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Global ENSO Ocean Wave Trends During the Last 30 Years

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Surfline celebrated 30 years of delivering surf reports and forecasts in 2015. The company has grown from an organization that initially produced surf reports and forecasts solely in Southern California in 1985 to a global marine, surf, and fish forecasting and editorial solution. The last 30 years of acquiring surf and swell observations have uniquely positioned us to analyze long term wave climate trends on a global scale.

This is an overview of Surfline's historical wave data, presented as it relates to the warm phases of the El Niño Southern Oscillation. The data presented in the plots for specified locations are daily mean significant wave height values (m) for the given months and year. The affects of El Niño on the Northern Hemisphere winter have been covered quite extensively, and plots from both the North Pacific and North Atlantic provide fairly clear, expected signals for many locations (Fig. 1).

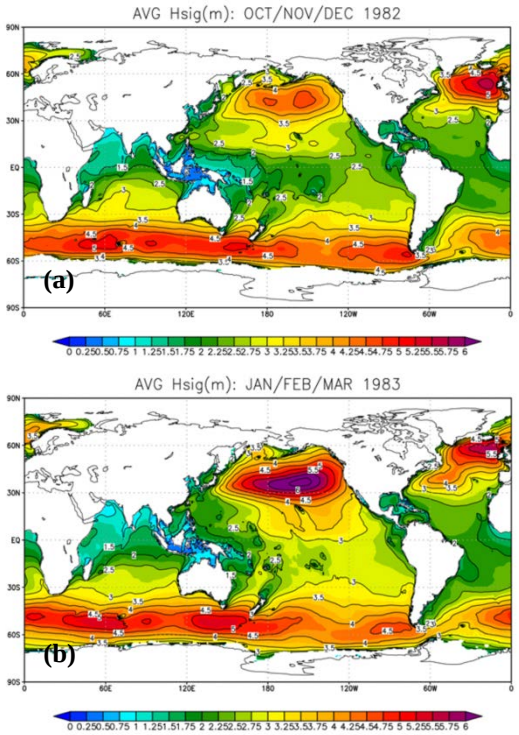

Fig. 1 Average significant wave heights, (a) OND 1982 and (b) JFM 1983.

Looking back through 30+ years of wind and wave data, the seasonal predictors associated with moderate and especially strong El Niño events are quite clear. During the winter peak, most notably during strong events, we see an appreciable uptick in swell energy after the holidays during the months of January, February, and March. In terms of the fall and early winter months of October, November, and December, the signal is far less clear. This is represented quite well in the cases of Southern California and New York (Fig. 2, 3). The locations of interest were offshore to the west of Point Conception, and to the southeast of the mouth of the Hudson River, respectively.

As the Southern Hemisphere winter typically bookends the peak of ENSO events, we have highlighted the years pre and post peak to try and better identify possible trends in swell activity. Looking back on swell data for key markets that rely on the fruits of the Southern Hemisphere's storminess, there were mixed findings. While the signals for the North Pacific, and North Atlantic for that matter, are quite clear for a myriad of destinations, the Southern Hemisphere is not so clear cut.

The impact the warm phase of ENSO has had, and potentially will have, on swell production during the Southern Hemisphere winter has been documented less and is more difficult to discern when looking back through the wave climatology (Fig. 4). That said it is interesting to note the uptick in swell for Fiji preceding the peak in strong El Niño events, likely attributable to increased tradeswell.

For more info on how this impacts the surf in the North Pacific and North Atlantic basins through the winter, please check out our Seasonal Outlooks for each respective basin. They can be found below.

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North Pacific Winter Outlook - http://www.surfline.com/surf-news/heres-what-we-can-expect-for-the-west-coast-hawaii-and-beyond-this-winter-thanks-to-a-robust-el-nino-event-off_133236/

North Atlantic Winter Outlook - http://www.surfline.com/surf-news/a-strong-el-nino-event-is-a-shoo-in-and-likely-to-enhance-surf-for-some-locations-official-15-16-atlantic-wint_133370/

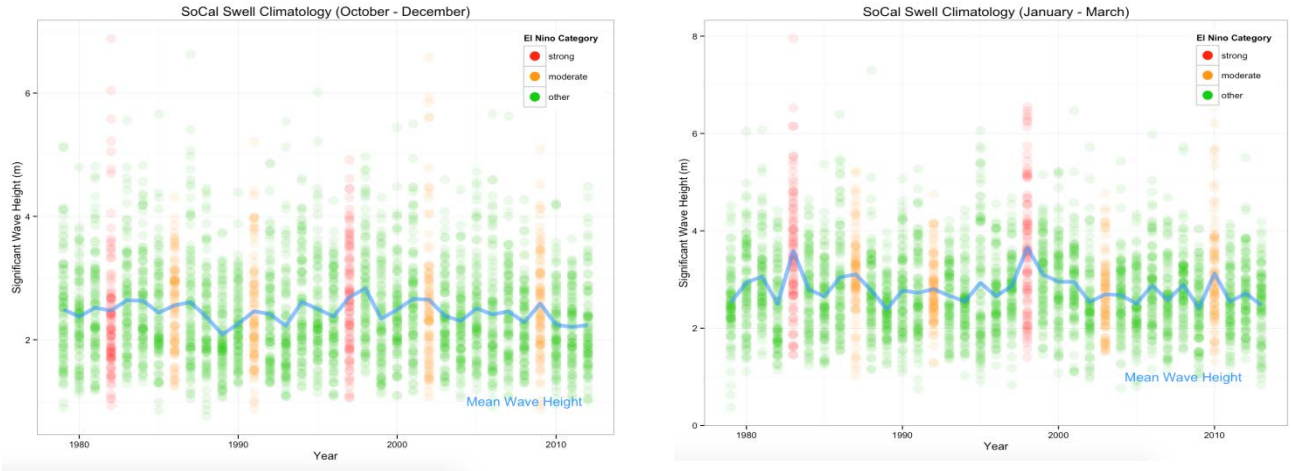

Fig. 2 Average significant wave heights for Southern California, (left) OND and (right) JFM.

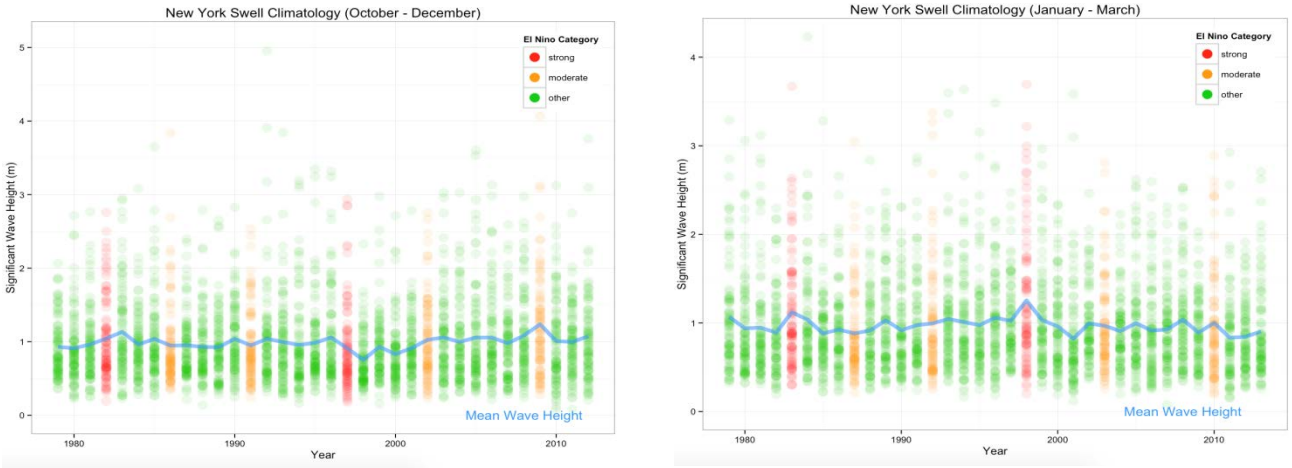

Fig. 3 Average significant wave heights for New York, (left) OND and (right) JFM.

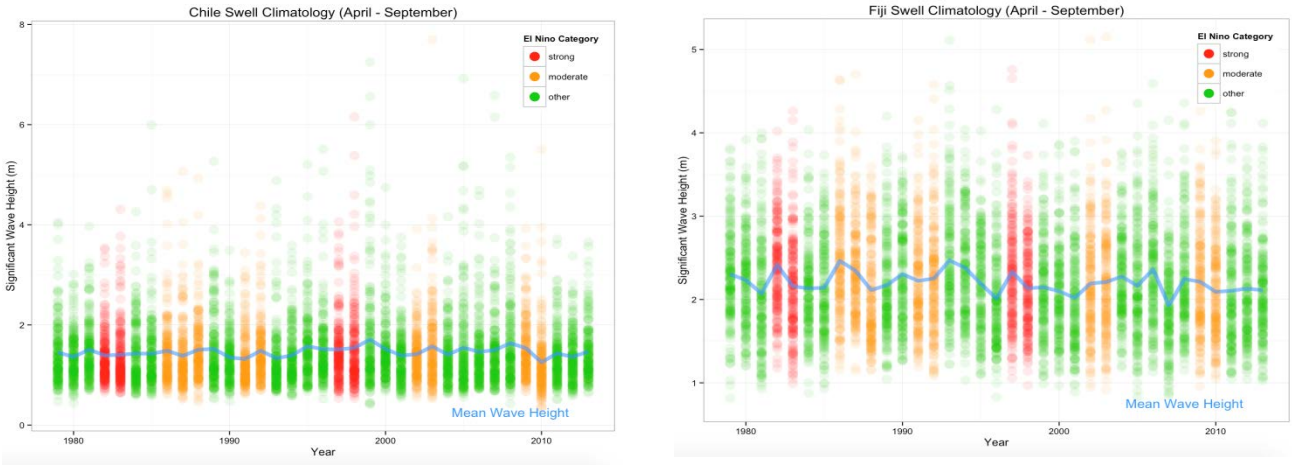

Fig. 4 Average Significant Wave Heights for Chile during the Southern Hemisphere winter pre and post peak of moderate to strong El Niño events, (left) Chile, (right) Fiji.