Calculating NO$_2$ and SO$_2$ emissions using only columnar data

Konstantinos Kourtidis, Aristeidis Georgoulias, and Stavros Stathopoulos

School of Engineering, Demokritus University of Thrace, Lab. of Atmospheric Pollution and Pollution Control Engineering of Atmospheric Pollutants, Dept. of Environmental Engineering, Xanthi, Greece (kourtidi@env.duth.gr)

The atmospheric variability of a trace gas is related to its lifetime, as pointed out by Junge (1978). We use a modified lifetime/variability parametarisation and calculate the NO$_2$ and the SO$_2$ lifetimes τ from $\sigma(\ln x)=\tau(-0.18)$, where x is the daily columnar OMI NO$_2$ (SO$_2$, respectively) retrieval for one year. As the amount of a trace species in the atmosphere is a function of emission and lifetime, we use the calculated lifetimes to derive spatial emissions of NO$_2$ and SO$_2$ over China without using any ancillary data or modeling, and compare them with more traditional methods. The agreement is good. This work has been funded under the FP7 Programme MarcoPolo (Grand Number 606953, Theme SPA.2013.3.2-01).