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Sea-breezes in the Mobile Bay Area

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The sea-breeze is a warm season atmospheric phenomenon in coastal regions. A horizontal temperature gradient driven by the differential heat capacities of land and water drives this gravity current, which brings in cool and moist sea air. The passage of the sea-breeze front is accompanied by a sudden drop in temperature and dew-point temperature while the wind shifts from offshore to onshore. Sea breeze frontal passages from several local South Alabama Mesonet weather stations (http://chiliweb.southalabama.edu/) are presented. The contrast between land- and sea-surface heating and the resulting horizontal pressure gradient is derived from buoy and Mesonet data. Sea breezes typically form under quiet synoptic conditions in opposing background flow. Upper air observations from the region demonstrate this. Dust and insects accumulate in the converging flow of the sea-breeze front, which is visible on WSR-88D Doppler radar. Under favorable atmospheric conditions, the converging flow at the sea-breeze front initiates thunderstorms. In Mobile and Baldwin counties (west and east of Mobile Bay) bay breezes can occur. Sometimes, both sea (Gulf) and bay breezes occur. Collison of these breezes can lead to the generation of thunderstorms. Radar images show this. Sometimes the sea-breeze can have significant impacts, including 1) severe thunderstorms with strong wind gusts, damaging hail, and/or dangerous lightning, 2) turbulence affecting air traffic, and 3) the concentration of ozone pollution.