Geophysical Research Abstracts
Vol. 19, EGU2017-16928-1, 2017
EGU General Assembly 2017

Predicting ozone profile shape from satellite UV spectra

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Identifying ozone profile shape is a critical yet challenging job for the accurate reconstruction of vertical distributions of atmospheric ozone that is relevant to climate change and air quality. Motivated by the need to develop an approach to reliably and efficiently estimate vertical information of ozone and inspired by the success of machine learning techniques, this work proposes a new algorithm for deriving ozone profile shapes from ultraviolet (UV) absorption spectra that are recorded by satellite instruments, e.g. GOME series and the future Sentinel missions. The proposed algorithm formulates this particular inverse problem in a classification framework rather than a conventional inversion one and places an emphasis on effectively characterizing various profile shapes based on machine learning techniques. Furthermore, a comparison of the ozone profiles from real GOME-2 data estimated by our algorithm and the classical retrieval algorithm (Optimal Estimation Method) is performed.