

A study of local circulation and their effect on air quality: a case study over Veracruz city, Mexico

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Veracruz city Harbor is the most important in Mexico. Recently an expansion project has result land cover changes, a population and vehicular fleet increase and major increment on emission rates. Therefore the meteorological condition information that favor or not the dispersion of pollutants is crucial to decision making. There are few studies about the pollution dispersion in this region; however the role of local circulations, the mixing height variability and particle trajectories emitted have not been examined yet. In this work, meteorological surface stations, buoys and the North America Regional Reanalysis data were used to characterize daily and seasonal variability of winds, temperature humidity. The CALMET model was also used to assess meteorological conditions for events with medium to high PM₁₀ concentrations. The results show that a strong katabatic wind originates from radiational cooling of air atop the Central Mexican Plateau reaches the coast during the night transporting particles to Xalapa and Veracruz cities area. Also during daylight the sea breeze carries particles inland and at night the emissions are trapped in a shallow boundary layer near the coastline. Additionally PM₁₀ concentration maxima occur during cold surges events due to wind erosion.

Keywords: dispersion of pollutants, local circulation, CALMET model