

(20-240328-B) **Optimized Umkehr and Satellite Ozone Profile Validation: Project with European Space Agency (ESA)**

K. Miyagawa<sup>1</sup>, I. Petropavlovskikh<sup>2,3</sup>, D. Balis<sup>4</sup>, and A. Bais<sup>4</sup>

<sup>1</sup>Guest Scientist at NOAA Global Monitoring Division (GML), Boulder, CO 80305; 720-939-5313, E-mail: miyagawa.koji@noaa.gov

<sup>2</sup>Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado, Boulder, CO 80309

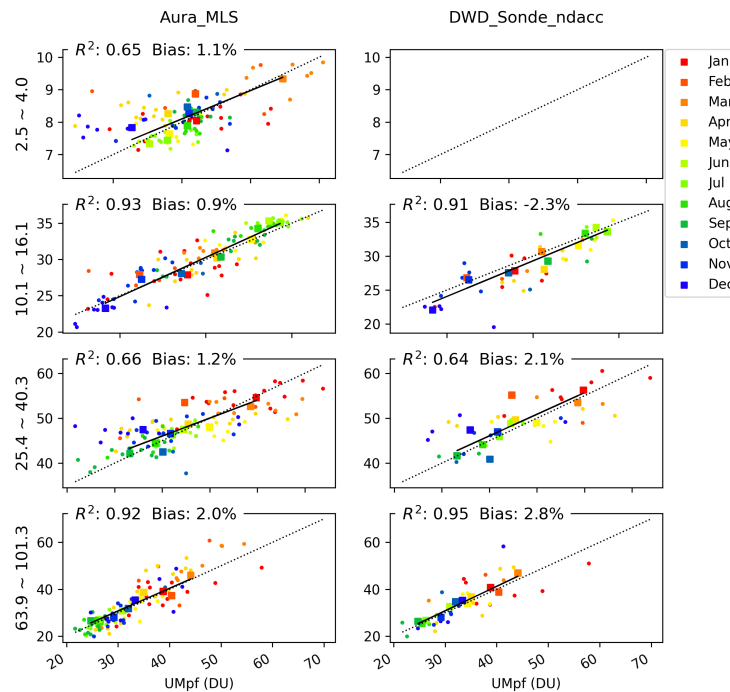
<sup>3</sup>NOAA Global Monitoring Laboratory (GML), Boulder, CO 80305

<sup>4</sup>Laboratory of Atmospheric Physics, Aristotle University of Thessaloniki, Thessaloniki, Greece

The European Space Agency (ESA)'s IDEAS+ QA4EO Phase 2 project will focus on comparisons with TROPOMI and GOME-2 ozone profiles. Modifications in the operational Umkehr algorithm were applied in order to optimize the Umkehr retrievals for the validation of TROPOMI nadir ozone profiles, using Umkehr retrievals of Dobson and Brewer instruments covering both the troposphere, UTLS, and stratosphere. Optimized Dobson Umkehr ozone profiles at NOAA were analysed for five fully automated NOAA/GML observing network stations (Boulder, OHP, MLO and Lauder) and for the MeteoSwiss Arosa/Davos station in Switzerland.

In this study, additional activities were undertaken to optimize the time series data from Arosa/Davos. It was possible to confirm a reduction in the uncertainty of Dobson Umkehr through comparisons with MLS, OMPS, and ozonesonde measurements. A 61-layer ozone profile and a complete AK matrix have been incorporated into the output of the Umkehr algorithm. The satellite ozone profile is smoothed using Umkehr AK. Figure 1 scatter plot depicts the relationship between ozone measurements obtained from NASA's Aura MLS satellite during overpasses and Umkehr ozone data collected at the Arosa/Davos station throughout 2020. The results for UTLS and the stratosphere exhibit good agreement within a few percent. However, uncertainties in the troposphere may exceed 5% depending on the year.

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**Figure 1.** Scatter Plot Comparison of NASA Aura MLS Satellite Overpass and Umkehr Ozone over Arosa/Davos, Switzerland Station in 2020, Along with Ozonesonde Data from Hohenpeissenberg (DWD).