An ozone climatology based on the distribution of ozonesonde measurements by Lagrangian trajectories

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We present a new data base of vertically resolved ozone fields. Those ozone fields were created by computing three days forward and backward Lagrangian trajectories which were subsequently used to distribute ozonesonde measurements from different stations contributing measurements to the World Ozone and Ultraviolet Radiation Data Centre (WOUDC), the Southern Hemisphere ADditional OZonesondes (SHADOZ), or Network for the Detection of Atmospheric Composition Change (NDACC). The atmospheric transport model LAGRANTO (Lagrangian Analysis Tool) driven by ECMWF ERA-INTERIM meteorological fields is used to calculate the trajectories. Although we focus on monthly averaged ozone fields on a one by one degree grid in this study, the data base is spatially and temporally flexible and can be easily adapted to other resolutions. One major application of the presented data base is an improved comparison/validation of satellite ozone products because this approach will significantly enhance the validation sample size and hence lead to a more reliable validation, especially for satellite instruments with relatively sparse sampling such as from limb and occultation instruments. We show and assess the quality of the described data base (for example by comparison with ozonesonde measurements not used to build the data base) and discuss examples of improved validation of space-borne ozone retrievals.