



Supplement of

Aerosol vertical distribution and interactions with land/sea breezes over the eastern coast of the Red Sea from lidar data and high-resolution WRF-Chem simulations

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Figure S1. Comparison of diurnal cycle of model-simulated 2-m air temperature between ocean and land pixel near KAUST site for Nov 2015.



Figure S2. Percentage contribution of aerosol type from CALIOP data; calculated from the total number of aerosol samples having a particular aerosol type summed up during each season and in all vertical levels at KAUST grid cell.



Figure S3. Particle size distribution of sea salt aerosols at KAUST from model simulations.



Figure S4. Particle size distribution of sulfate aerosols at KAUST from model simulations.



Figure S5. Planetary boundary layer height (meters) from the model in different seasons at two different times of day and night.



Figure S6. Vertical profile of temperature during the day and night in summer. An inversion layer is visible in the night at ~6-8 km.



Figure S7. Comparison of winds above the boundary layer during the day and night in summer. At ~6-8 km, tropical easterly low-level jets (LLJ) are observed, which are strongest in summer. At a lower height, the winds are northeasterly trade winds.



Figure S8. Winds at different elevation for two representative months of summer and winter. In summer, tropical low level easterly jets (LLJ) are observed. Upper-level subtropical westerly jets (commonly called westerlies) are observed in the upper levels, which are strongest in winter.



Figure S9. Comparison of KAUST-MPL aerosol vertical profiles for two years, 2015 and 2016.