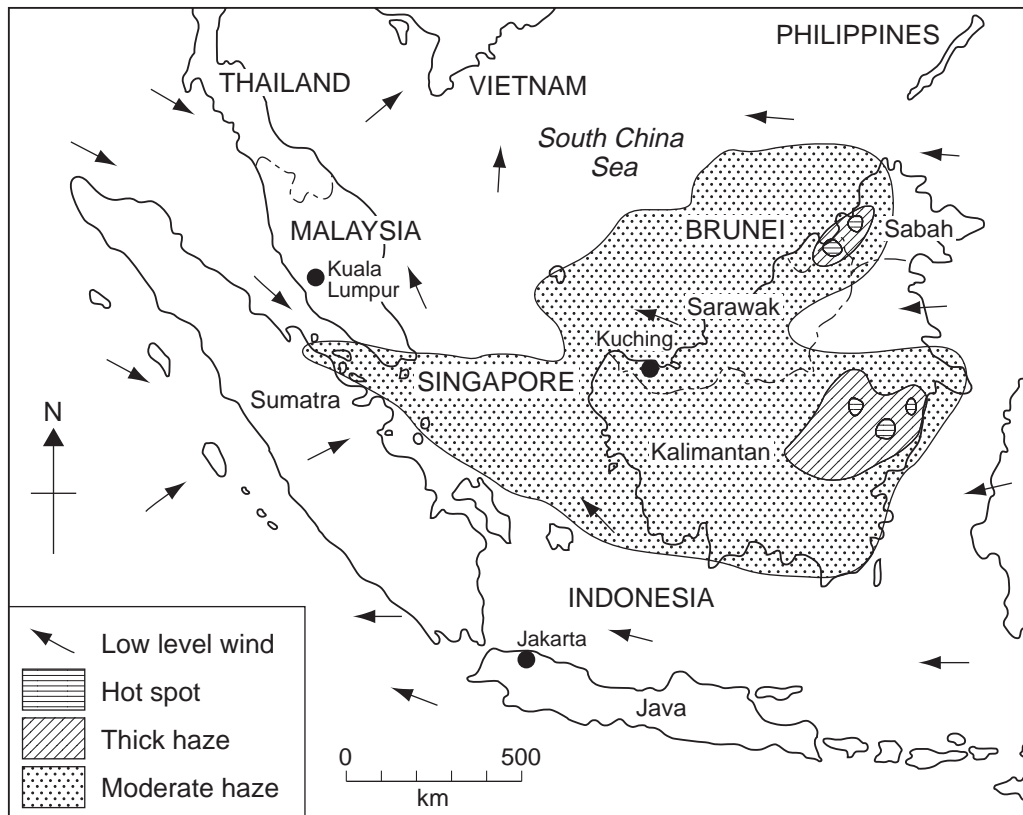


Window 2.5 *El Niño, 1997–1998*

El Niño is the term used to describe an extensive warming of the upper ocean in the tropical eastern Pacific lasting up to a year or even more. The negative or cooling phase of El Niño is called *La Niña*. El Niño events are linked with a change in atmospheric pressure known as the Southern Oscillation (SO, see below). Because the SO and El Niño are so closely linked, they are often known collectively as the El Niño/Southern Oscillation or ENSO. The system oscillates between warm to neutral (or cold) conditions every three to four years.

The 1997–8 El Niño was one of the strongest on record, developing more quickly and with higher temperature rises than ever recorded. It developed rapidly throughout the central and eastern tropical Pacific Ocean in April and May 1997. During the second half of the year, it became more intense than the major El Niño of 1982–3, with sea-surface temperature (SST) anomalies across the central and eastern Pacific of 2–5 °C above normal. SSTs exceeded 28 °C across the central and east-central equatorial Pacific beginning in May 1997, as the normal cooling of ocean waters typical of June–October was notably absent. The warming effect of El Niño was a major factor contributing to the record high global temperature in 1997. The estimated global mean surface temperature for land and marine areas averaged 0.44 °C above the 1961–90 base period mean. The previous warmest year was 1995 with an anomaly of +0.38 °C. By mid-January 1998, the volume



The pattern of forest fires and their haze over south-east Asia in August 1997.

of El Niño's warm water pool had decreased by about 40 per cent from its maximum in early November 1997, but its surface area in the Pacific was still about 1.5 times the size of the continental USA. This warm pool had so much energy that its impact dominated world climate patterns until mid-1998.

Precipitation and temperature anomaly patterns appear to characterise all El Niño warm episodes. These can be summarised as follows:

- The eastward shift of thunderstorm activity from Indonesia to the central Pacific usually results in abnormally dry conditions over northern Australia, Indonesia and the Philippines.
- Drier-than-normal conditions are also usually observed over south-eastern Africa and northern Brazil.
- During the northern summer season, the Indian monsoon rainfall tends to be less than normal, especially in the north-west.
- Wetter-than-normal conditions are usually observed along the west coast of tropical South America, and at subtropical latitudes of North America (the Gulf Coast) and South America (southern Brazil to central Argentina).
- El Niño conditions are thought to suppress the development of tropical storms and hurricanes in the Atlantic but to increase the numbers of tropical storms over the eastern and central Pacific Ocean.

One newsworthy consequence of dry conditions over Indonesia was the occurrence of huge forest fires that polluted the air over large expanses of south-east Asia. In August 1997 a series of forest fires raged in Indonesia and continued until the following June when they were subdued by rainfall. Large tracts of forest were burnt and a great haze of smoke covered extensive areas, especially over Borneo, but extending as far as Sri Lanka. In extreme cases, visibility was reduced to less than 50 m. A warm episode of ENSO brought the worst drought in half a century and set the preconditions for burning. In the western tropical Pacific rainfall totals in 1997 and early 1998 dropped more than 50 per cent below the norm in some months.

Sources

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