OFFICIAL ABSTRACT and CERTIFICATION

Evaluating the Relationship Between Two Extreme Wind Events in Southern California for Advancements in Forecasting

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Frequent extreme wind events in Southern California are associated with elevated risks for rapid wildfire spread. The extreme wind events analyzed in this study are Santa Ana Winds (SAWs), which impact Ventura, Los Angeles, and San Diego Counties; and Sundowners, which are particular to Santa Barbara County. This study examines the typical timing between SAW and Sundowner events and their associated large-scale meteorological conditions to provide improvements for models and forecasting. Data on pressure, temperature and wind was analyzed to create composite maps. Results demonstrated a weak correlation in the likelihood that the two events occurred within 2 days of each other, and the most likely temporal arrangement when these events occurred in close proximity to each other was found to be a Sundowner event occurring 2 days prior to a SAW event. This can be attributed to the eastern flow of air masses in the atmosphere. The composite maps suggested that atmospheric pressures at 500mb height had the most distinct patterns by wind event. Distributions of pressure at 850mb height suggested the most about lag time values and what event could be expected to occur in close proximity from the day represented on the map. The composite maps for vector winds suggested that the highest overall wind speeds observed during any wind event were when both SAWs and Sundowners occurred on the same day. Variations in results suggest that differences in topography between the regions affected by each event is critical to the development of unique characteristics for each.

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