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Atmospheric Pollution over the Eastern Mediterranean during summer – A Review

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The subsiding air aloft induced by global circulation systems affecting the EM and the depth of the Persian Trough, control the spatio-temporal distribution of the boundary layer during summer. The shallow mixed layer and weak zonal flow, leads to poor ventilation rates, inhibiting an efficient dispersion of the pollutants. Several studies pointing at specific local (e.g. ventilation rates) and regional peculiarities (long range transport) enhancing the building up of pollutant concentrations are presented. Tropospheric-ozone concentrations over the EM basin are among the highest over the Northern Hemisphere. The processes controlling its formation (i.e. long range transport from Europe, dynamic subsidence at mid-troposphere, and stratosphere-to-troposphere exchange) are reviewed. Airborne and satellite-borne initiatives have indicated that the concentration values of reactive nitrogen are 2 to 10 times higher than in the hemispheric background troposphere. Models, aircraft measurements, and satellite data, have shown that sulfate has a maximum during spring and summer. The CO seasonal cycle, mainly governed by the concentration of the hydroxyl radical demonstrates high concentrations over winter months and lowest during summer when photochemistry is active. The daily variations in CO concentration are caused by long-range CO transport from European anthropogenic sources. The spatial distribution of methane, derived from satellite identified August as the month with the highest levels over the EM. The results of a comprehensive analysis of atmospheric methane over the EM Basin as part of the ChArMEx program, using satellite data and model simulations is consistent with other previous studies.