

November 1998 that seasonal rains returned to normal.

Over the Cook Islands, east of the International Date Line, there were 17 tropical cyclones during the 1997–98 season, which is a record. The season started early with tropical cyclone *Martin* devastating Manihiki on 31 October 1997–1 November 1997. A storm surge swept the atoll and 30 persons were washed out to sea and drowned, all but four buildings were damaged beyond repair and electricity supply was stopped. At Rarotonga in early December 1997, tropical cyclone *Pam* relieved the serious drought that had developed and there was as much rainfall in six hours as in the previous four months.

Stronger than normal onshore southwest winds prevailed over New Zealand during winter and brought excess rainfall to the southwest but rainfall deficits over the east, in the shadow of the mountain range. The summer was also very warm with below average rains leading to drought. As a result of the higher temperatures and drought there were losses of pastures and a reduced number of animals. Production of meat, wool, dairy and grain were US \$220 million below normal. There were significant losses of native and planted trees. The full cost to the New Zealand economy was estimated at US \$530 million.

The impact of below average rainfall on Australia was not as severe as for many previous El Niño events. Despite a very dry winter over most of eastern Australia there were widespread relieving spring rains during September and October 1997 that saved crops and provided some boost for pastures. Over the southeast, by the end of the 1997–98 summer, water storages were depleted, major river flows were at low levels and irrigation allocations to farmers were reduced. Over these parts the rainfall deficiencies had commenced before the onset of the El Niño and the relief rains had largely missed the area. There were several deaths and some property destroyed by wildfires but the most significant loss was to forests and parklands. A brief surge in the Australian summer monsoon over northern Australia during late January 1998 brought heavy rain to the tropical north and flooding to the region of Katherine in the Northern Territory. However, it was not until April 1998 that widespread rains eased the generally dry conditions associated with the 1997–98 El Niño event.

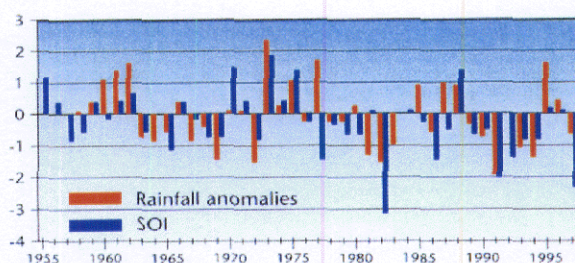


Figure II.57
Standardized rainfall anomaly over Southern Africa for the October to April rainy season and corresponding SOI values from 1955–56 to 1997–98.
(Drought Monitoring Centre, Harare)

Coral bleaching was a major environmental impact across the South-West Pacific. Sea level was lowered by more than 20 cm for many months over summer so that at low tide shallow reef water became abnormally warm. Also, some reefs that are normally covered became exposed at low tide.

East and Southern Africa

Rainfall over equatorial East Africa is often significantly below normal through the Northern Hemisphere summer during an El Niño event. However, as the intertropical convergence zone shifts southward late in the year this generally changes to very heavy rainfall over eastern Kenya and the United Republic of Tanzania.

The main rainy season of the subtropics of Southern Africa is from October to April and has a high degree of year-to-year variability. The variability of rainfall is associated with the Southern Oscillation of the Asia-Pacific region. The extent of the association between southern African rainfall and the Southern Oscillation can be seen in Figure II.57, where standardized mean rainfall anomalies for Southern Africa are plotted with the SOI for the October–April period for each year from 1955–56 to 1997–98.

Significant climate anomalies that occurred over East and Southern Africa during the 1997–98 El Niño were:

- Warmer than normal sea surface temperature over the western equatorial Indian Ocean and in the eastern Gulf of Guinea; and
- Intense and persisting rains over equatorial East Africa from October 1997 to April 1998.

During the second half of 1997, warmer than normal sea surface temperatures (higher than 28°C over a wide area) developed over the western equatorial