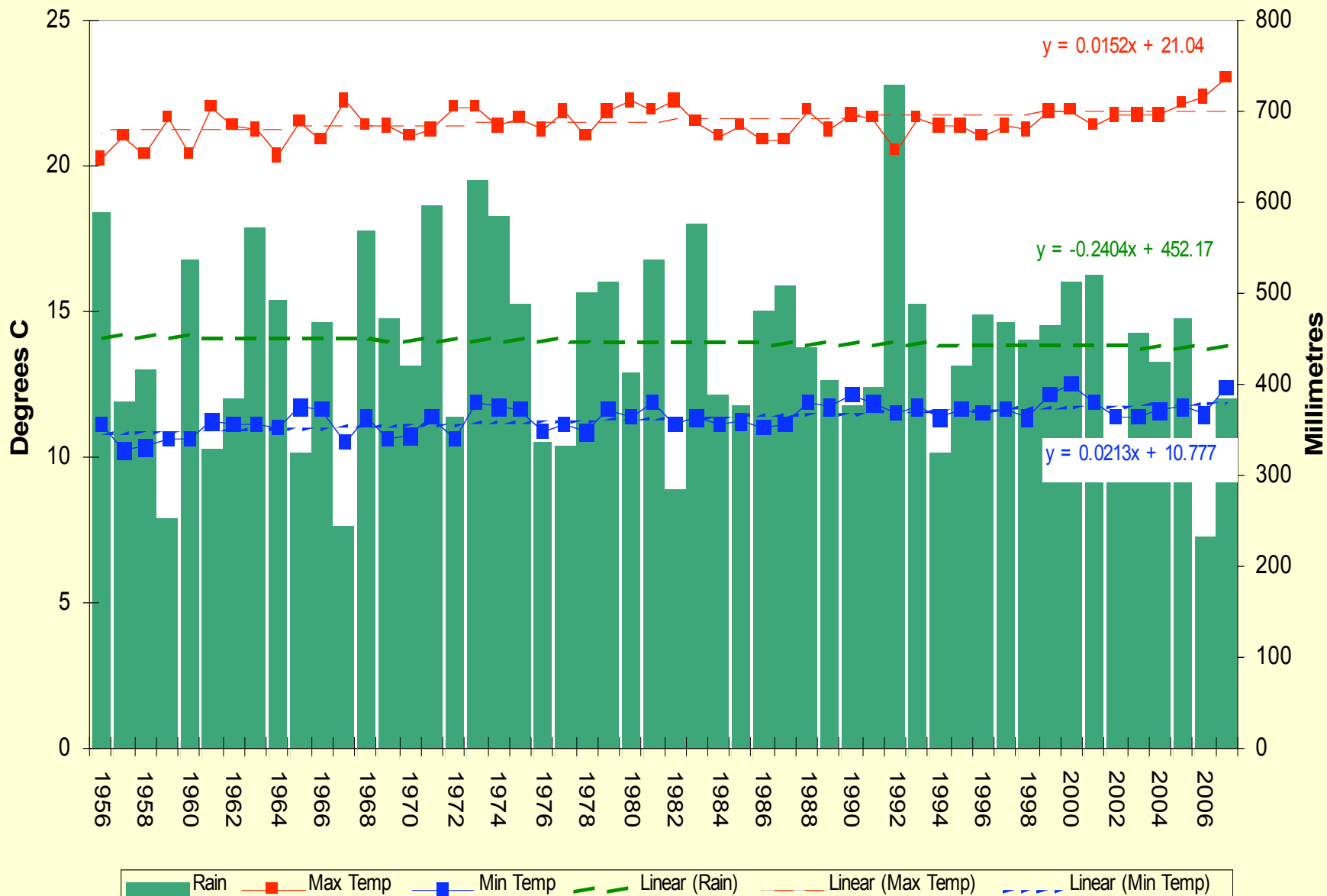
Temperature, rainfall trends, Ceduna : 1956 - 2007 (source BOM)



Temperature, rainfall trends, Woomera : 1950 - 2007 (source BOM)

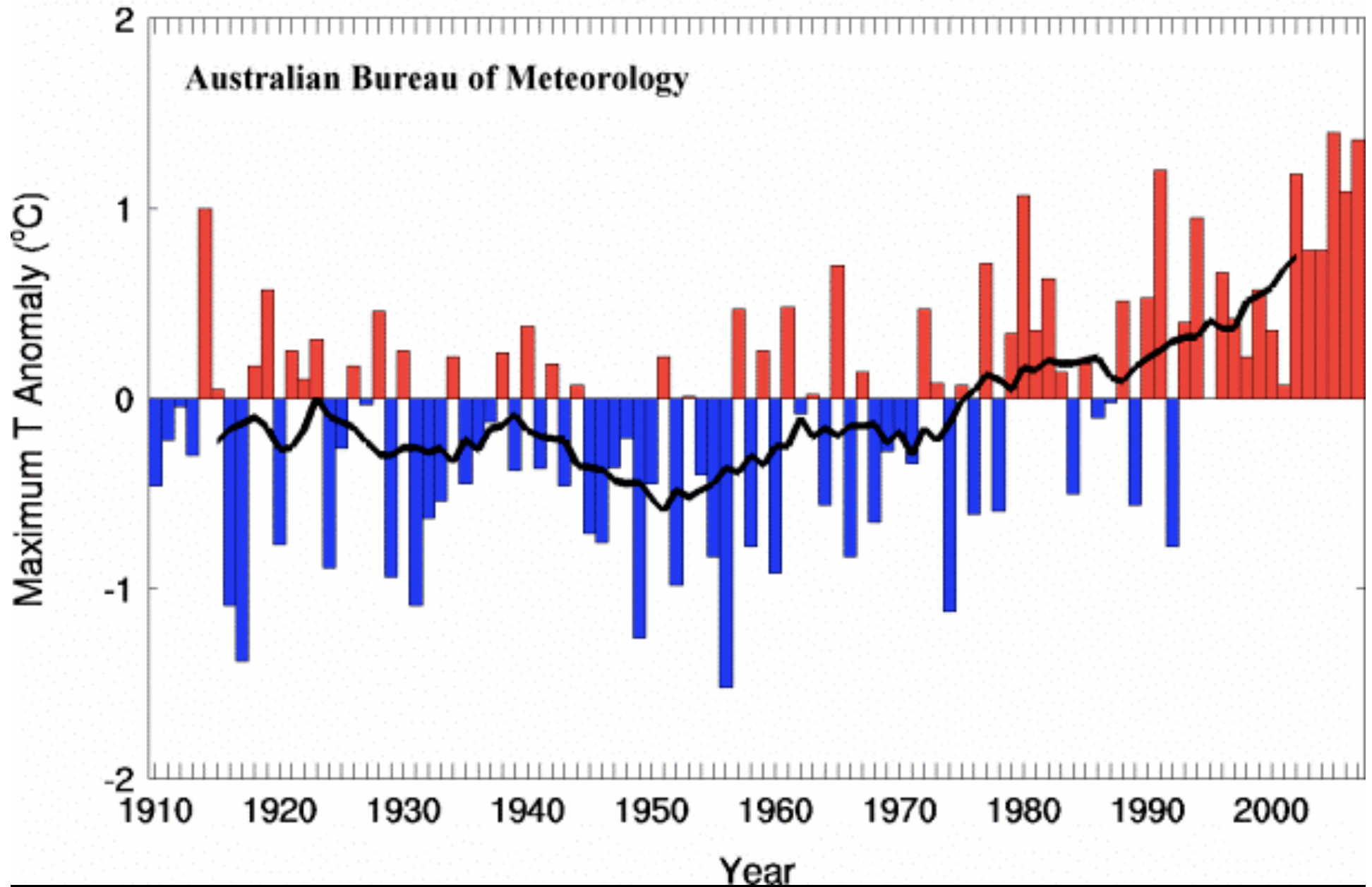


Temperature, rainfall trends, Mt Gambier : 1953 - 2007 (source BOM)



Temperature, rainfall trends, Adelaide Airport : 1956 - 2007 (source BOM)

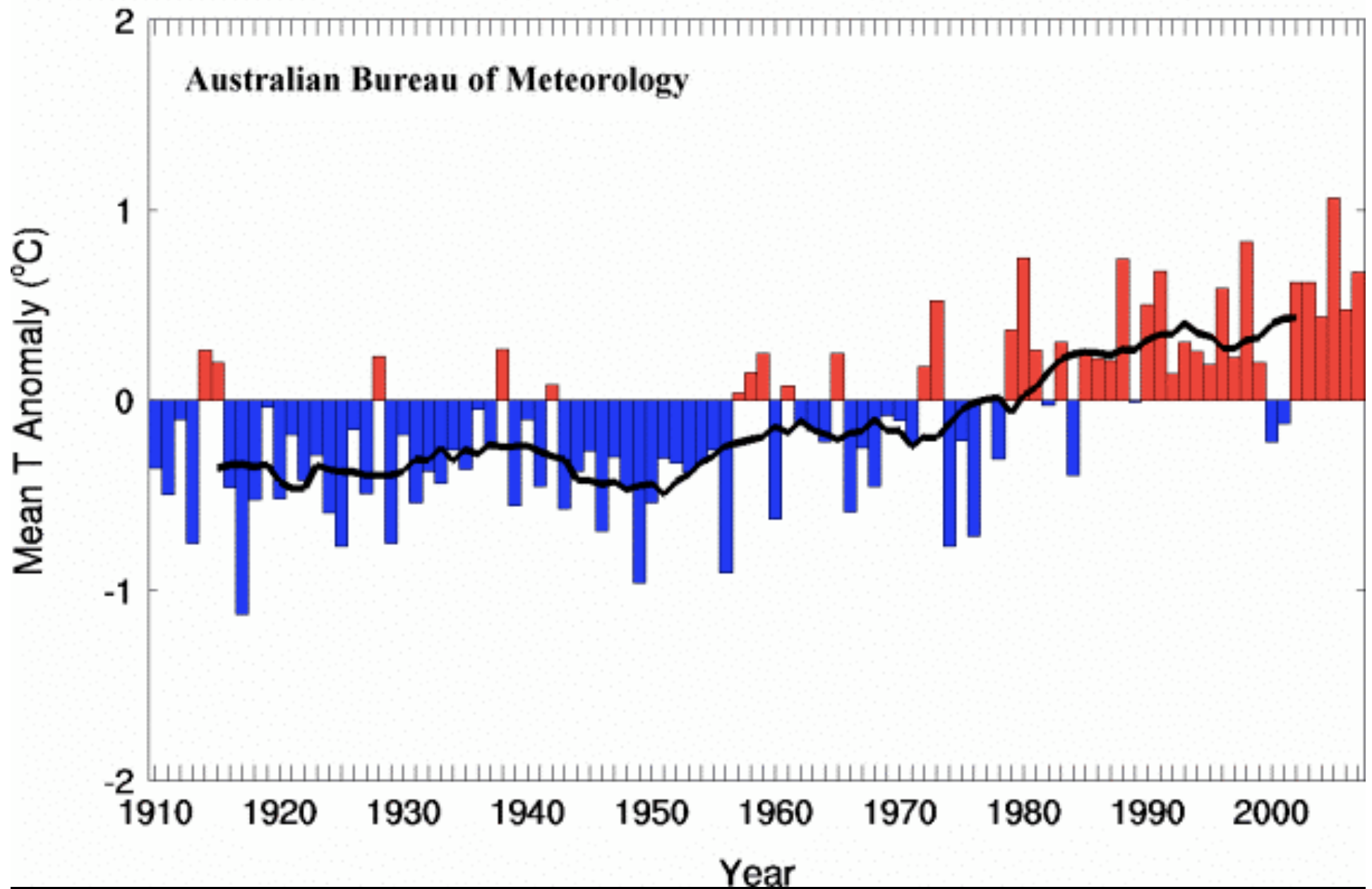
# South Australia Annual Maximum T Anomaly (base 1961-90)



South Australian mean temperature trend : 1910 – 2007 (source BOM)

# **Australian Temperature Trends**

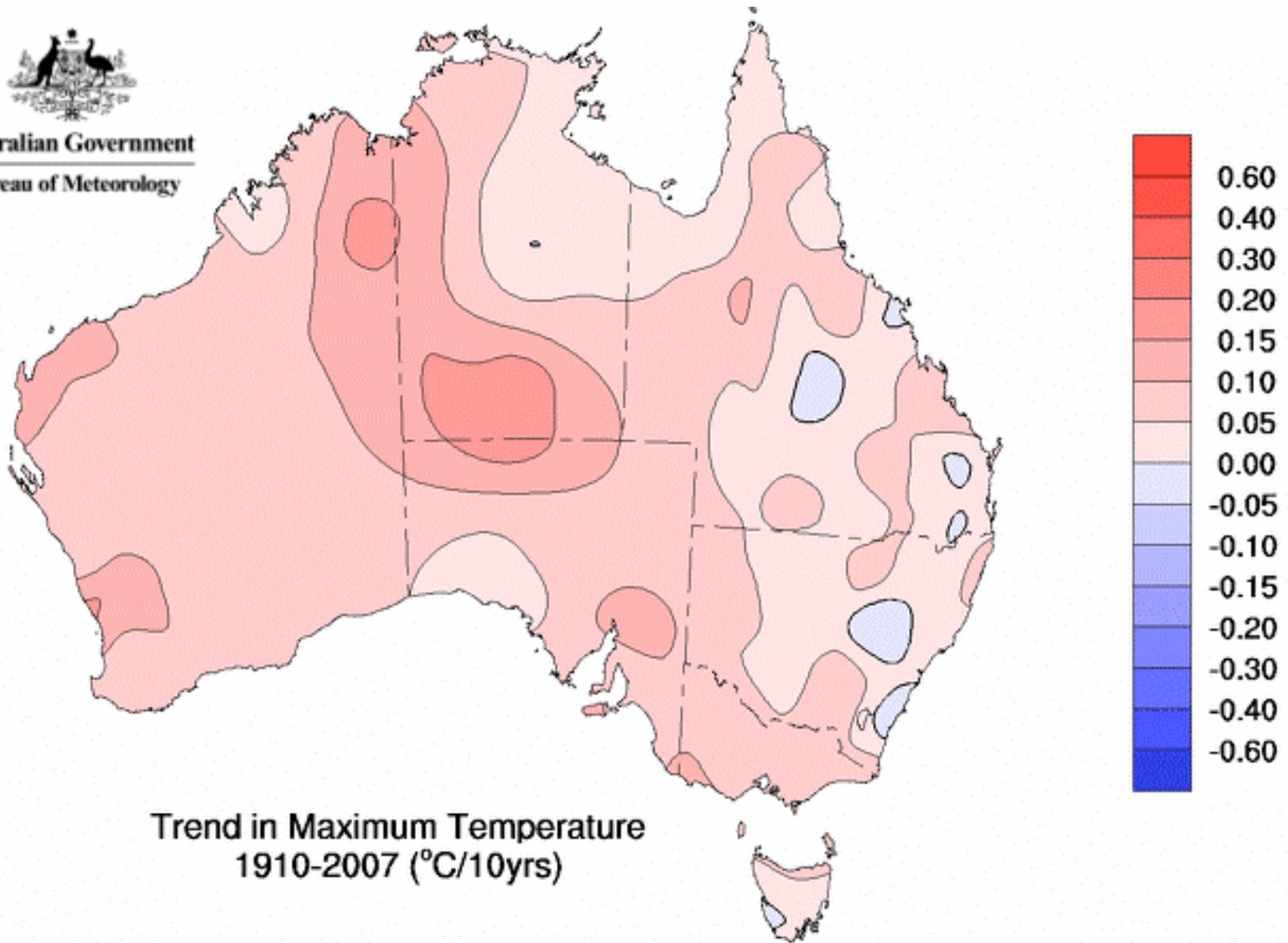
# Australia Annual Mean T Anomaly (base 1961-90)



National mean temperature trend : 1910 - 2007 (source BoM)



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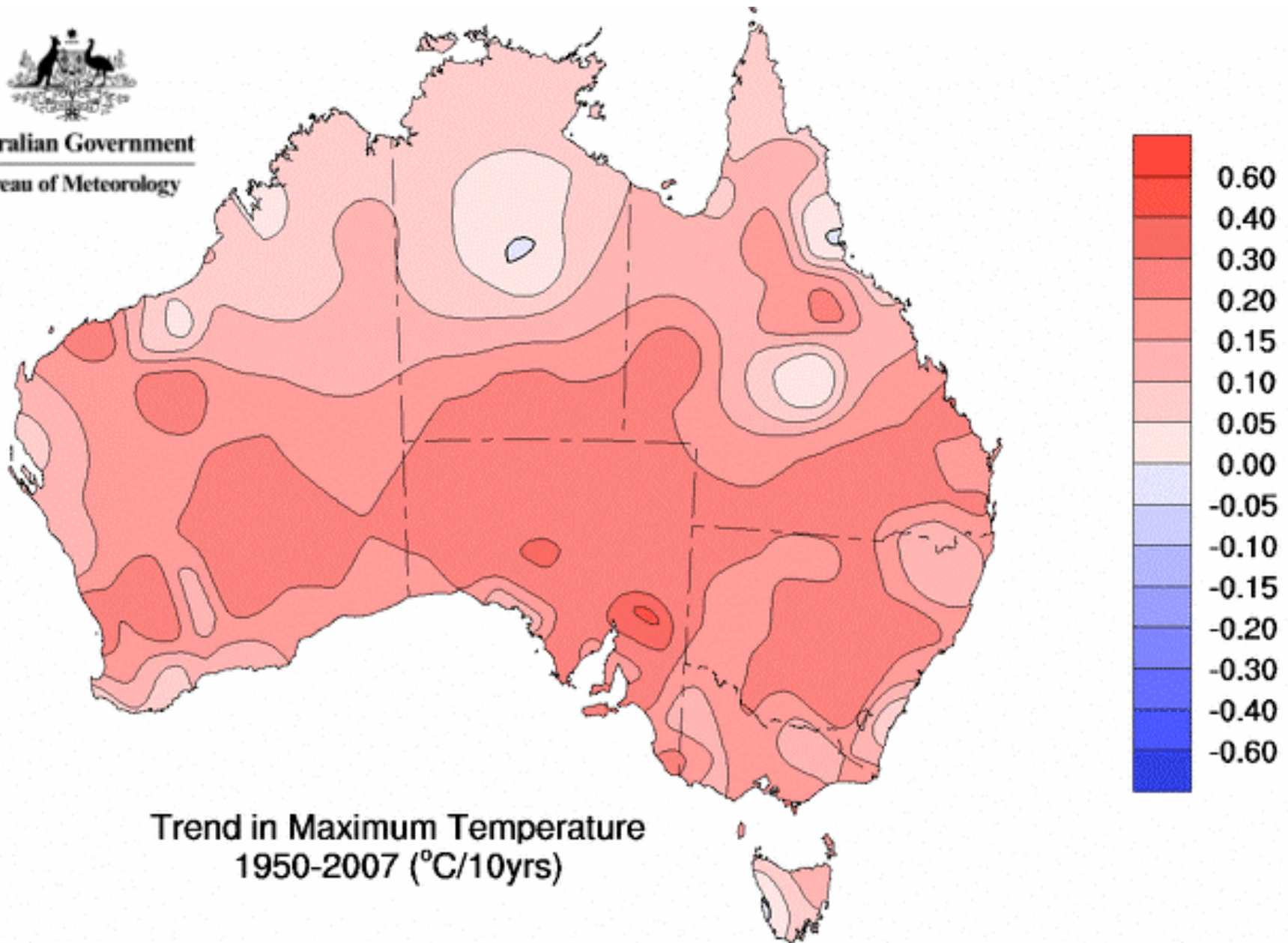


Maximum temperature trends ( $^{\circ}\text{C}/10\text{yrs}$ ), Australia : 1910 - 2007 (source BOM)





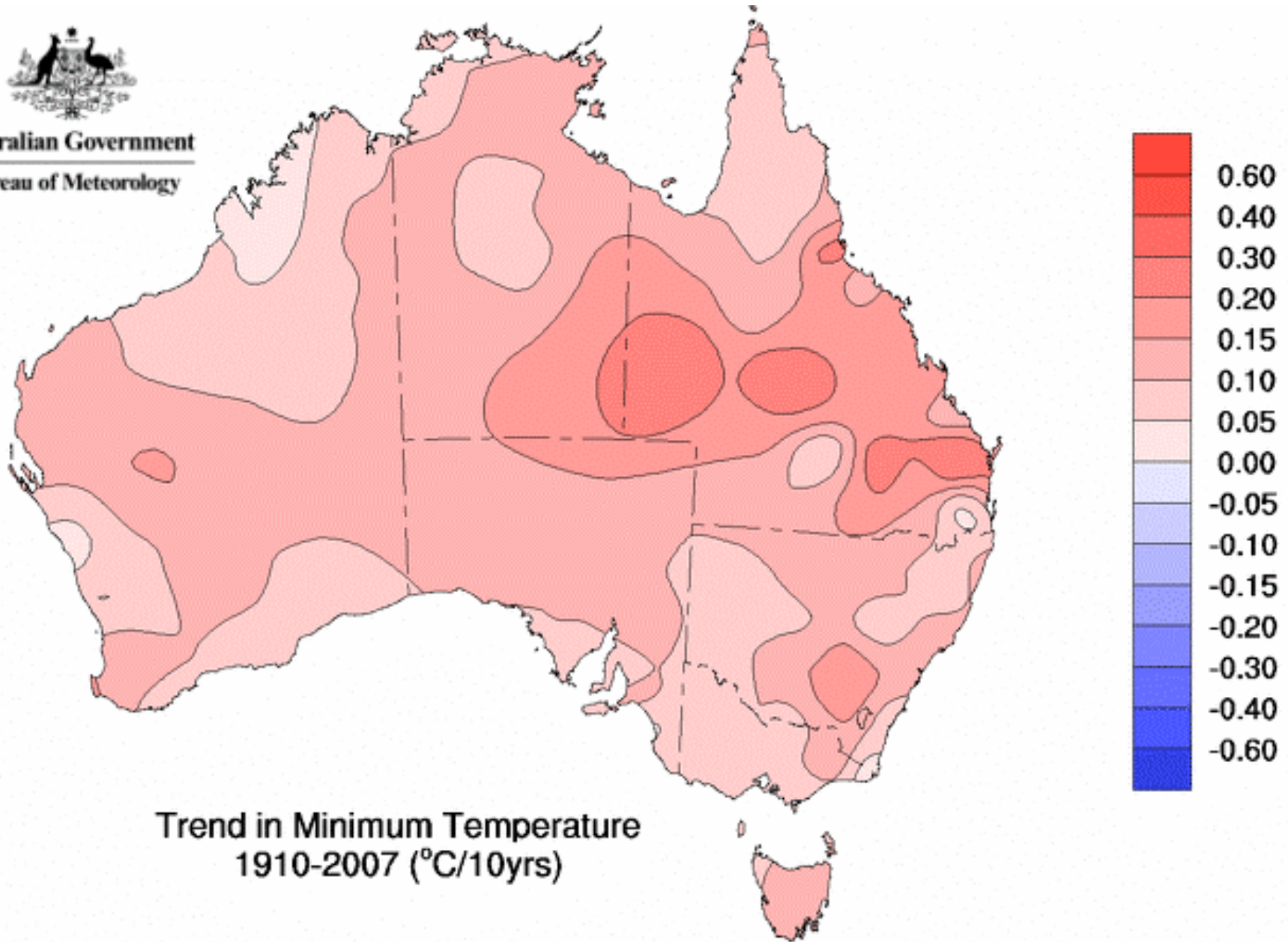
Australian Government  
Bureau of Meteorology



Maximum temperature trends ( $^{\circ}\text{C}/10\text{yrs}$ ), Australia : 1950 - 2007 (source BOM)



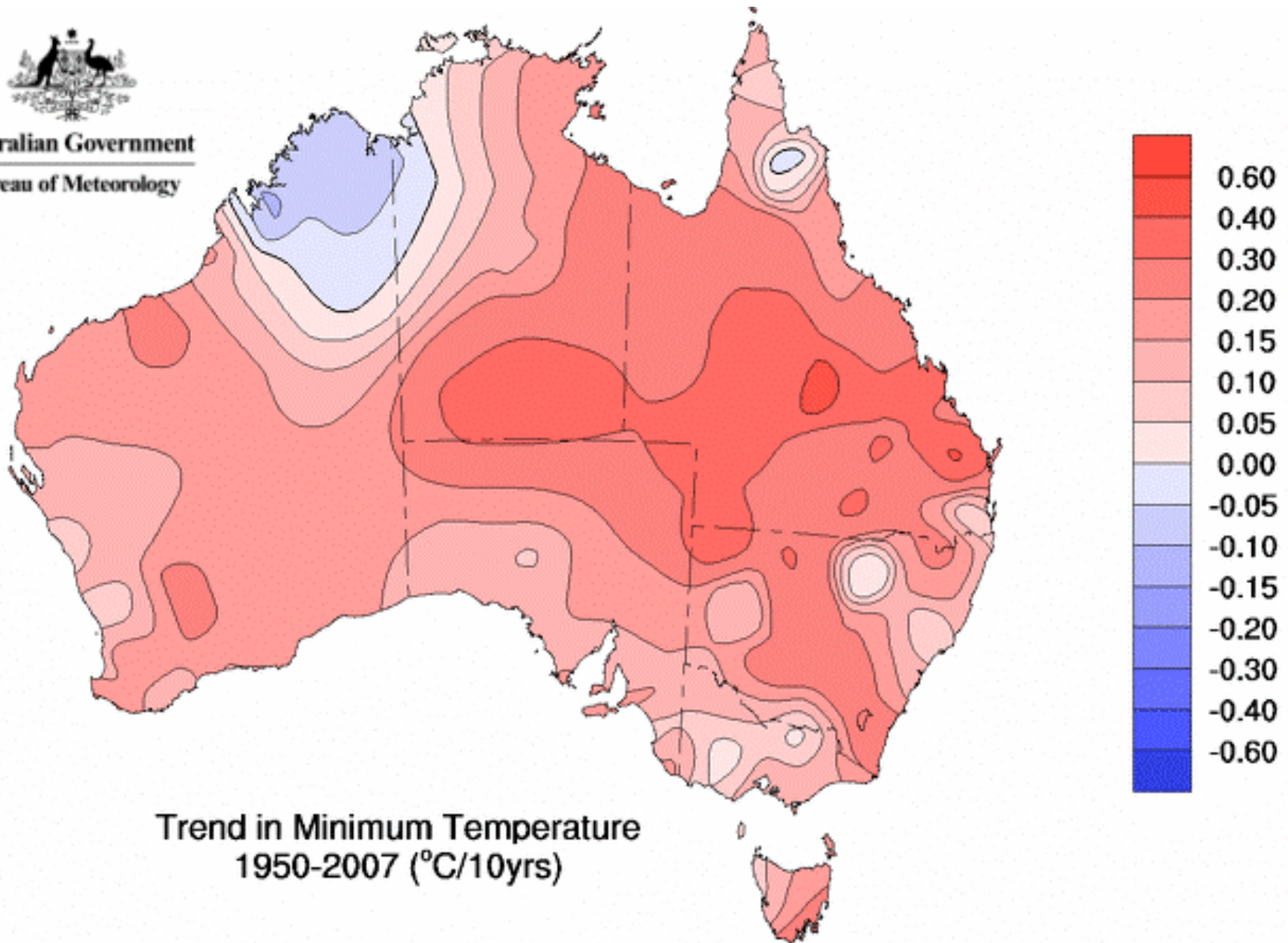
Australian Government  
Bureau of Meteorology



Minimum temperature trends ( $^{\circ}\text{C}/10\text{yrs}$ ), Australia : 1910 - 2007 (source BOM)



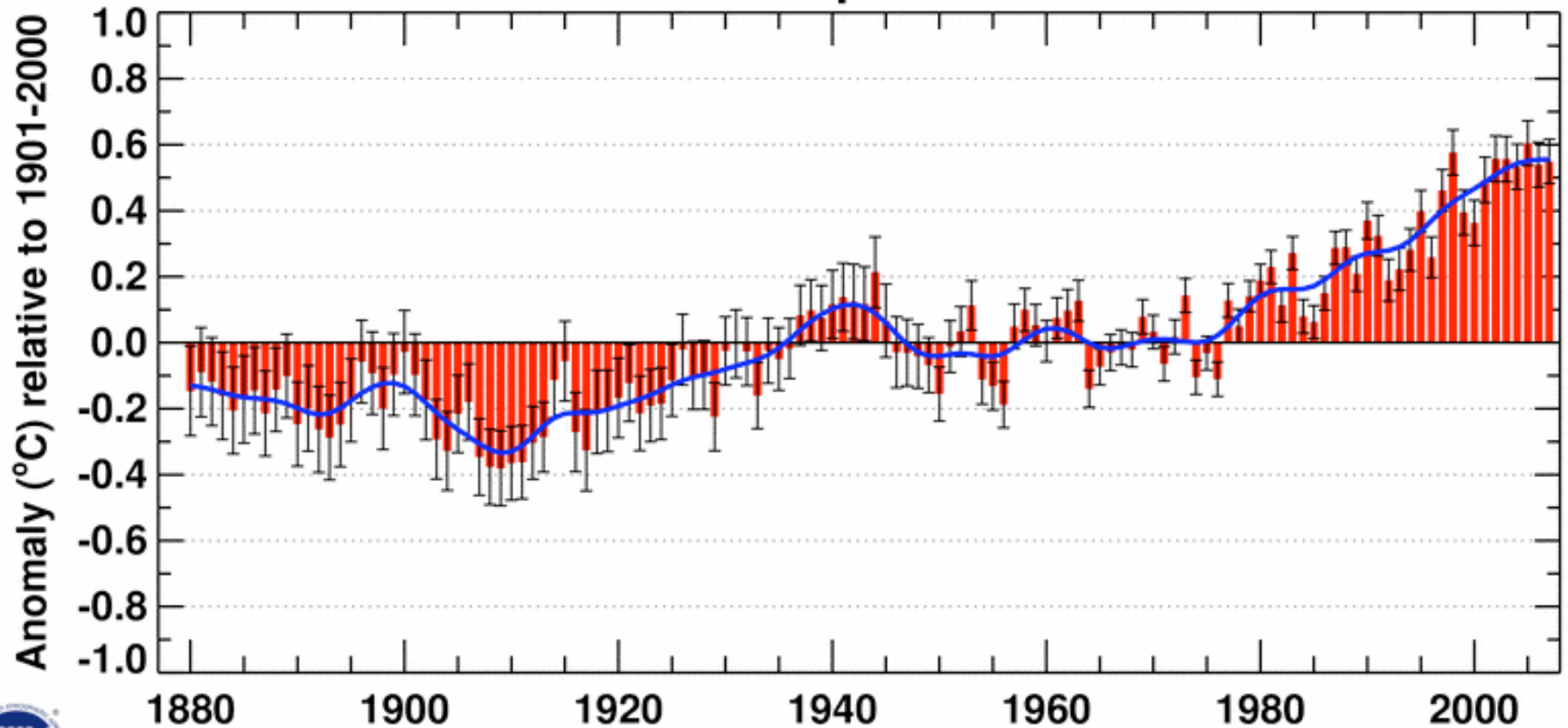
Australian Government  
Bureau of Meteorology



Minimum temperature trends ( $^{\circ}\text{C}/10\text{yrs}$ ), Australia : 1950 - 2007 (source BOM)

# Global Temperature Measurements

# Jan-Dec Global Mean Temperature over Land & Ocean



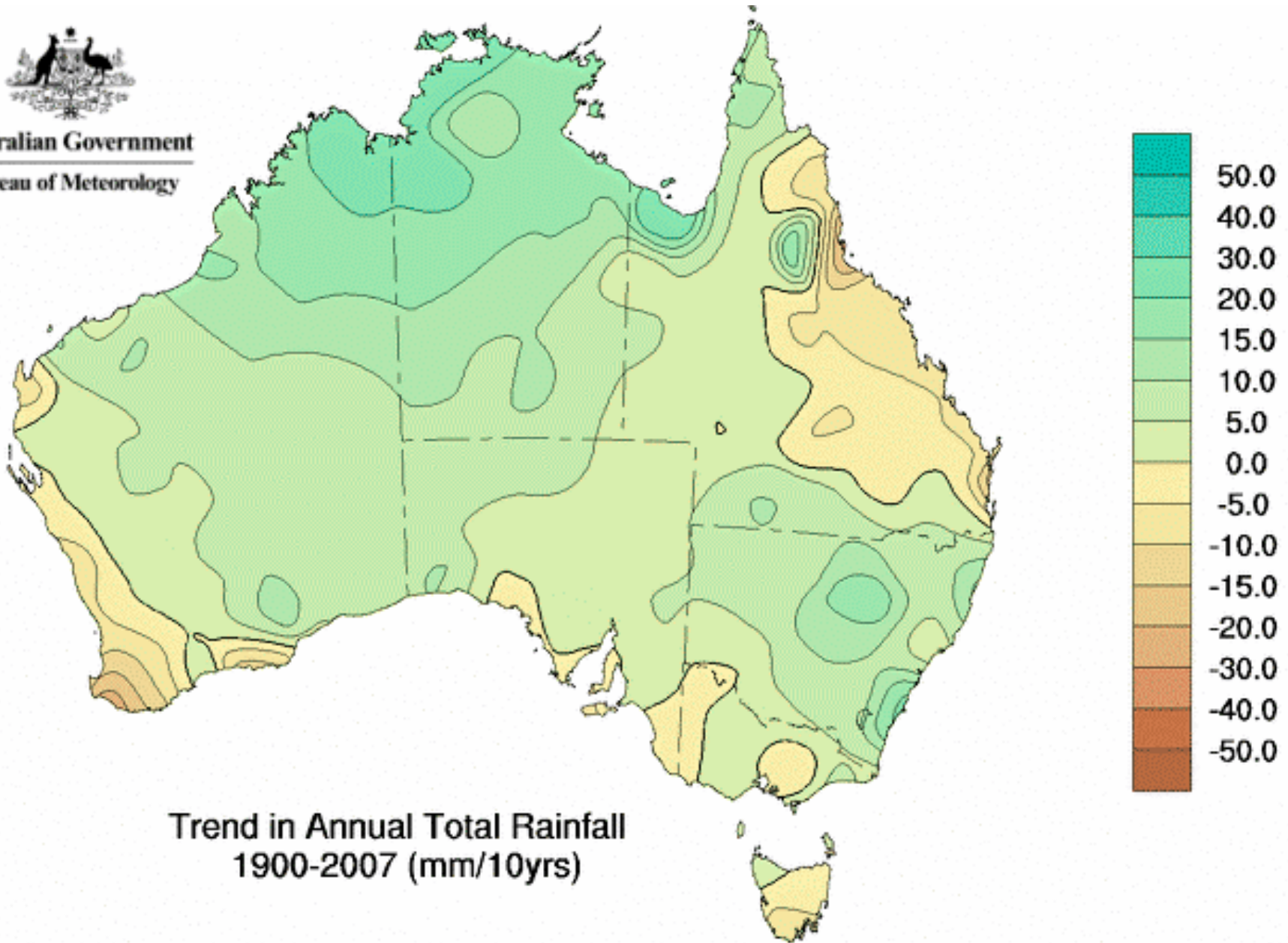
NCDC/NESDIS/NOAA

Global mean temperature trend : 1880 - 2007 (source NOAA)

# Australian Rainfall Trends



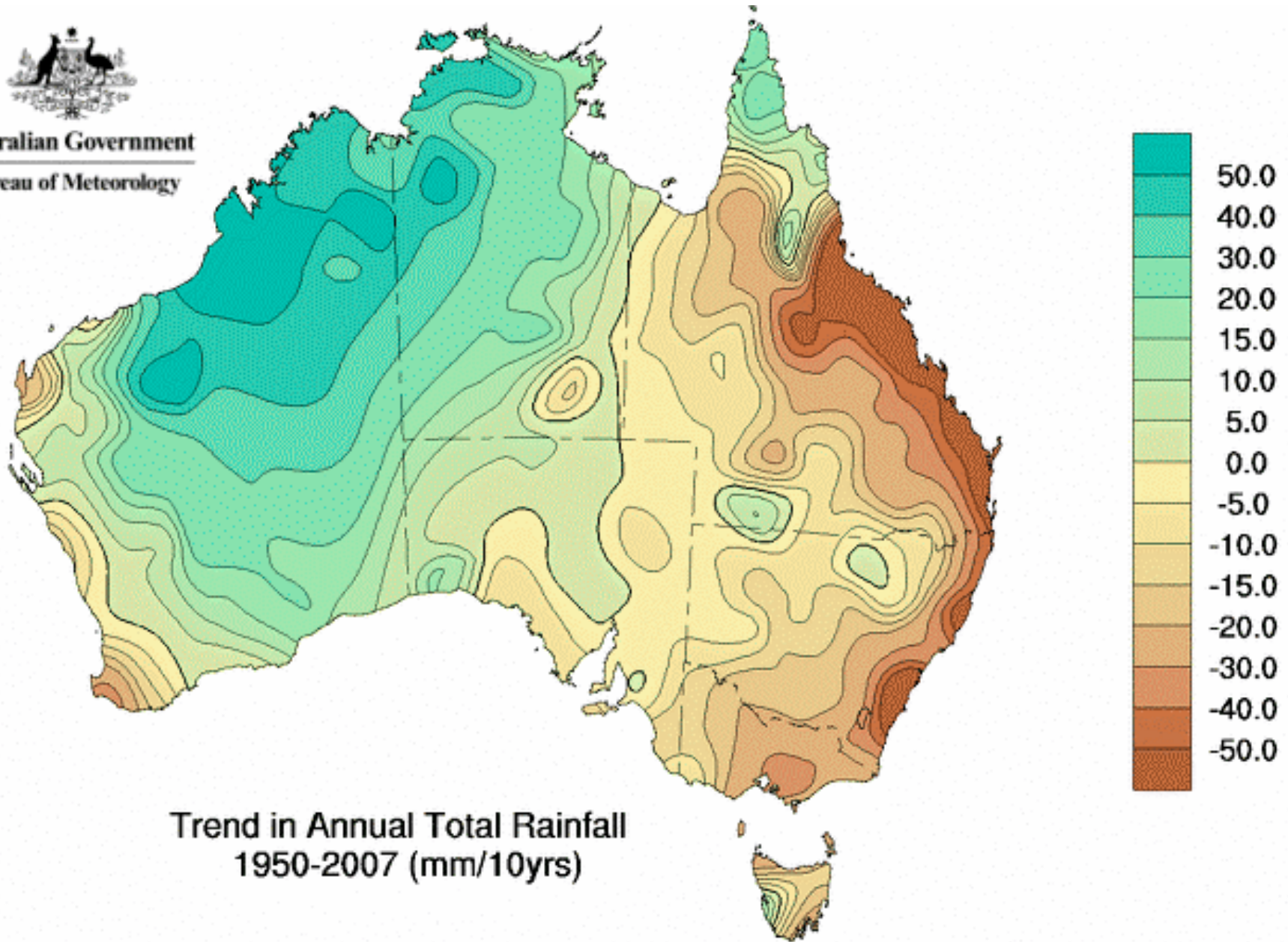
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Spatial rainfall trends (mm/10yrs), Australia : 1900 - 2007 (source BOM)



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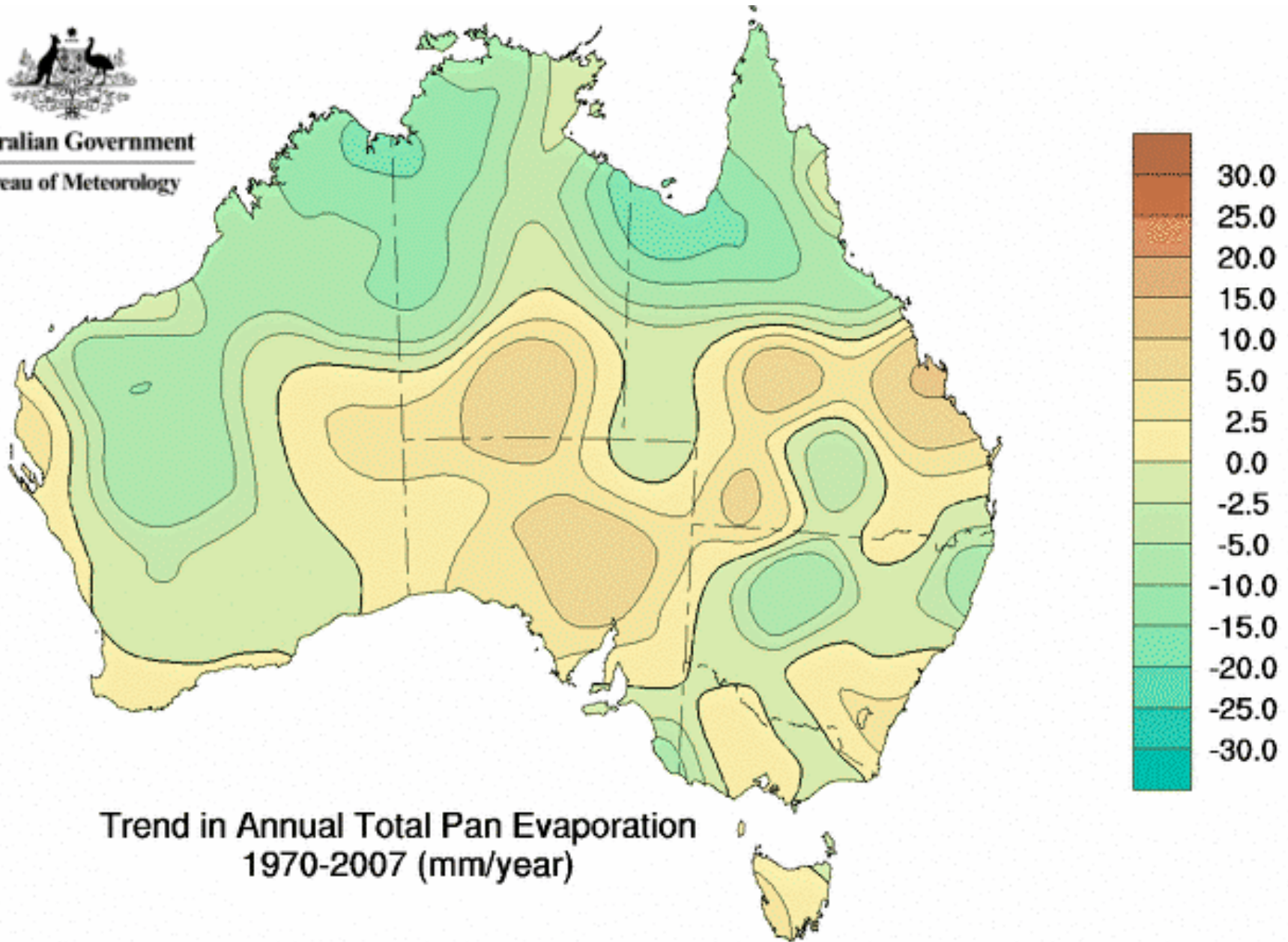
Spatial rainfall trends (mm/10yrs), Australia : 1950 - 2007 (source BOM)



# **Australian Evaporation Trends**

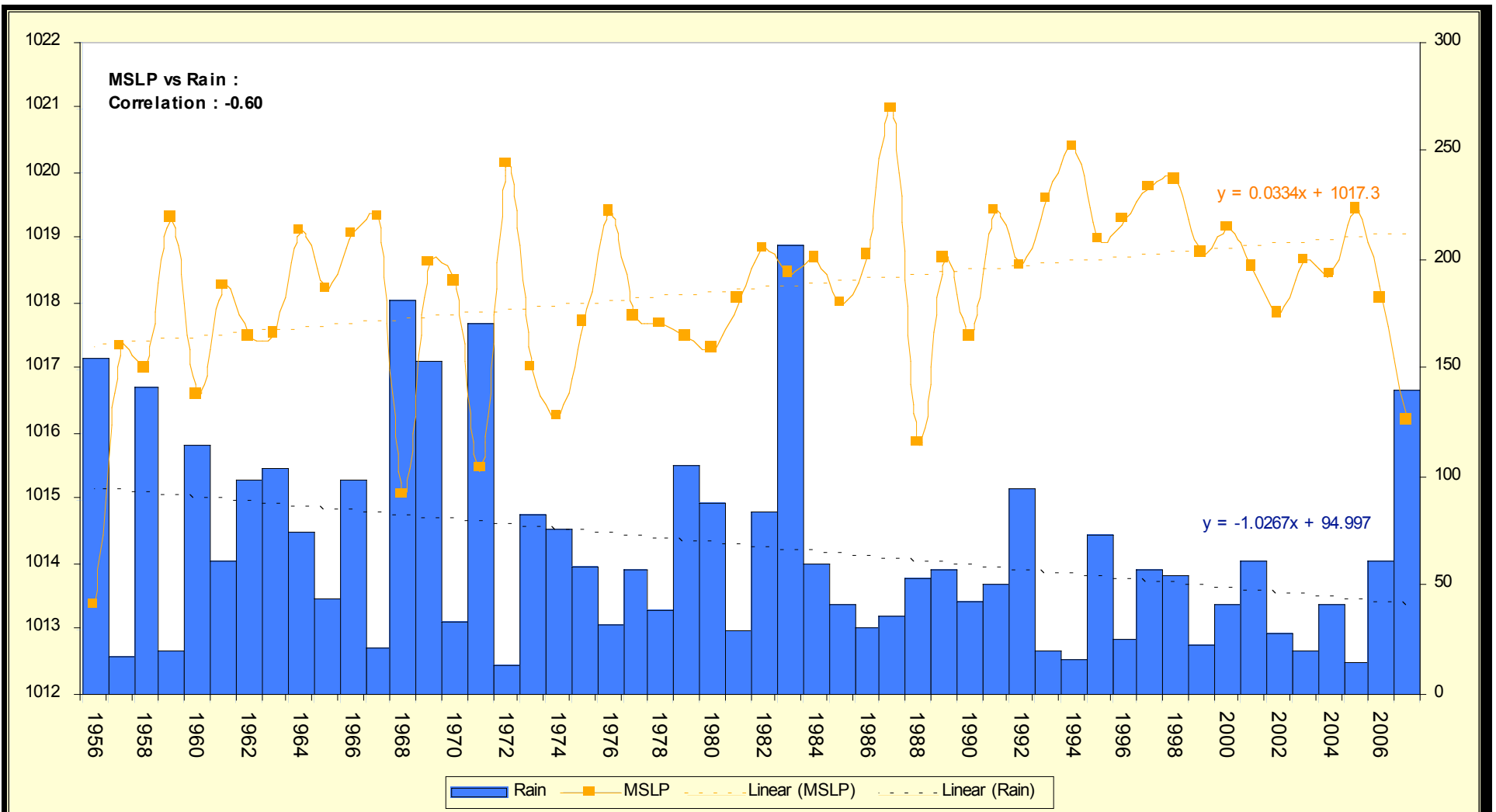


Australian Government  
Bureau of Meteorology

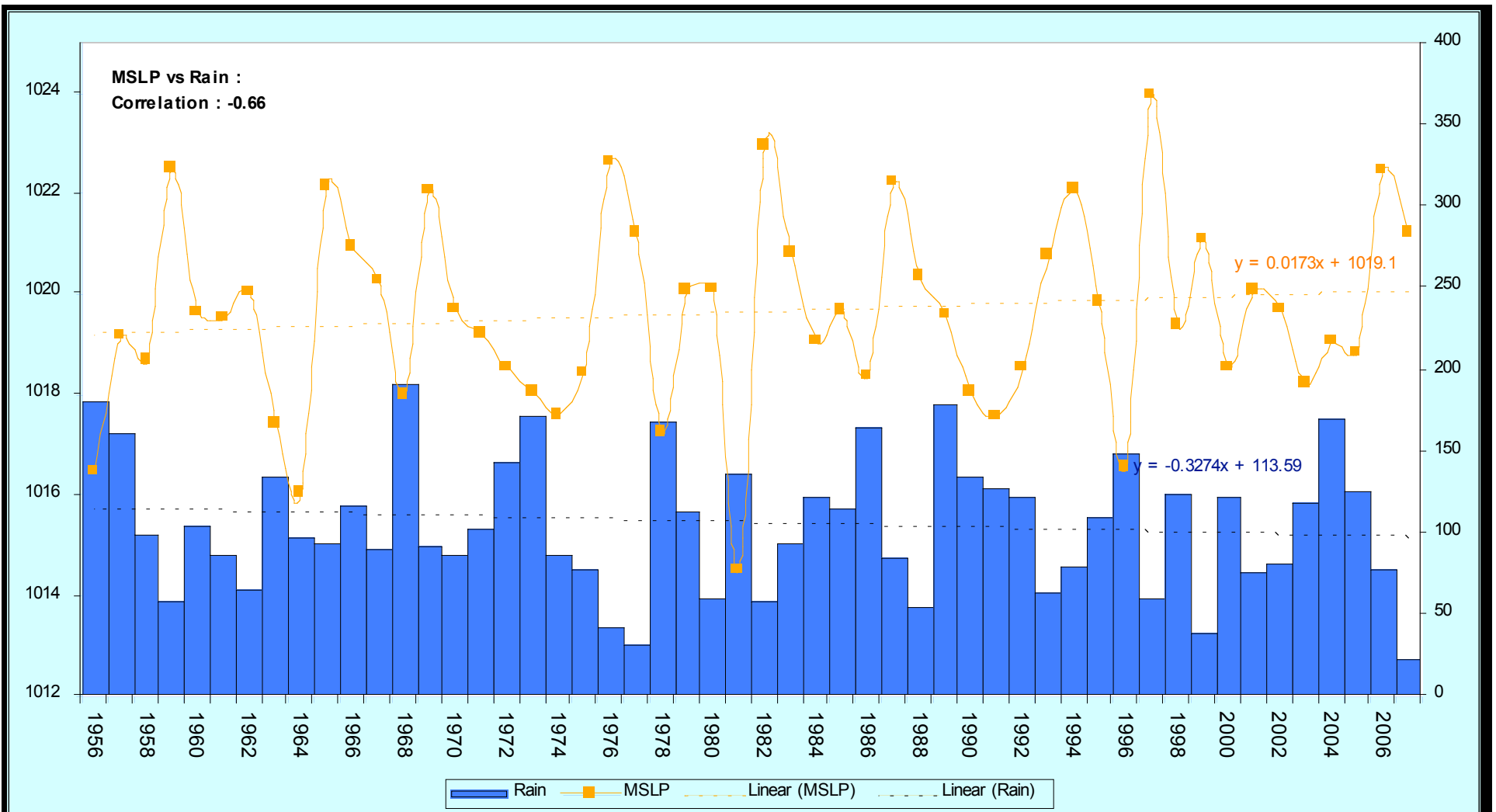


Spatial evaporation trends (mm/yr), Australia : 1970 - 2007 (source BOM)

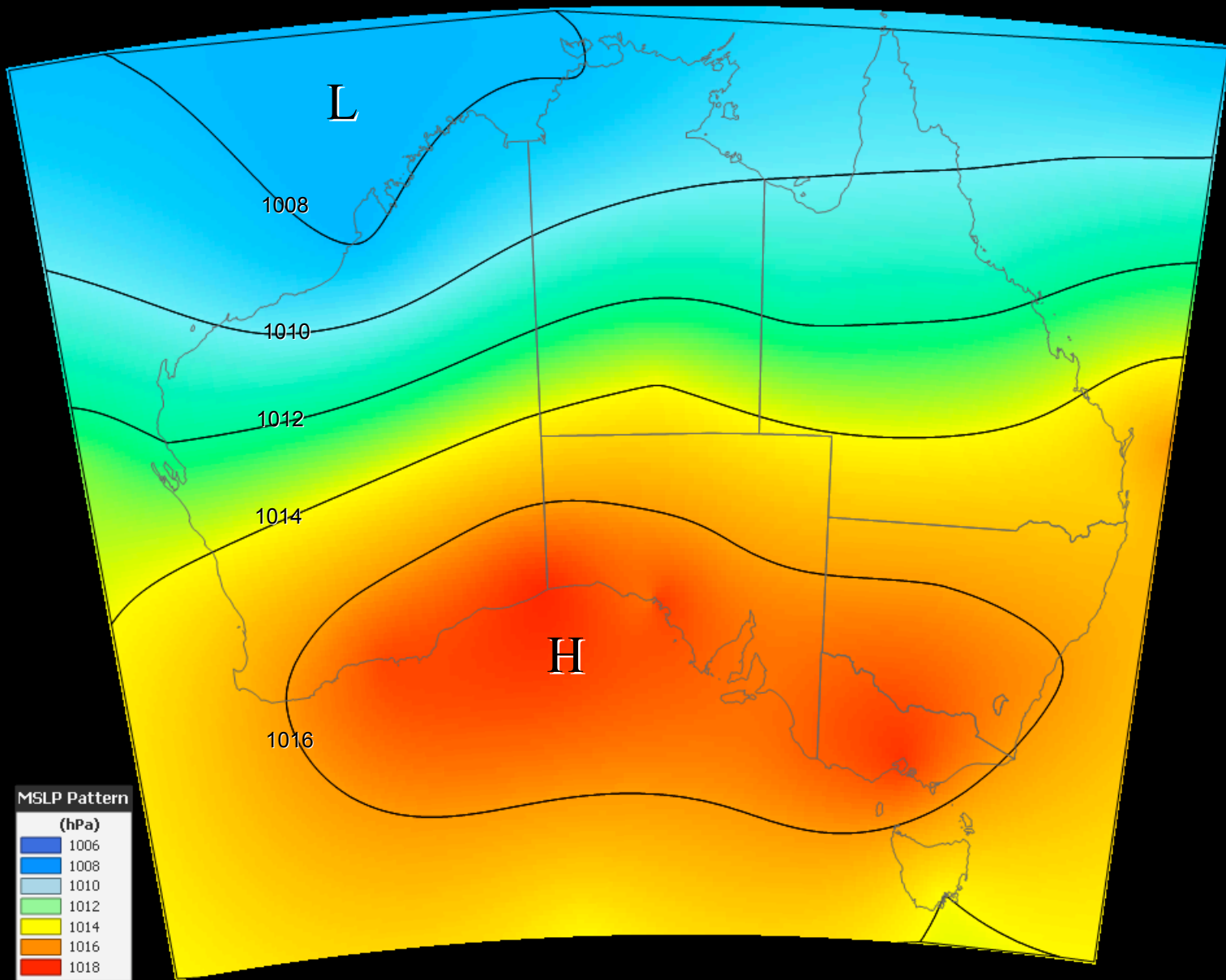
# **Atmospheric Air Pressure and Rainfall Trends**



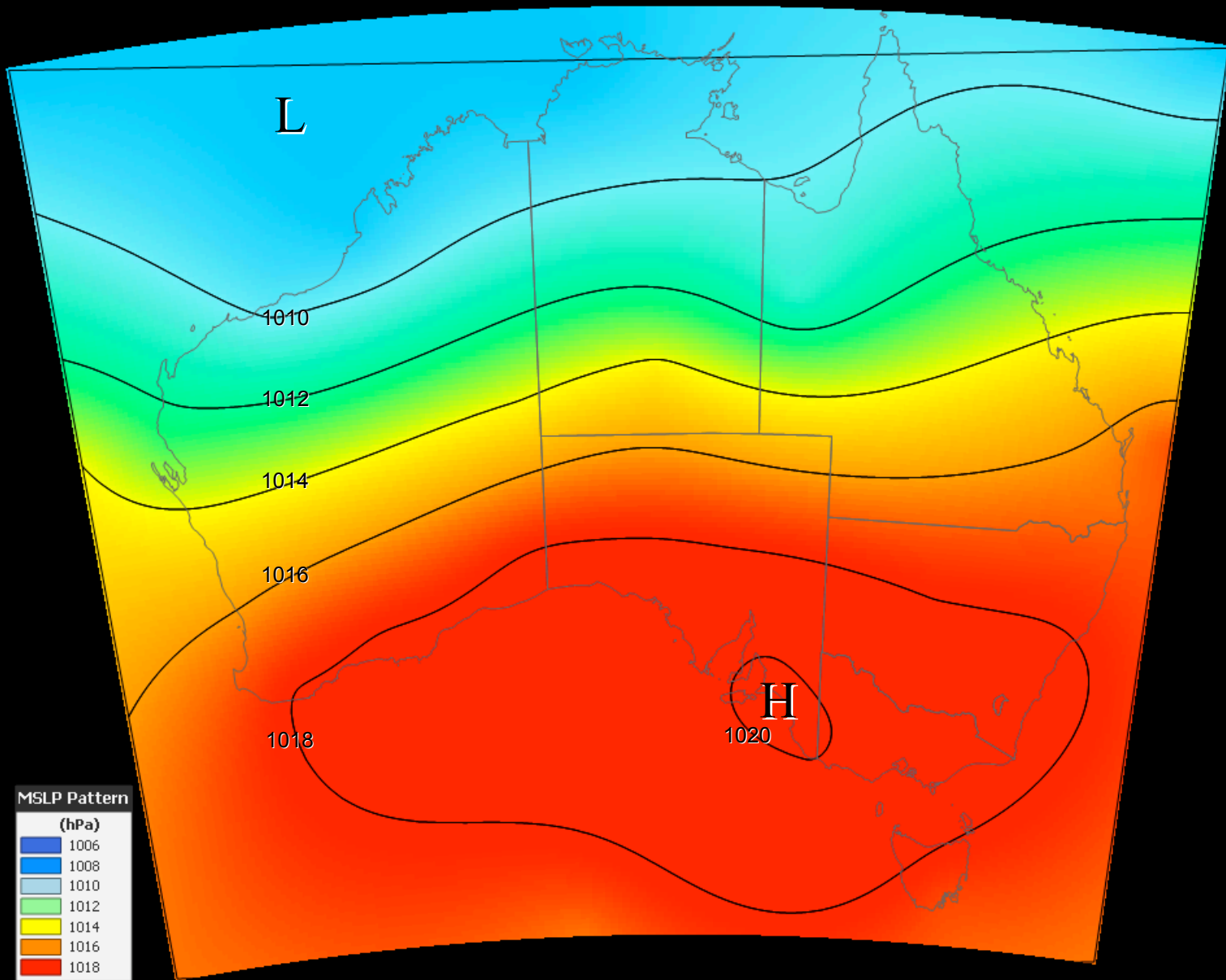
Autumn Mean Sea Level Pressure, rainfall trends, Ceduna : 1956 - 2007 (source BOM)



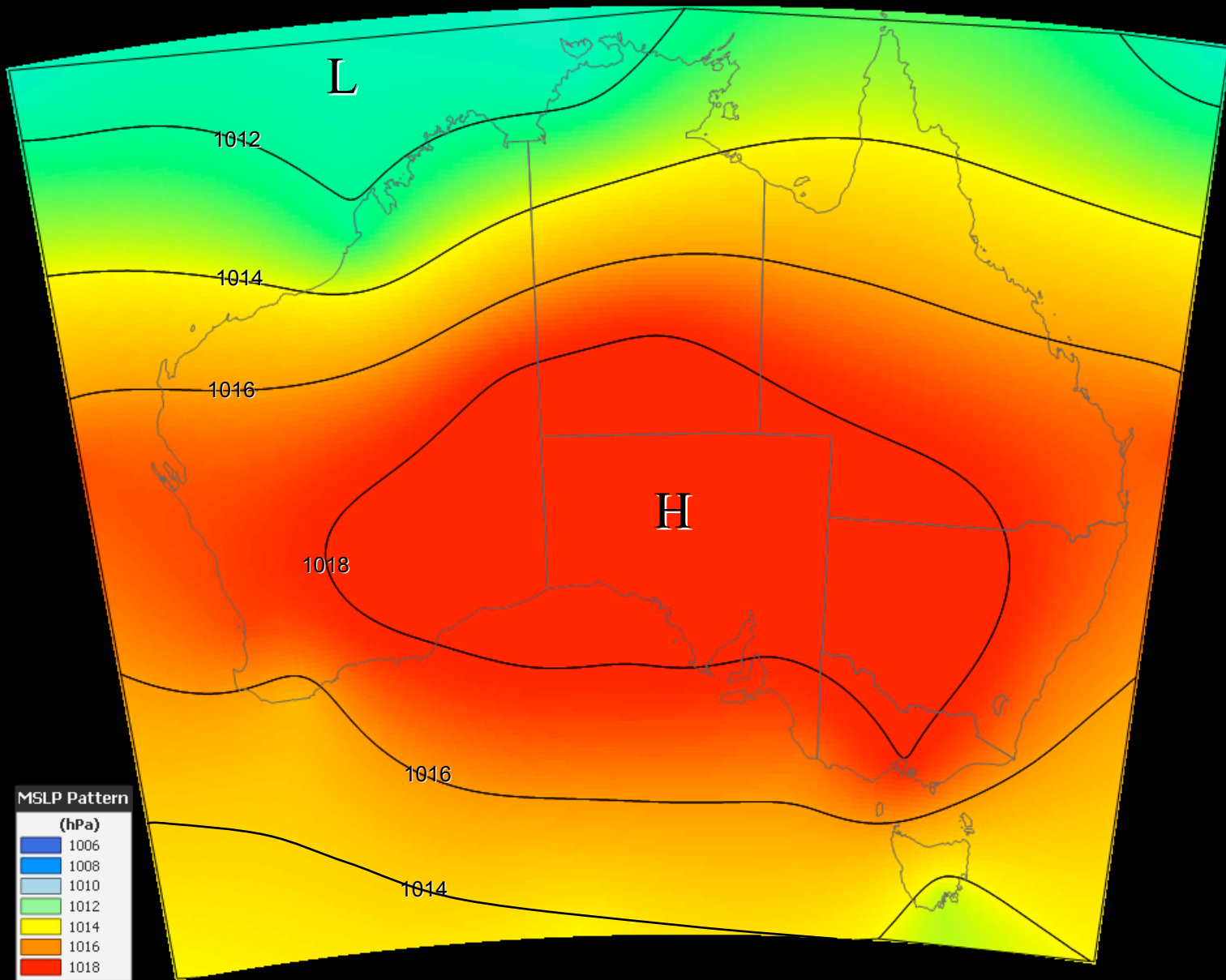
Winter Mean Sea Level Pressure, rainfall trends, Ceduna : 1956 - 2007 (source BOM)



Autumn MSLP Pattern, 1956 - 1965

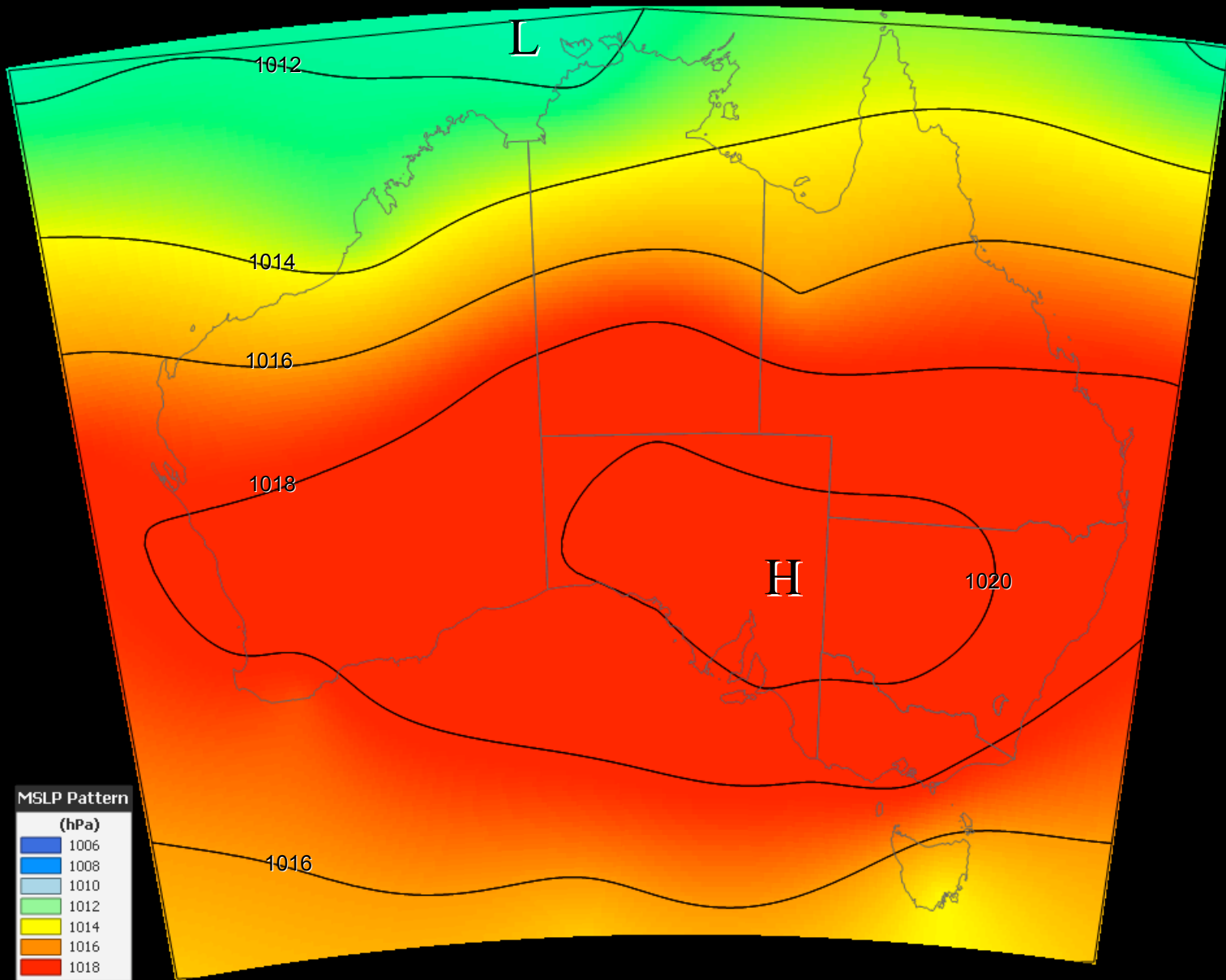


Autumn MSLP Pattern, 1998 - 2007

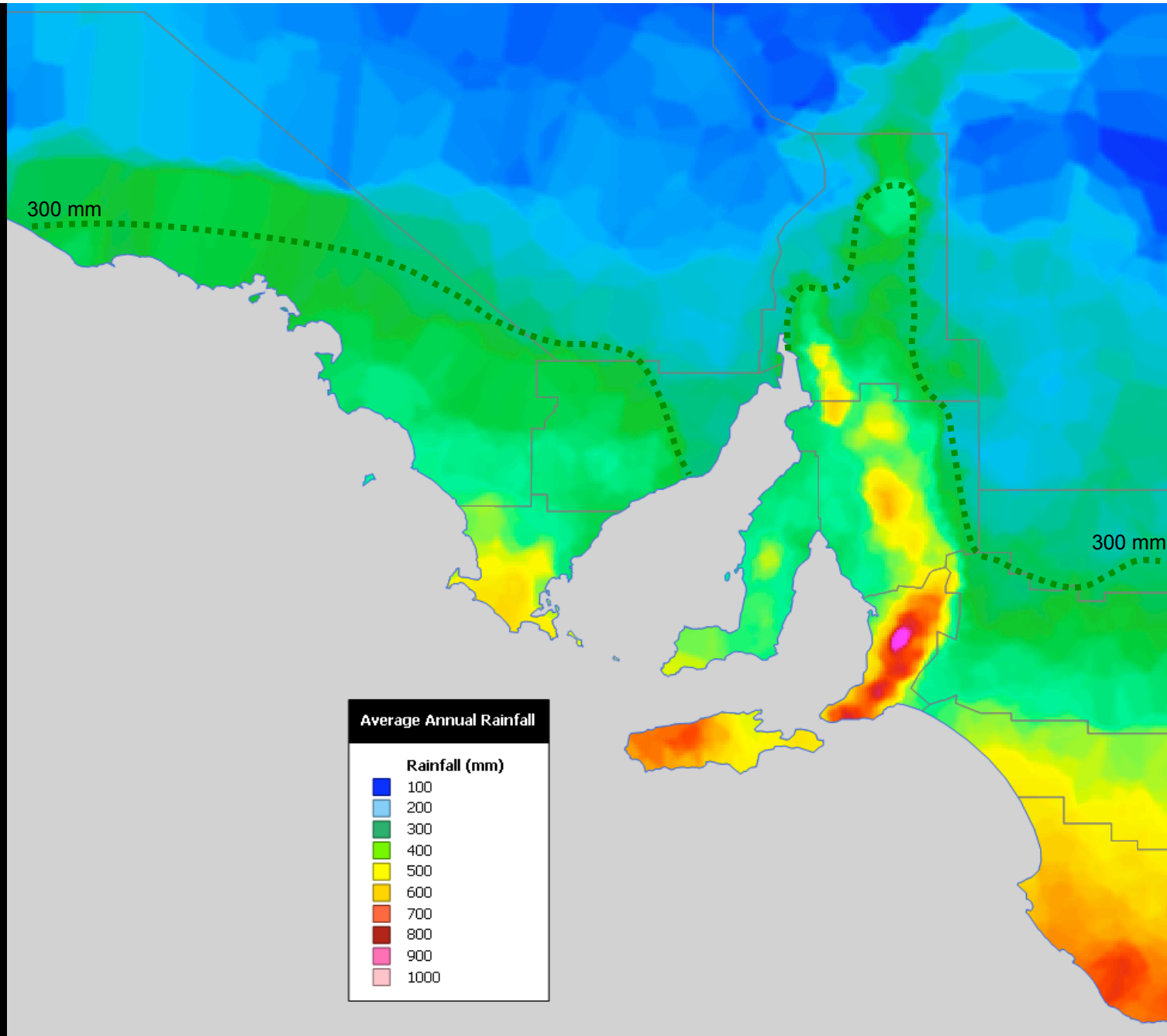


Winter MSLP Pattern, 1956 - 1965

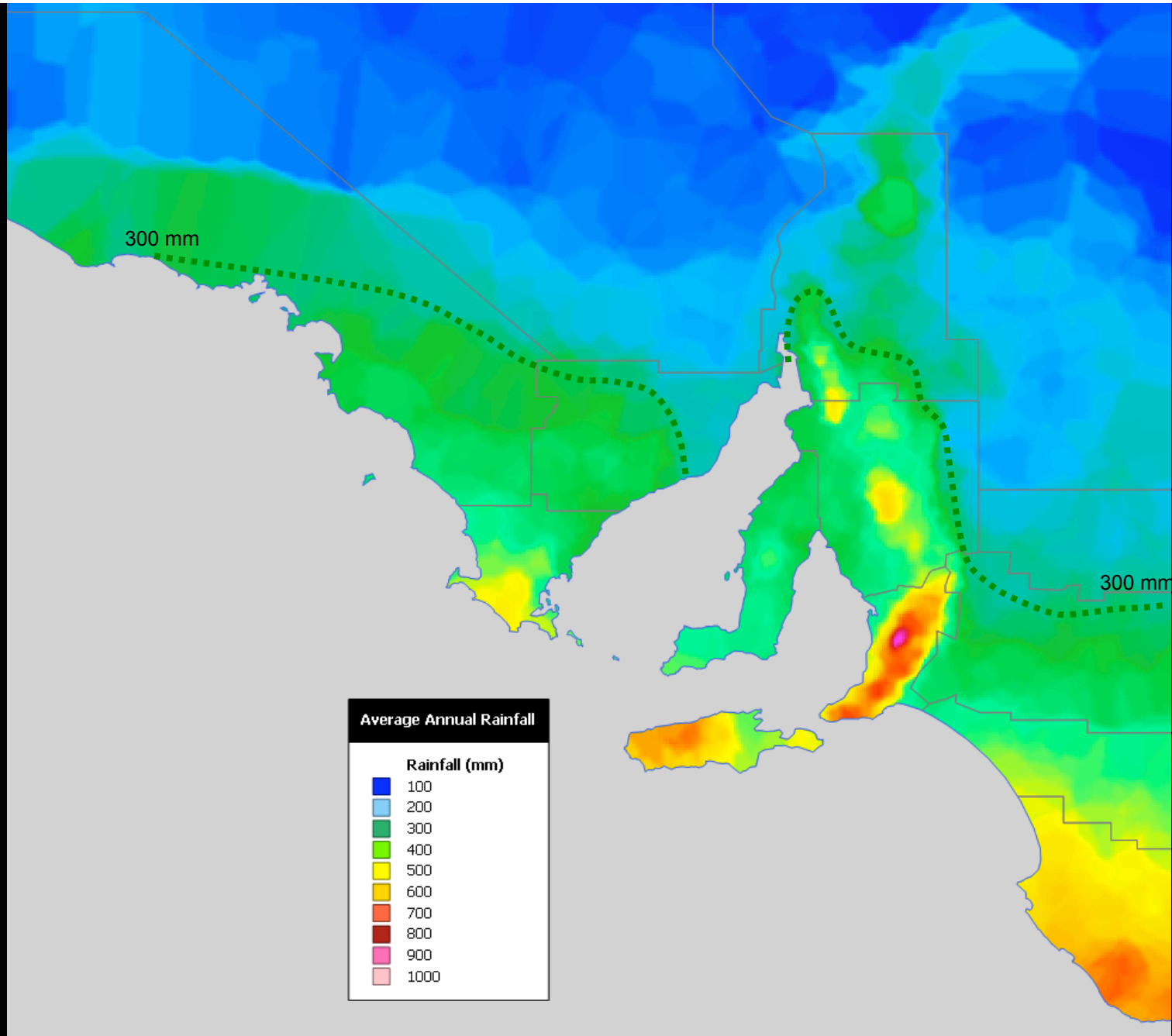




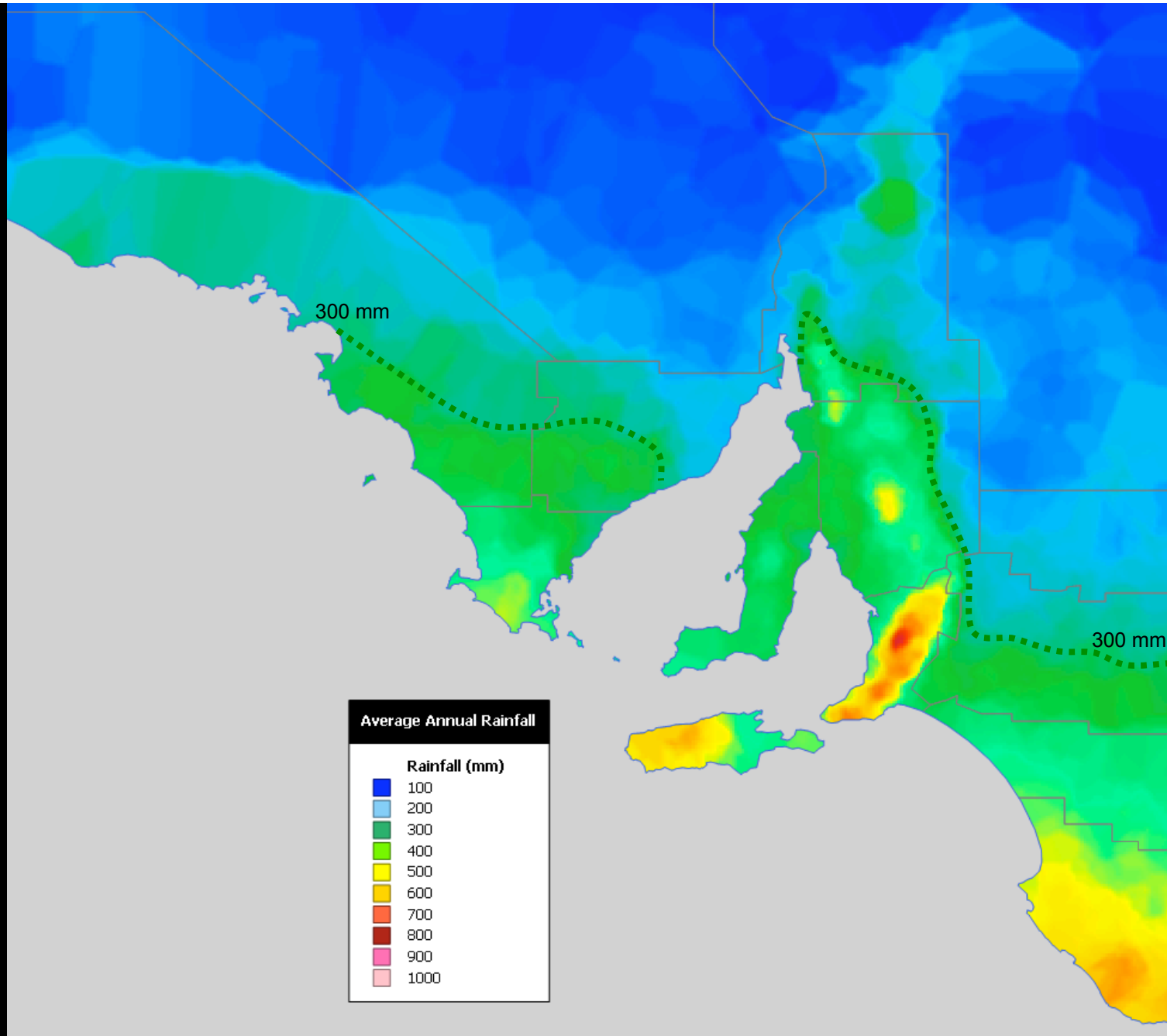
Winter MSLP Pattern, 1998 - 2007



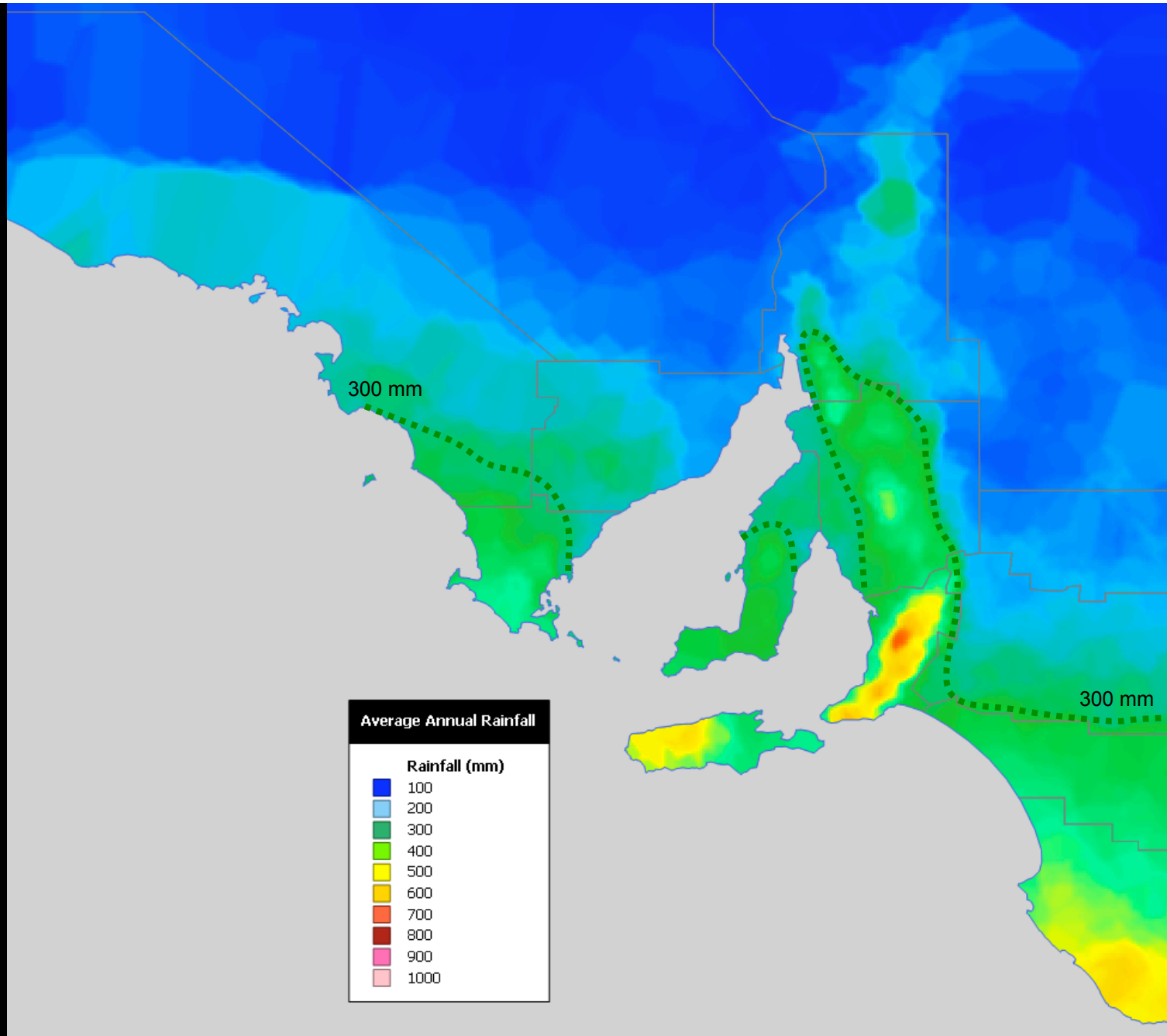
Average Annual Rainfall : South Australia



10% reduction in annual rainfall : South Australia



20% reduction in annual rainfall : South Australia



30% reduction in annual rainfall : South Australia

**Thank you**