

RAINFALL INDEX vs SOUTHERN OSCILLATION INDEX (SOI) (over various region in Malaysia)

SOI (Southern Oscillation Index)

- Is calculated from the monthly or seasonal fluctuations in the air pressure difference between Tahiti and Darwin.

Mathematical Method:

There are few different methods of how to calculate the SOI. The method that is used here, Troup SOI which is the standardised anomaly of the Mean Sea Level Pressure difference between Tahiti and Darwin. It is calculated as follows:

$$SOI = 10 \frac{[Pdiff - Pdiffav]}{SD (Pdiff)}$$

Where,

Pdiff = (average Tahiti MSLP for the month) – (average Darwin MSLP for the month)

Pdiffav = long term average of Pdiff for the month in question

SD (Pdiff) = long term standard deviation of Pdiff for the month in question

Rainfall Index

The index is calculated by the following formula:

$$\text{Rainfall Index (year } x) = \frac{\text{monthly rainfall (year } x) - \text{normal mean}}{\text{SD}}$$

The Analysis

Sustained negative values of the SOI often indicate [El Niño](#) episodes. These negative values are usually accompanied by sustained warming of the central and eastern tropical Pacific Ocean, a decrease in the strength of the Pacific Trade Winds, and a reduction in rainfall. The most recent strong El Niño was in 1997/98.

Positive values of the SOI often indicate [La Niña](#) episodes. Waters in the central and eastern tropical Pacific Ocean become cooler and the Pacific trade wind was stronger during this time. Together these give an increased probability that most regions in Malaysia will be wetter than normal. The most recent strong La Niña was in 1999/2001. A moderate La Niña developed slowly during 2007.

Following are graphs of Rainfall Index vs SOI which have been plotted for various regions in Malaysia:

a) Peninsular Malaysia

 [Northwestern Region](#)

 [Central and Southern Region](#)

 [Eastern Region](#)

b) Sarawak

 [Eastern Division](#)

 [Western Division](#)

c) Sabah

 [Eastern Residency](#)

 [Western Residency](#)