Physical and chemical properties of deposited airborne particulates over the Arabian Red Sea coastal plain

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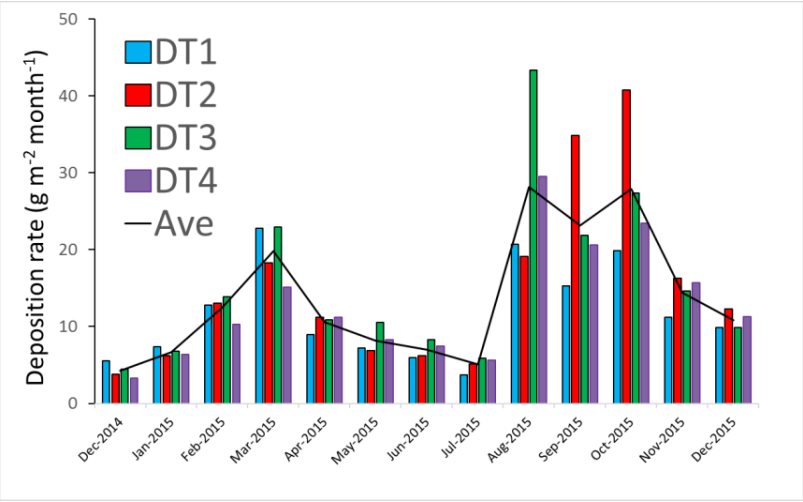
Dust emission and deposition modeling and measurements are required for the assessment of the dust mass budget. They will help to improve dust modeling in this important dust belt source area by better quantifying dust mass balance and optical properties of airborne dust particles, their potential nutrient input into the Red Sea, as well their effect on machinery, human health, and solar panel efficiency. Aerosols deposited from the atmosphere were collected during 2015 at six sites on the campus of the King Abdullah University of Science and Technology (KAUST) situated on the Red Sea coastal plain of Saudi Arabia. Frisbee deposition samplers with foam inserts were used to collect dust and other deposits, for the period December 2014 to December 2015. The average deposition rate measured at KAUST for 2015 was 15 gm^{-2} per month with lowest values in winter and increased deposition rates in August to October (Figure).



Freeze-dried samples were re-suspended onto the Teflon® filters for elemental analysis by XRF, while splits from each sample were analyzed for water soluble cations and anions by Ion Chromatography. XRD analysis of a subset of samples confirms variable amounts of quartz, feldspars, micas, and halite, with lesser amounts of gypsum, calcite, dolomite, hematite, and amphibole. It is suggested that the dust deposits along the Red Sea coast are a mixture of dust emissions from local soils, and soils imported from distal dust sources.