Australia's Variable Rainfall with Tropical Cyclone Tracks

April to March Annual Australian Rainfall Relative to Historical Records 1910-2023

1910–1911
1911–1912
1912–1913
1913–1914
1914–1915
1915–1916
1916–1917
1917–1918
1918–1919
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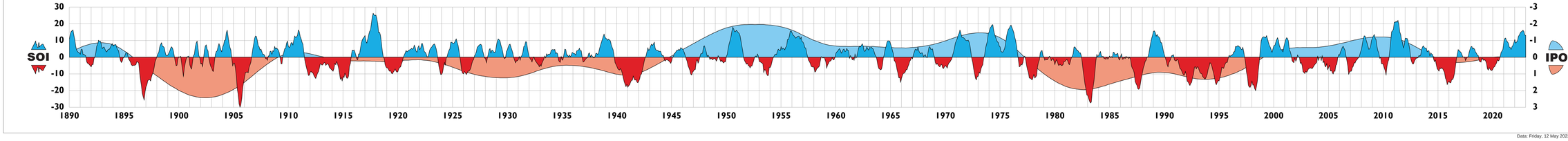
1954–1955
Agnes 1955–1956
1956–1957
1957–1958
Bertha Bearice Connie 1958–1959
1959–1960
1960–1961
1961–1962
Annie 1962–1963
Audrey Dora 1963–1964
Flora Judy 1964–1965
1965–1966
Barbara 1966–1967
Dixie 1967–1968
1968–1969
Ada Dawn 1969–1970
Dora Gertie Fiona 1970–1971
Althea Bronwyn Daisy 1971–1972
Emily Faith Madge 1972–1973
Una Wanda Yvonne Zoe 1973–1974
1974–1975
Kim David Alan Beth Dawn 1975–1976
Ted Keith Nancy Otto 1976–1977
Gwen 1977–1978
Hal Peter Greta Gordon Rosa Kerry 1978–1979
Stan Paul 1979–1980
Eddie Cliff Freda 1980–1981
Charlie 1981–1982
Dominic Elinor 1982–1983
Jim Kathy 1983–1984
Pierre Rebecca 1984–1985
Tanya Vernon Winifred 1985–1986
Manu Jason 1986–1987
Charlie 1987–1988
1988–1989
Aivu Msusa Felicity Greg Ivor 1989–1990
Joy Kelvin 1990–1991
Mark Fran 1991–1992
Les May 1992–1993
Nina 1993–1994
Sadie 1994–1995
Gertie Barry Dennis Ethel 1995–1996
Gillian Ita Justin 1996–1997
Rona 1997–1998
Steve 1998–1999
Warren 1999–2000
Tessi Abigail 2000–2001
Bernie 2001–2002
Erica 2002–2003
Fritz Fay 2003–2004
Raymond Ingrid 2004–2005
Larry 2005–2006
Monica Nelson 2006–2007
Olga Uhli 2007–2008
Charlotte Ellie 2008–2009
Olga Uhli 2009–2010
Tasha Anthony Yasi 2010–2011
Grant Jasmine 2011–2012
Owald Tim 2012–2013
Zane Dylan Fletcher Gillian 2013–2014
Ita Lam Marcia Nathan 2014–2015
Pam 2015–2016
Alfred Debbie 2016–2017
Nora 2017–2018
Owen Penny Trevor 2018–2019
Ann Esther Gretel 2019–2020
Imogen Lucas 2020–2021
Seth Tiffany 2021–2022
2022–2023
2023–2024
2024–2025
2025–2026
2026–2027
2027–2028
2028–2029
2029–2030

a printable map update sheet is made available each year at www.longpaddock.qld.gov.au/rainfall-poster



Classification of years

Years are classified, according to colour, based on whether they are either 'El Niño' years (red text year title), 'La Niña' years (blue text) or 'ENSO Neutral' years (dark grey text).

For this poster: El Niño and La Niña year classification is based on values of the Southern Oscillation Index (SOI)* between June and March. An original classification proposed by Dr Rob Allan has been modified to allow for late-forming El Niño or La Niña events. Threshold values of the SOI have been adjusted such that the frequency of El Niño and La Niña years from 1950–51 to 2009–10 is similar to that obtained by the 'WMO RA IV Consensus Index and Definitions of El Niño and La Niña'**.

El Niño

Originally referred specifically to a warming of the sea surface off the coast of Peru, now more generally refers to the warming of the central and eastern equatorial Pacific Ocean, strongly associated with persistently negative values of the Southern Oscillation Index (SOI). Generally associated with extended drier periods.

For this poster: An 'El Niño year' is indicated if the six-month average value of the SOI, ending in any month between November and March, was below a threshold value of negative 6.0.

La Niña

Now used to refer to the opposite of El Niño, or events associated with persistently positive values of the SOI. Generally associated with extended wetter periods.

For this poster: A 'La Niña year' is indicated if the six-month average value of the SOI, ending in any month between November and March, was above a threshold value of positive 6.0.

ENSO Neutral

ENSO refers to the El Niño–Southern Oscillation which fluctuates between El Niño or La Niña (above). 'ENSO Neutral' refers to neither El Niño or La Niña. Often the equatorial Pacific Ocean temperatures are near the long-term average. It is possible to have wet or dry periods associated with 'ENSO Neutral' years.

For this poster: 'ENSO Neutral' are all years which do not fall in either El Niño or La Niña categories (above).

*Monthly SOI values calculated using base period 1933–1992 inclusive (monthly values available at: http://www.bom.gov.au/climate/current/soihtm1.shtml)

**NOAA: World Meteorological Organisation Region IV Adopts Consensus El Niño and La Niña Index and Definitions, Press Release, April 28, 2005 (available at: https://wfile.ait.org.tw/wf-archive/2005/050428/epf413.htm)

Rainfall classification

Maps for each year show rainfall ranked against historical records from 1890 to 2023. The ranking is expressed as a percentile. For example, a percentile rank of 0–1 indicates that rainfall over the year ranks within the lowest one per cent of rainfall values recorded for all annual periods, at that location.

Percentile 99–100		Highest on record
90–99		Extremely high rainfa
80–90		Well above average
70–80		Above average
30–70		Average
20–30		Below average
10–20		Well below average
1–10		Extremely low rainfall
0–1		Lowest on record

Tropical Cyclone tracks

Tropical Cyclone tracks have been sourced from Australian Bureau of Meteorology (http://www.bom.gov.au/cyclone/history/index.shtml). Tracks for 1907-1909 have not been included due to space availability. Data in the post-satellite era (i.e. 1980s) are considered to be of higher quality. The 'system description' is based on the highest intensity the whole system evolves to in its lifetime. The 'Draft' version of a track would normally signify an un-checked operational track.

System names are indicated for sytems that cross the Queensland coast. Systems that occur over the March/April boundary are drawn on both year's maps and indicated by a dotted track. Tracks that proceed or originate outside the maps' boundary are faded and shown by a broken line. Track colour changes when over land.

Graph

The bottom graph shows fluctuations in the six-month moving average of the **Southern Oscillation Index (SOI)**. The SOI compares the difference in atmospheric pressure anomalies between Tahiti and Darwin. The graph also shows fluctuations in the **Inter-decadal Pacific Oscillation (IPO)**, a slower moving fluctuation in Pacific Ocean sea surface temperatures which influences climate variability. The IPO values on the graph are the filtered time series using 11 year Chebychev filter provided by Andrew Coleman, UK Met Office, updated to May 2020.

Produced by

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Acknowledgments

- Rainfall data sourced from the Australian Bureau of Meteorology (www.bom.gov.au). Interpolation and percentile calculations by Queensland Government.
- SOI data sourced from the Australian Bureau of Meteorology (www.bom.gov.au) with monthly values smoothed using a six-month moving average.
- IPO data sourced under © Crown copyright, UK Met Office. Reproduced under Licence Number MetO/IPR/2/2003 0027.
- Tropical Cyclone track database sourced from the Australian Bureau of Meteorology (www.bom.gov.au/clim_data/IDCKMSTM0S.csv)

Queensland Government

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