



Global distribution of CO₂ in the Upper Troposphere-Stratosphere

Mohamadou Diallo (1), Bernard Legras (2), and Alain Chedin (3)

(1) Department of Environmental Sciences, University of Virginia, Charlottesville, VA, USA(mdiallo@lmd.ens.fr), (2) Laboratoire Dynamique Météorologie/Ecole Normale supérieure Paris, Geosciences Department, Paris, France, (3) Laboratoire Dynamique Météorologie/Ecole Polytechnique Palaiseaux, Geosciences Department, Paris, France(chedin@lmd.polytechnique.fr)

The origin of air parcels in the lowermost stratosphere, is strongly affected by the stratosphere-troposphere exchanges or fast isentropic mixing, in particular occurring in the shallow branch of the Brewer-Dobson circulation. The Brewer-Dobson circulation can be diagnosed using the inert feature of CO₂. Currently, most of our knowledge of the global distribution of the atmospheric chemical species, such as CO₂, is limited by the uncertainty in dynamics of transport and the sparseness of *in situ* concentration measurements. The ability of chemistry-transport models or Lagrangian transport Models as TRACZILLA or analysed winds to reproduce the Brewer-Dobson circulation is a pre-requisite for the representation of transport and distribution of long-lived species as CO₂ within the troposphere and stratosphere. In this study, we investigate the global monthly mean distribution of CO₂ derived from our Lagrangian Transport Model, Traczilla driven by the ERA-Interim reanalysis from European Center for Medium range Weather Forecast (ECMWF) (Fig. 1). First, we will present the global monthly distribution of mean CO₂ derived from TRACZILLA. We will show the seasonal variability across the vertical distribution, the time series in the northern hemisphere over 10° of latitudes bins and finally the monthly averaged vertical profiles of CO₂ between the upper troposphere and the stratosphere.