Intercomparison of IASI ozone products: contribution to the Tropospheric Ozone Assessment Report, Phase II (TOAR-II)

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ABSTRACT

The Tropospheric Ozone Assessment Report, Phase I (TOAR-I) published in 2018 and 2019 showed large differences between the different existing satellite ozone products to describe the tropospheric ozone distribution and inconsistencies between the ozone trends derived from ultraviolet and infrared satellite sounders. In the framework of the TOAR, Phase II, on-going since 2021, one of the objectives is to understand the discrepancies between the satellite products, highlighted in the TOAR-I. Our contribution is focused on the intercomparison of the three IASI ozone products: IASI-CDR, IASI-KOPRA, and IASI-SOFRID. The study mainly focuses on the IASI.Metop-A instrument from 2008-2018 and on the IASI/Metop-B instrument from 2018-2022. Firstly, the three products are compared to homogenised ozonesondes profiles delivered by the HEGIFTOM TOAR working group and taken as a reference for 8 sondes stations representing different latitude bands. The same coincidence criteria are used for all the products and the comparison is done exactly on the same subset of pixels to limit the sampling effect in the results interpretation. This comparison will help identifying the possible drifts and differences between the three products. Secondly, distribution and trends of ozone combining IASI-A and IASI-B from 2008 to 2022 will be evaluated and compared for the three products over three regions of the Northern Hemisphere: Europe, North America and East Asia. A similar procedure as for the sondes will be applied to select the subset of coincident pixels between the three products. The analysis will focus on two partial columns: surface to 450hPa and surface to 300hPa.