

## (Why) do we need scaling factors for the O4 SCD?

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Several groups have reported a mismatch between modeled and measured O4 DSCDs, for reasons still not fully understood. Thus, within MAX-DOAS profile inversions, the measured O4 (D)SCDs are often multiplied by a scaling factor (SF) of about 0.8-0.9, applied for all elevation angles. However, it should be noted that several groups do not see a need for such a scaling factor.

The MAinz Profile Algorithm (MAPA) (v1.x) derives vertical profiles of aerosol extinction and trace gas concentration from MAX-DOAS measurements based on a Monte-Carlo approach. In addition, it provides the option to determine the best matching O4 SF during the profile inversion.

Here we present best matching SFs for MAX-DOAS measurements from several campaigns, covering a wide range of geolocations and atmospheric conditions. Connections between the SFs and other parameters like temperature, aerosol optical thickness, or aerosol profile are discussed in order to reveal possible reasons for the need for SFs.