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Measured and modelled variabilities of long-lived species over the Mediterranean Basin

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The Mediterranean Basin (MB) is of particular interest in terms of pollution sources as it is at the confluence of three continents, Europe, Africa and Asia. The impact of these varied continental sources (industrial and populated coastal cities, forest fires, etc.) is still not well understood especially on the O_3 and CO budgets. Within the Chemistry-Aerosol Mediterranean Experiment (CHARMEX) Project, a particular attention is given to the variabilities and recent trends in chemical species and aerosols over the MB in order to study the weight of different processes (long-range transport, emissions, import/export, chemical transformation) on the budgets of these species. The present contribution deals with the time evolution of medium- to long-lived species (N_2O, CO, CH_4 and CO_2) as measured by the nadir-viewing Infrared Atmospheric Sounding Interferometer (IASI) instrument aboard the MetOp-A platform over the MB from 2008 to 2010 and how it compares with the 3D Chemical Transport Model (CTM) MOCAGE outputs (CO_2 not yet included). The Atmospheric Infrared Sounder (AIRS) sensor aboard the AQUA platform will also be used to diagnose CO and CH_4 evolutions. As expected, a great variability is measured for CO and eventually CH_4, but the N_2O and CO_2 variabilities are also found to be non negligible. Furthermore, an Eastern-Western difference is measured within all the observed data sets for the four species, highlighting the different physico-chemical regimes occurring in the Eastern and Western parts of the MB. Finally, although the CTM has some great difficulties to mimic the variabilities observed over the MB, it obviously tracks the seasonal variation of the East-West difference in N_2O, CO and CH_4 as measured by the spaceborne sensors.