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Validation of concentrations of lead-210 in high altitude simulated by MOCAGE

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One of the main difficulties of climate modelling is to correctly simulate the negative regional aerosols impact on the Earth global warning. A first step to address this issue is to evaluate the tropospheric vertical distribution of submicronic aerosol (including sulphate and organic aerosol).

Lead-210 is particularly interesting to study the dynamic transport of Chemistry and Transport Models (CTM), because it is an excellent passive tracer of atmospheric circulation. Hence, it is a simple representant of atmospheric submicronic aerosol and its transport is well correlated with the sulphate aerosol one. Simulations of the concentrations of this tracer have been made for the years 2002 and 2003 with the recent three-dimensional Chemistry and Transport Model MOCAGE (Model Of atmospheric Chemistry At larGE scale). It is a multi-scale model, from the global domain (2°x2°) down to the regional one (0.25°x0.25°). The meteorological analyses come from ARPEGE, the Meteo-France's forecasting model.

The simulations results are validated by comparison with the CARBOSOL project observed data. Six stations were instrumented and have collected atmospheric aerosol (inorganic versus organic) data at various points of Europe (Azores, Aveiro on Portuguese coast, Puy de Dome 1500 m France, Schauinsland 1500m Germany, Sonnblick 3000 m Austria, K-pustka Hungary plain). A particular attention is paid to the convection simulation by the model. Thus the results analysis focuses on high altitude sites, where the convection induces a strong seasonality of the lead-210 concentration (maximum in summer, minimum in winter).