Abstract Submitted
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Wind/Aerosol LiDAR measurements at a coastal zone[1] YAJAT PANDYA, Wind Fluids and Experiments (WindFluX) Laboratory, Department of Mechanical Engineering The University of Texas at Dallas, Richardson TX, MENG LI, DI YANG, Department of Mechanical Engineering, University of Houston, Houston, TX, GIACOMO VALERIO IUNGO, Wind Fluids and Experiments (WindFluX) Laboratory, Department of Mechanical Engineering The University of Texas at Dallas, Richardson TX, UTD-UH COLLABORATION — Production and transport of the marine aerosol in the Marine Atmospheric Boundary Layer (MABL) flow depend on several factors including wind speed, shear, turbulence intensity, wave height, steepness, and wave age. The coastal zone of the MABL flow undergoes complex processes of wave breaking and wave crashing that significantly differ from the aerodynamically smooth conditions typical for the open ocean. Using ground-based measurements of wind speed and aerosol backscatter from a pulsed Doppler wind LiDAR, it is possible to characterize the spatio-temporal distribution of marine aerosol under different wind directions. Fixed LiDAR scans were performed at the Galveston Island State Park, TX, which have enabled estimating friction velocity and aerodynamic roughness length for different wind/wave/atmospheric conditions. We compare these flow parameters with the equivalent values typically predicted through an open- ocean model (Andreas *et al.*, 2012) to single out differences of orders of magnitude in aerodynamic roughness length, which are connected with wave breaking, spraying and foam owing the coastal zone. Finally, an empirical model to predict aerodynamic roughness length from the friction velocity for coastal zone is proposed.

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