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Climate and atmospheric turbulence analysis during Shamal events in Persian Gulf YUAN LI, REZA SADR, Texas AM University, College Station — The impact of low-level jets (LLJs) on events such as dust/salt storms has demonstrated the need for a clear understanding of the physical mechanisms underlying such LLJs. Shamal is a prominent LLJ blowing over Persian Gulf that is characterized by wind speeds of 30 m/s, or more, at an altitude of 300–700 m, and much lower speed at surface level, with a Northerly-Northwesterly direction. This is mainly a thermal phenomenon where the vertical temperature profile forms an inversion. A Shamal day is commonly defined as a day with a meteorological in Northerly-Northwesterly direction and wind speed over 8.75 m/s in at least 3 hours of the day. This work analyzes the climate and turbulence characteristics during Shamal events that consists of at least two consecutive Shamal days. Micrometeorological data was obtained at a coastal site of Qatar (26.08N, 51.36E) from September 2015 to August 2016. Three sonic anemometers and a weather station placed on a 9 m tower recorded the wind velocity, direction, temperature, humidity, and pressure data. It is observed that during a Shamal event, temperature and humidity decrease while pressure increases. General climate and turbulence characteristics of the coastal cite presented and compared with that of the Shamal events, with one day before and after each event. Turbulence kinetic energy and shear stress, heat flux, Richardson number, and Monin-Obukhov length are analyzed for characterization of turbulent mixing processes in Shamal days.

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