

EGU23-4115, updated on 27 Apr 2024 https://doi.org/10.5194/egusphere-egu23-4115 EGU General Assembly 2023 © Author(s) 2024. This work is distributed under the Creative Commons Attribution 4.0 License.



## Atmospheric Turbulent Characteristics under Summer Shamal in Coastal Qatar

## Yuan Li and Reza Sadr

Department of Mechanical Engineering, Texas A&M University, College Station, USA

Summer Shamal, a strong low-level northwesterly wind in the Middle Eastern region, is the major trigger for dust storm activity with a broad impact on regional transport and human safety. Due to the scarcity of high-frequency data, near-ground turbulent mixing analyses under Shamal are still rare. The current study investigates the near-surface turbulence characteristics of the atmospheric boundary layer (ABL) in the coastal region of Qatar under summer Shamal conditions (26.08 N, 51.36 E). The results show that, in the absence of monsoon, Shamal prevents the development of summer sea breezes in the Persian Gulf. Compared to non-Shamal days (NSD), Shamal days (SD) are characterized by higher sensible heat flux magnitude and turbulent kinetic energy (TKE) with lower humidity, especially around noon time. Turbulence stability analysis indicates the probability of different dust activities during summer SD and NSD. Wind velocity spectra are investigated to evaluate the TKE dissipation rate. A Weibull distribution is observed for PDFs of TKE dissipation rate under SD for both stable and unstable conditions.