Western Region Technical Attachment
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WARM EL NINO CONDITIONS UNEXPECTEDLY RETURN

Last winter a relatively strong El Nino warm event occurred in the central Pacific. Sea surface temperatures near 155°W were approximately 2.5°C above the climatological average. This produced the typical atmospheric response with severe drought in Indonesia, northern Australia and southeastern Africa. At the same time, excessive rainfall affected the southern United States, northern Mexico and central South America. By May of 1992, the sea surface temperatures rapidly declined and became near-normal or slightly negative in the eastern Pacific by July 1992 (see Fig. 1). Experimental prediction techniques and comparisons with the intensely studied El Nino warm events of 1982-83 and 1986-87 suggested that sea-surface temperatures would remain near-normal, or possibly evolve into a cold event (anomalously cold sea surface temperatures in the central Pacific) by the 1992-93 winter.

However, late last fall conditions began changing again. Figure 1 shows that the negative anomalies east of 160°W have disappeared and that by December 1992, they have become slightly positive again. Figure 2 shows that the anomalies of outgoing longwave radiation have become negative again near the dateline. Negative outgoing longwave radiation anomalies imply enhanced convection in this area. The negative anomalies were also progressing eastward during November and December. The depth of the 20°C isotherm is also getting deeper in the eastern Pacific (indicating a larger pool of warm water in the eastern Pacific), the equatorial easterly winds are weaker than normal, and the Southern Oscillation Index (SOI) remains negative. All these signs indicate that warm El Nino conditions are again occurring in the Pacific, and the Climate Analysis Center has recently released an El Nino/Southern Oscillation (ENSO) Advisory.

This type of a "second-year follow-on" warm event was not seen in the 1982-83 and 1986-87 El Nino warm events which were carefully observed and examined. In the historical records of El Nino events, such "follow-on" events have been observed, but none with the large number of quality observations that are now available in the central Pacific. In fact, El Nino's have historically been defined by their eastern Pacific component (along the coast of Peru) and were not associated so much with central Pacific warming. It may turn out that this two-year evolution of an ENSO warm event is quite common, but that will have to be examined more closely after we get a longer record of high-quality observations in the central Pacific.

The typical U.S. result of warm El Nino conditions is enhanced precipitation across the southern states and in northern Mexico. The recent rains and flooding in southern California and Arizona certainly seem to fit within this scenario and is, at least partially, similar to the pattern that persisted late last winter. While considerable atmospheric variability remains within El Nino warm events, it is likely that if warm conditions continue through the winter that patterns which favor enhanced precipitation across the southern states of the U.S. (particularly the Southeast) will predominate. The current 90-day forecast indicates above normal precipitation across the South (especially Texas) and reflect some of this signal.

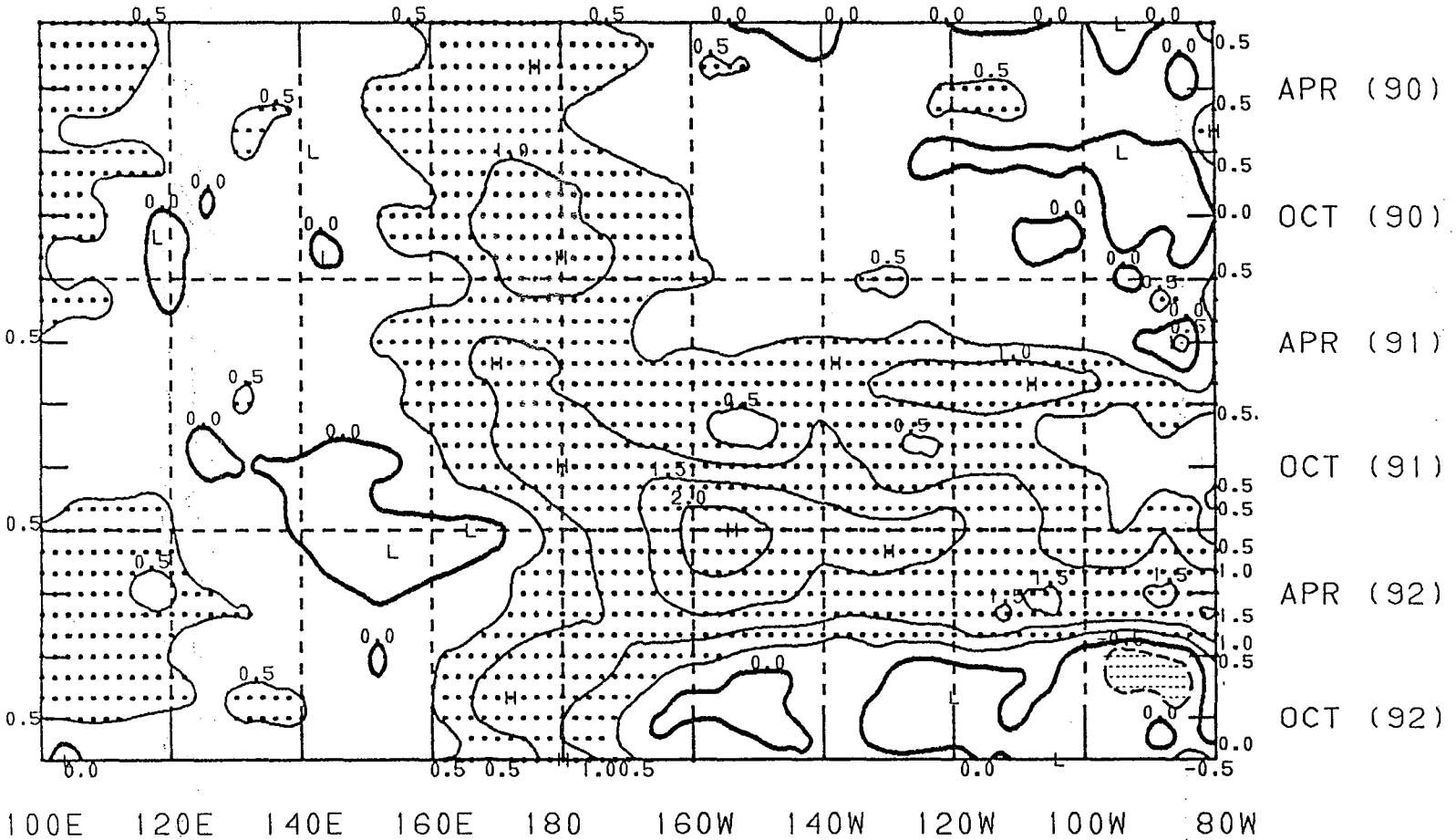

FIGURE 1 Time-longitude section of equatorial sea surface temperature anomalies in the Pacific. Contour interval is 0.5°C. Negative (positive) values are indicated by shading (stippling).

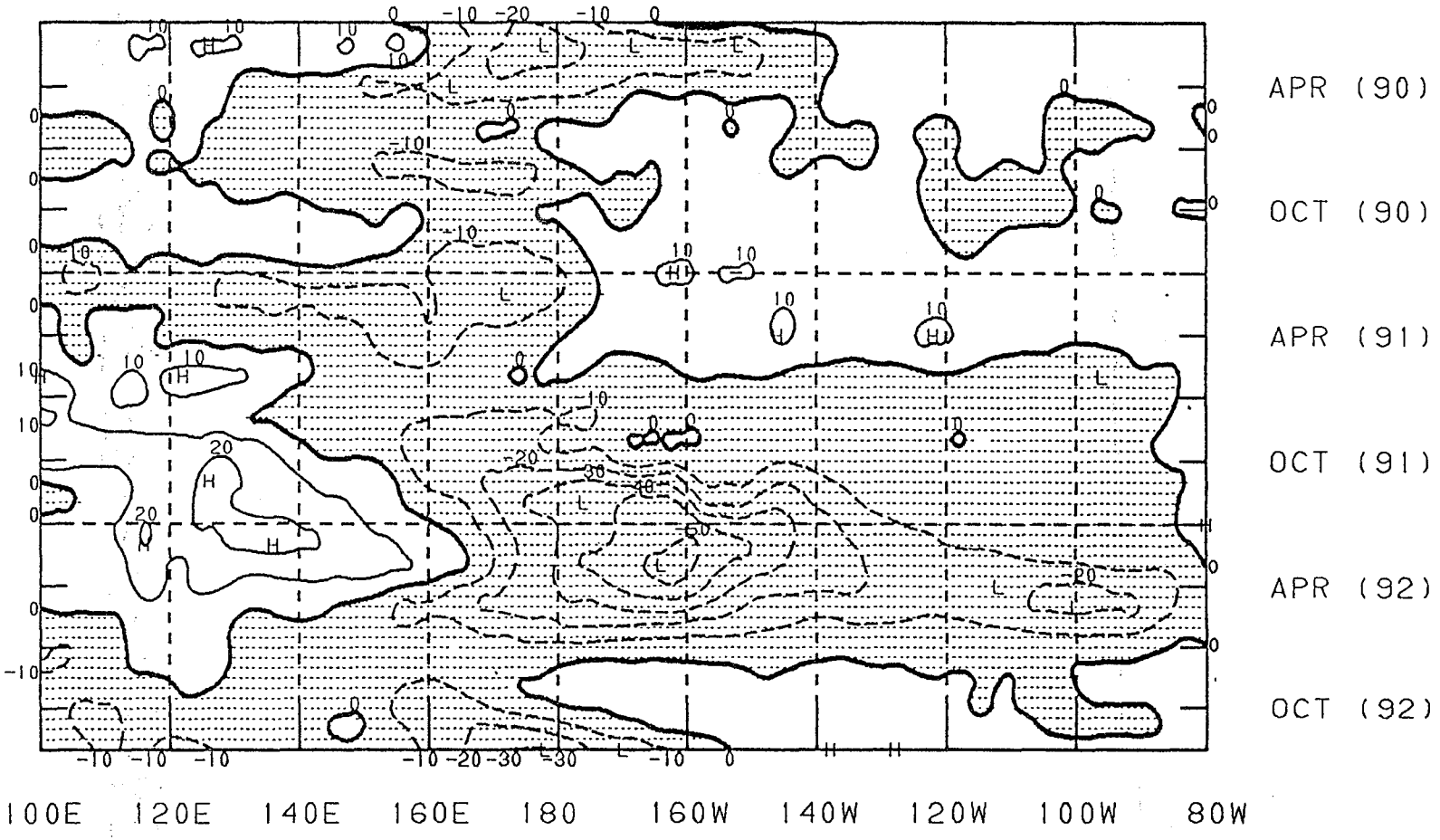

FIGURE 2 Time-longitude section of outgoing longwave radiation (OLR) anomalies in the tropical Pacific ($5^{o}N$-$5^{o}S$). Contour interval is 10 Wm^{-2}. Negative values are indicated by shading.