

Relationships between ENSO (El Niño and the Southern Oscillation) and runoff of Tumbes River (Peru)

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The basins of the Tumbes (Perú) and Puyando (Ecuador) rivers are characterized by a runoff with strong temporal variations. Such variations have a significant social and economical impact in the region, because extreme events are associated with natural disasters. In this study, the relationship between Tumbes runoff and sea surface temperatures (SST) in the Pacific Ocean is investigated. Monthly runoff data (Period 1950-2006) and monthly SST observations in the Pacific Ocean (Period 1950-2006) were used. A strong positive correlation between riverflows during the period January-April of year N and SST anomalies during year N-1 was observed, when the warm phase of the ENSO phenomenon (usually referred to as El Niño) is developing. Therefore, when El Niño develops, the Tumbes runoff increases significantly. The reversed situation was not observed, since during the cold phase of ENSO (usually referred to as La Niña), the runoff may either increase or decrease. Ocean-atmosphere coupled models that are able to predict the development of El Niño phenomenon become a useful tool to estimate the probability of having a significant increase of the runoff with up to one year in advance.