# Climate Anomalies and Impacts

The disruption to firstly artisan fishing and, later, commercial fishing during the appearance of abnormally warm water off the equatorial Pacific coast of South America has been the historical focus of socio-economic impacts associated with El Niño. It is now recognized that the abnormally warm surface water that is the characteristic feature of El Niño events can trigger episodes of extreme weather and seasonal climate extremes in many parts of the globe. These episodes have a relatively consistent pattern from one event to the next and produce severe socio-economic impacts in many regions.

The 1997–98 El Niño was a major event that provided strong forcing to the atmospheric circulation. The global pattern of weather and climate during 1997 and 1998 included near extremes over many parts of the globe. Some of the more significant extremes are presented in the annual summaries of 1997 and 1998 reproduced in Figure II.20, although not all of these anomalies can be attributed directly or indirectly to the El Niño event. Direct or indirect linkages can, however, be made between many of the climate anomalies and the El Niño event especially over tropical and subtropical latitudes.

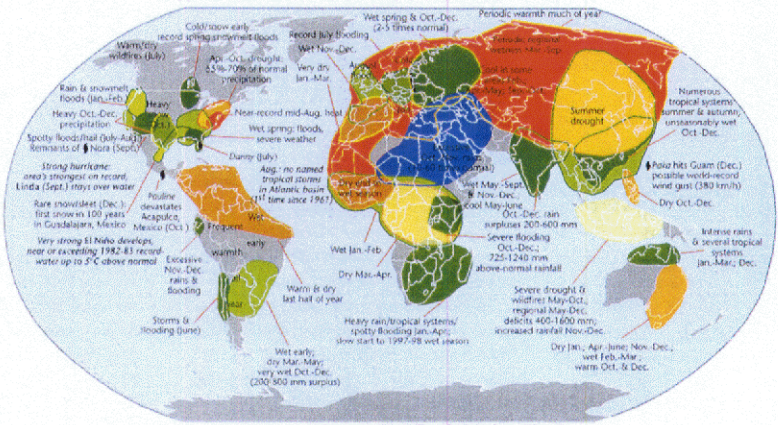
The eastward spread of abnormally warm sea surface temperatures associated with the El Niño event enhanced the local exchange of heat and moisture between the ocean and the atmosphere over the eastern equatorial Pacific Ocean. The warm waters acted as an energy source and established suitable conditions for deep atmospheric convection to occur further east than usual. The deep atmospheric convection was a linkage through which the sea surface temperature anomaly was able to force an atmospheric response.

In the tropics and subtropics of the Pacific Ocean the altered pattern of deep atmospheric convection resulted in changes to the large-scale zonal and meridional circulations of the atmosphere, such as the Walker Circulation and Hadley Cell respectively. The changes in weather and climate patterns across the tropical Pacific Ocean can therefore be directly linked to the warmer sea surface patterns.

The changes to the meridional overturning of the Hadley Cell also strengthened the high atmosphere westerly flow of the subtropics, causing changes in the location and strength of the jetstreams. In middle to high latitudes the linkage between the El Niño and climate anomalies was through teleconnections involving atmospheric Rossby waves. The new locations of tropical deep atmospheric convection triggered downstream waves in the upper atmosphere westerly flow.

A change in seasonal strength and/or location of the jetstreams is one manifestation of teleconnections between the tropics and middle latitude weather systems. From December 1997 through February 1998 (during El Niño's mature

MAJOR GLOBAL CLIMATE ANOMALIES AND EPISODIC EVENTS IN 1997




Source: Climate Prediction Center, NOAA, USA

*Figure II.20*
*Major climate anomalies and episodic events of 1997 and 1998.*
(NOAA/CPC, USA, WMO-No. 877 and WMO-No. 896)