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Long Term Trend Analysis of Aerosol Variables at Eastern Mediterranean Atmosphere

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The objective of this study is to find long-term trends observed in the chemical composition of aerosols in Eastern Mediterranean atmosphere. To this end, approximately 1700 daily PM_{10} Hi-Vol aerosol samples were collected on cellulose fiber filters (Whatman 41), between 1993 and 2001, at a station located on the Mediterranean coast of Turkey (30.34˚E, 36.47˚N). Major ion content of the collected samples was analyzed by Ion Chromatography (IC) and Colorimetry. Energy Dispersive X-Ray Fluorescence (EDXRF) and Inductively Coupled Plasma Mass Spectrometry (ICP MS) were employed to determine trace element constituents from Li to U. These analytical techniques enable us to measure about 60 parameters. To our knowledge, this study is unique conducted on Eastern Mediterranean not only for the number of parameters investigated but also for time period covered. The mean concentration values for the measured values range from 15.4 pgm^{-3} for Ho to 7.93 μgm^{-3} for SO_4^{2-}. In order to understand whether a monotonic increasing or decreasing long-term trend exists, a non-parametric technique, namely Seasonal Kendall Test, was applied along with the Sen's Slope Estimator. Preliminary findings have revealed that elements, which are the markers of crustal and marine origin like Al, Ca, K, Na and Cl have showed well defined seasonal variation depending on the condition of immediate and remote soil cover and also strength of the wind speed which is strongly related with the bubble bursting mechanism releasing sea salt particles to the atmosphere. The applied Seasonal Kendall test has demonstrated that there was no obvious increasing or decreasing

trend exists for Na. In contrast to Na, Al had an increasing trend in 1993, 1995 and 2000, and such a trend can be explained by the increase in the amount of Saharan dust transported to the region within these years. Regarding to anthropogenic pollutants, Pb did not show any trend at all in this period. Nevertheless, SO_4^{2-} had increasing trend in 1995, 1999, and 2000 while there was a decreasing one in 1993. These preliminary findings need to be further confirmed by comparing them with the values reported in the literature.