

What is El Niño and what might it mean for Australia?

<http://www.bom.gov.au/climate/updates/articles/a008-el-nino-and-australia.shtml>

Issued June 2014

El Niño Southern Oscillation (ENSO)

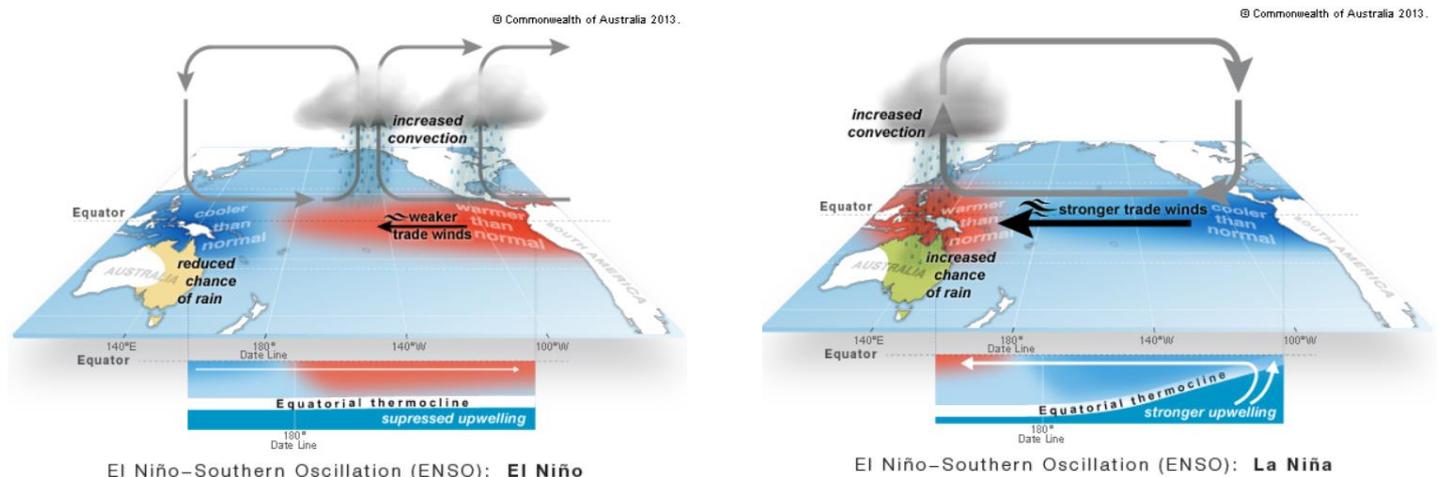
<http://www.bom.gov.au/climate/about/australian-climate-influences.shtml?bookmark=enso>

Watch the video and read the text to provide an introduction. A few guiding questions are provided to direct your enquiry.

i. What does ENSO stand for?

El Niño–Southern Oscillation (ENSO)

ii. What is the difference between El Niño and La Niña? (include a diagram complement your theory notes)



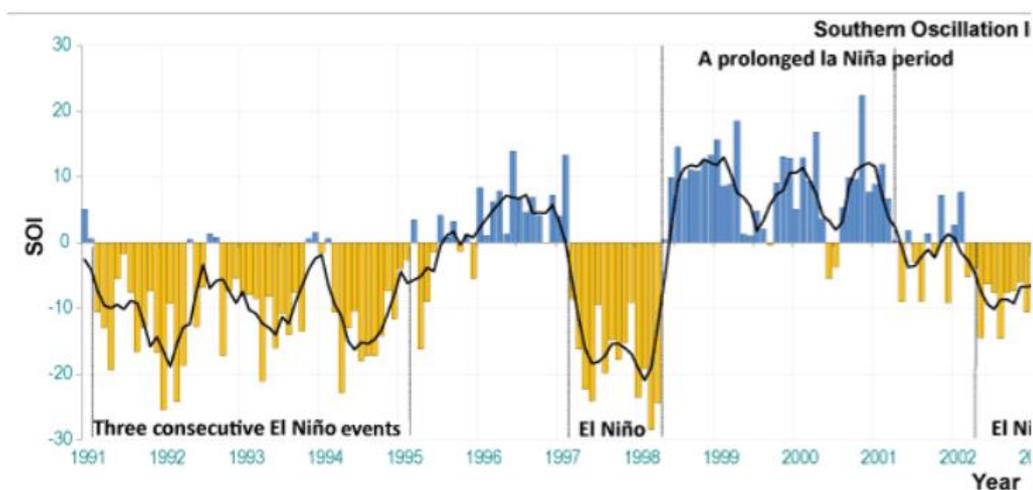
The main difference between the two cycles is that El Niño cycles are associated with cooler ocean temperatures promoting dryer seasonal averages while La Niña cycles produce the opposite (warmer ocean temperatures driving Wetter seasonal averages).

iii. What does El Niño involve in terms of environmental systems?

El Niño and La Niña are governed by interactions between the atmosphere and ocean circulation.

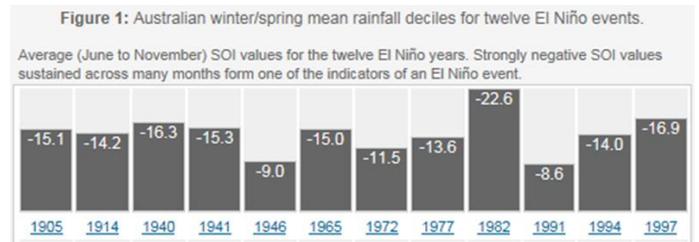
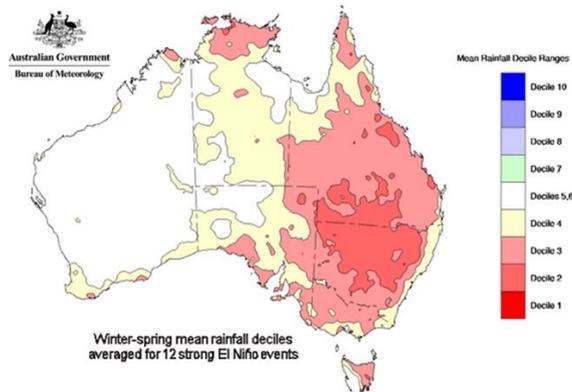
iv. What is the Southern Oscillation Index and why is it so significant to ENSO cycles? (include a graph complement your theory notes)

The term oscillation means a periodic rise and fall. The Southern Oscillation Index, or SOI is calculated from the monthly or seasonal fluctuations in the air pressure difference between Tahiti and Darwin.



Australian rainfall patterns during El Niño

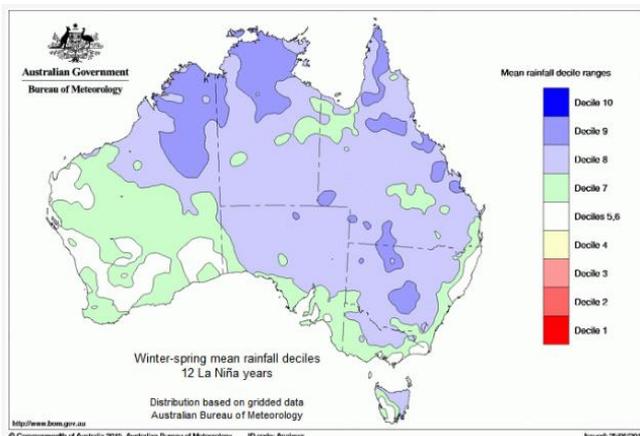
<http://www.bom.gov.au/climate/enso/ninocomp.shtml>



Average SOI values during the past 12 El Niño events are consistently below average (a negative SOI). There is a strong correlation between a negative SOI and lower average rainfall. This influence is experienced predominantly over the Eastern half of the continent.

Australian rainfall patterns during La Niña

<http://www.bom.gov.au/climate/enso/ninacomp.shtml>



Average SOI values during the past 12 La Niña events are consistently above average (a positive SOI). Strong correlation between positive SOI and higher average rainfall. Again, this influence is experienced predominantly over the Eastern half of the continent.

- i. The information supporting ENSO events is not clear cut. List on some other factors that might affect Summer rainfall patterns in El Niño cycles.

ENSO is only one of several cyclic climate drivers that impacts on Australia. Generally speaking, El Niño's impact on Australian rainfall diminishes from November onwards, so that by summer the El Niño-induced tendency towards drier than average conditions has almost entirely broken down across the east and south of the country.

Indian Ocean influences on Australian climate

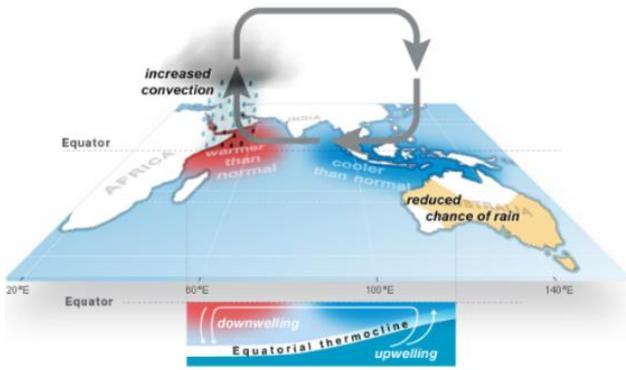
<http://www.bom.gov.au/climate/iod/>

Watch the video and read the text to provide an introduction.

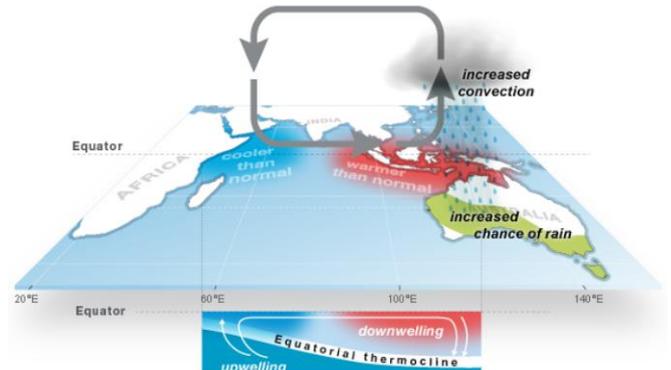
i. What is the IOD?

The Indian Ocean Dipole or IOD describes the changes in the difference between sea surface temperatures of the tropical western and eastern Indian Ocean. The IOD is one of the key drivers of Australia's climate.

The IOD has three phases: neutral, positive and negative.



Indian Ocean Dipole (IOD): **Positive phase**



Indian Ocean Dipole (IOD): **Negative phase**

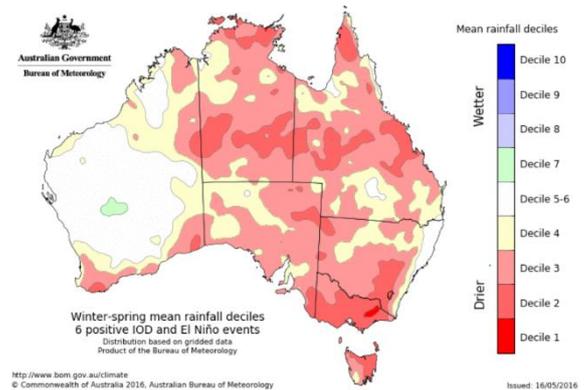
ii. When does it occur?

Events usually start around May or June, peak between August and October and then rapidly decay when the monsoon arrives in the southern hemisphere around the end of spring.

iii. What is the relationship between the IOD and ENSO?

When El Niño coincides with a positive IOD, the two phenomena can reinforce their dry impacts. Likewise, when La Niña coincides with a negative IOD, the chance of above-average winter–spring rainfall typically increases.

The map shows that when positive IOD and El Niño coincide. There is a significant shift in the rainfall pattern towards dry conditions in the eastern half of the country, in line with impacts typically expected during El Niño. There is also a reduced rainfall signal across central Australia, which is not usually seen when El Niño occurs on its own.



Negative IOD events rarely coincide with El Niño. The map shows that when a negative IOD event and La Niña coincide, winter–spring rainfall has been above average over large parts of Australia.

