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Sea Level During the 1972 El Niño

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ABSTRACT

Sea level records at many island and coastal stations in the equatorial Pacific Ocean have been used to study its response and that of the associated equatorial circulation to the 1972 El Niño. The response can be divided into five phases. Preceding El Niño, stronger than normal equatorial trade winds cause a buildup of sea level in the western Pacific in 1970 and 1971. After the wind strength peaks, sea level begins to drop slowly in the western Pacific. The first collapse of the wind field is followed by high sea level along the eastern border of the ocean, actually initiating El Niño off Peru. The initial oceanic response seems to consist of an equatorial Kelvin wave, which has been successfully modeled by others, and a strong reduction of the South Equatorial Current. During the third phase sea level drops very rapidly in the western Pacific, the equatorial trough is being filled, the South Equatorial Current retreats to the south of the equator, and the Countercurrent intensifies. Then follows a second peak of sea level along the eastern side of the ocean including the coast of Central America and extremely low sea level in the western Pacific. Thereafter, conditions return to normal, and sea level changes are even more rapid than at the onset of El Niño. The development of a weaker event in 1975 is also analyzed, and it is shown that such an event terminates after the second phase.

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