

## **Using Lightning Data to Monitor the Intensification of Tropical Cyclones in the Eastern North Pacific**

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The Eastern North Pacific basin is the second most active region in the world for developing tropical cyclones, averaging from 16 to 17 named storms per year. These storms form in the inter-tropical convergence zone (ITCZ), an environment suited to prolific development of cloud clusters, a few of which actually develop into tropical cyclones. Formation often occurs just off the coasts of Central America and Mexico where weather observations other than satellite data are scarce, but where their close proximity to the coastline can result in weather-related problems for coastal communities. In addition, many of the developing storms move north up the coast into Northern Mexico and the Southwestern United States in a chaotic process known as extratropical transition, posing a serious forecasting problem for these regions.

Fortunately, a Long-range Lightning Detection Network (LLDN), an extension of the National Lightning Detection Network, can be used to monitor electrical discharges within cloud clusters that develop within the ITCZ. The region of analysis is limited to 80W-130W and 0-30N to guarantee that the detection efficiency of the LLDN is acceptable. Two populations of cloud systems from the 2006 season are tracked: 1) named tropical cyclones from 72 hours prior to the formation of a tropical depression to ensure any indication of development in the early stages can be assessed; and 2) cloud clusters that do not develop into tropical cyclones, but persist for at least 3 days in satellite infrared imagery. Lightning flashes and lightning flash densities in both populations are evaluated for useful trends prior to and during intensification. Results will be presented that show: distinct differences between developing tropical cyclones and non-developing cloud clusters; substantial differences between systems that are over land compared with those over the ocean; and early results that indicate that intensification and steady-state stages of a tropical cyclone can be identified using the lightning data.