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Atmospheric stability analysis over statically and dynamically rough surfaces[1] EMINA MARIC, MEREDITH METZGER, University of Utah, ARINDAM SINGHA, REZA SADR, Texas A&M University at Qatar — The ratio of buoyancy flux to turbulent kinetic energy production in the atmospheric surface layer is investigated experimentally for air flow over two types of surfaces characterized by static and dynamic roughness. In this study, "static" refers to the time-invariant nature of naturally-occurring roughness over a mud/salt playa; while, "dynamic" refers to the behavior of water waves along an air-water interface. In both cases, time-resolved measurements of the momentum and heat fluxes were acquired from synchronized 3D sonic anemometers mounted on a vertical tower. Field campaigns were conducted at two sites, representing the "statically" and "dynamically" rough surfaces, respectively: (1) the SLTEST facility in Utah's western desert, and (2) the new Doha airport in Qatar under construction along the coast of the Persian Gulf. Note, at site 2, anemometers were located directly above the water by extension from a tower secured to the end of a 1 km-long pier. Comparisons of the Monin-Obukhov length, flux Richardson number, and gradient Richardson number are presented, and discussed in the context of the observed evolution of the turbulent spectra in response to diurnal variations of atmospheric stability.

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