Interpol_IAGOS software

With their multi-decadal timescale and their geographical coverage reaching the hemispheric scale, the IAGOS measurements are an essential tool for assessing long-term simulations from chemistry-climate/chemistry-transport models. The data are mostly gathered in the upper troposphere – lower stratosphere, a key region regarding the impact of greenhouse gases like water vapour and ozone on the surface temperature, and also regarding the exchanges between the troposphere and the stratosphere. However, the IAGOS data set has still never been used in its whole ensemble to assess model simulations, notably because they are not gridded and their spatio-temporal resolution is far different from the simulations outputs. In the case of the reference simulation with specified dynamics (REF-C1SD) from the Chemistry-Climate Model Initiative (CCMI) experiment, these outputs are characterized by a monthly resolution and a ~ 1 km vertical resolution at cruise altitudes.

The current software is presented in detail in Cohen et al., 2020 (to be submitted). It consists in distributing IAGOS data on a model grid configurated for the REF-C1SD simulation, notably on the MOCAGE (MOdélisation du Climat À Grande Échelle) CTM grid, averaged through each month and each sampled grid cell, for the following observed quantities: ozone, carbon monoxide, temperature, and for the following quantities derived from observations: O_3/CO ratio and potential temperature.

In a first step, the outputs are monthly averaged fields from IAGOS with several metrics, helpful for filtering with respect to sampling. There are also the fields from the simulation after the application of a mask that follows the IAGOS sampling. In a second step, the final outputs from the Interpol_IAGOS software consist in time series and mean seasonal (and yearly) climatologies. All the output files are in the NetCDF format.