Geophysical Research Abstracts
Vol. 17, EGU2015-13077, 2015
EGU General Assembly 2015


# Variability of Surface pollutants and aerosol concentration over Abu Dhabi, UAE - sources, transport and current levels

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In the view of recent economic, industrial, and rapid development, Abu Dhabi (24.4oN; 54.4oE; 27m msl) has become one of the most populated regions in the world despite of extreme heat, frequent dust storms, and with distinctive topography. The major sources of air pollution are from the dust and sand storms, greenhouse gas emissions, and to some extent from industrial pollution. In order to realize the accurate and comprehensive understanding of air quality and plausible sources over this region, we have made a detailed analysis of three years simultaneous measurements during 2011-13 of pollutants such as $O_3$, $SO_2$, $NO_2$, CO, and PM10 concentrations. Diurnal variation of meteorological parameters such as temperature and wind speed/relative humidity clearly shows daytime maximum/minimum in summer followed by pre-monsoon, post-monsoon and winter. The prevailing winds over this region are mostly from northwesterly direction (Shamal wind). Diurnal wind pattern showed a clear contrast with the majority of the wind pattern during nighttime and early morning is from the westerly/northwesterly and daytime is from southwesterly/southeasterly directions. The diurnal pattern of $O_3$ shows minimum during 08 LT and increases thereafter reaching maximum at 17 LT and decreases during nighttime. However, the diurnal pattern of $SO_2$ and $NO_2$ show a peak at $\sim$ 08 LT and dip at $\sim$ 14 LT during all the seasons with some variability in each season. On the other hand, the diurnal pattern of CO shows a peculiar picture of elevated levels during daytime peaking at $\sim$ 10 LT (prominent in summer and post-monsoon) followed by a sharp decrease and minimum is $\sim$14 LT. PM10 concentration has an early morning peak at $\sim$ 02 LT and then decreases to a minimum value at $\sim$11 LT and again increases in the afternoon hours (maximum at $\sim$17 LT) depicting a forenoon-afternoon asymmetry. Monthly variation of PM10 shows maximum in pre-monsoon season and minimum in winter. Our observations show the diurnal pattern of pollutants are in contrast with the diurnal pattern of wind speed as evident from the previous observations. Wind rose diagram of pollutants reveal that the dominant source directions are scattered from northwesterly to southwesterly. Our results (2011-13) are compared with earlier observations from the same region (2007-08) and no alarming differences were observed in the pollutant levels. Our observations are discussed in the light of current understanding of pollutants sources over this region.