



## Wind waves climatology of the Southeast Pacific Ocean

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The Southeast Pacific coast still lacks a high-resolution wave hindcast and a detailed description of its wave climatology. Since buoy wave measurements are particularly scarce along the coast of South America, a model hindcast forced with wind information derived from atmospheric Reanalysis seems an attractive way to generate a wave climatology in this poorly studied region, providing far better spatial and temporal coverage than can be achieved using observational data alone. Here, the climatology of wind waves over the Southeast Pacific is analyzed using a 32-year hindcast from the WaveWatch III model, complemented by satellite-derived Significant Wave Height (SWH) and buoy measurements for validation. Using partitioned spectral data, a regional climatology of wind sea and swell parameters was constructed.

In general, the simulated SWH shows a good agreement with satellite and in-situ SWH measurements.

The spatial pattern of SWH is clearly influenced by the meridional variation of mean surface wind speed, where the stronger winds over the Southern Ocean play a significant role generating higher waves at higher latitudes. Nevertheless, regional features are observed in the annual variability of SWH, which are associated with the existence of atmospheric coastal low-level jets off the coast of Peru and central Chile. In particular, the seasonal variation of these synoptic scale jets shows a direct relationship with the annual variability of SWH. Off the coast of Peru at  $\sim 15^{\circ}\text{S}$  the coastal low-level jet is strongest during austral winter, increasing the wind sea SWH. In contrast, off central Chile, there is an important increase of wind sea SWH during summer. The seasonal variation of the wind sea component leads to a contrasting seasonal variation of the total SWH at these locations: off Peru the coastal jet amplifies the annual variability of SWH, while off Central Chile the annual variability of SWH is suppressed by the presence of the coastal jet.