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ENSO in the South Eastern Pacific ocean: the connection with Equatorial Kelvin waves

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Peruvian fishers are credited with giving the name 'El Niño' to the unusual coastal warming that occurs around Christmas along the South American coast. It was further discovered that El Niño was not just a regional phenomenon but the signature of a large scale climate fluctuation that involves the whole tropical Pacific ocean-atmosphere system. Thirty years ago, very little was known about El Niño. Today, matters are very different, in part because scientists have made enormous strides in observing, explaining, simulating by means of numerical models, and predicting El Niño. In particular, the international TOGA (Tropical Ocean Global Atmosphere) program (1985-1994), an impressive array of instruments, now monitors the equatorial Pacific continuously. This observational network allows following and documenting the major changes in the circulation of the tropical Pacific Ocean that accompany the alternate warming and cooling of the surface waters of the eastern equatorial Pacific as they happen. As an extension of the equatorial wave guide, the west coast of South America experiences related significant changes in oceanic conditions that drastically affect its very productive ecosystem. How ENSO impacts the Peru/Chile coast is a major concern of the scientific community. The latter has to deal with a complex problem due to the variety of timescales and ocean dynamics involved which link the central equatorial Pacific variability to the coastal upwelling at the extra-tropical latitudes.

In this presentation, an overview of our current knowledge on ENSO is proposed, focusing on remaining unresolved scientific issues that are relevant to the understanding of the teleconnections between the equatorial variability and oceanic conditions of Peru and Chile. Current warm conditions in the tropical Pacific from observations and model simulations are also documented.

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