and the downstream propagation of Rossby waves that will affect subtropical and mid-latitude weather systems. Both of these responses were observed at times during 1997 and 1998.

Significant climate anomalies of 1997–98 over the region of South America that can be attributed to the influence of the El Niño event were:

- An abnormally warm surface layer in the waters of the eastern equatorial Pacific Ocean along the coast and offshore (the El Niño itself);
- Unusual storm activity with above normal rainfall along the central coast of Chile, particularly during the Southern Hemisphere winter and spring periods;
- Frequent and often heavy rains over the subtropics east of the Andes Mountains, leading to severe flooding during May 1998;
- Intense summer rains with flooding and mudslides over the usually dry coastal regions of southern Ecuador and northern Peru; and
- Suppressed rainfall over much of the tropical region east of the Andes Mountains with drought over parts of the northeast of the continent until April 1998.

June–November 1997

The El Niño event was developing during August through October 1997. The broad influences of the evolving El Niño on the weather patterns of South America during these seasons were essentially twofold:

- Mid-latitude storms tended to be further northward and more persistent under the influence of the enhanced subtropical jetstream; and
- Convection and rainfall over the tropical parts of the continent east of the Andes Mountains, including the Amazon River basin to the northeast coast, were suppressed as a consequence of the changed zonal circulations and subsiding air over the region.

The direct influence of the subtropical jetstream was manifest as a tendency for "blocking" high pressure systems southwest of the continent and for winter cyclones to follow a more northerly track from the Pacific Ocean to the central regions of Chile. Much of central and northern Chile experienced above average winter rainfall. There were also more storms with some heavy rainfalls east of the Andes Mountains. The "blocking" high pressure systems contributed to a reduction of rainfall along the far south coast of Chile and southern Argentina. The montage in Figure II.22 shows three-month composite anomaly maps for selected climate indicators covering the period August through October 1997.

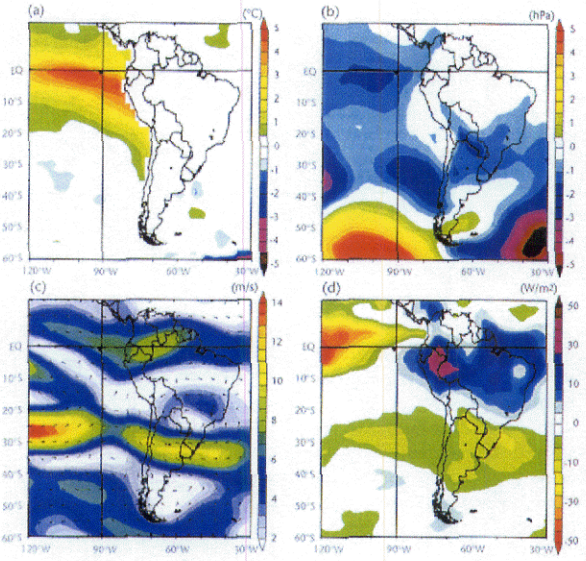

Figure II.22
Climate characteristics during August through October 1997 during the developing stage of the El Niño event: anomalies of a) sea surface temperature; b) surface atmospheric pressure; c) 250 hPa (approximately 10.5 km altitude) vector mean wind; and d) outgoing longwave radiation.
(NOAA/CDC, USA)

Warmer than normal sea surface temperatures were well established over coastal waters during the Southern Hemisphere winter of 1997 and had extended westward into the eastern equatorial Pacific Ocean. Actual sea surface temperatures rose during spring, reaching values approaching the threshold for deep tropical atmospheric convection by October 1997. Over the southeast Pacific Ocean and over the Atlantic Ocean sea surface temperatures were near normal from August–October 1997 (Figure II.22a).

Surface air pressure that was below normal extended over much of the tropical and subtropical southeastern Pacific Ocean and South America (Figure II.22b). The low surface pressures, reflecting the eastern arm of the cross-Pacific Southern Oscillation, were consistent with the negative values of the SOI at that time. The middle to high latitude surface pressure anomaly field also indicated that the seasonal high pressure systems of the southeast Pacific Ocean were further to the south than usual. The region of lower than normal pressure offshore from Chile reflected the more frequent winter