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# Assesment of aerosol optical depth at UV wavelegths from Microtops II "ozone monitor"

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The aerosol optical depth (AOD) retrieval at ultraviolet spectral region (UV) has been of interest for the last few years, especially due to the important rule that the particles play in the Earth climate modifying the earth-atmosphere energy budget. That is the reason why a great number of methodologies have been developed to obtain AOD, usually by means of instruments aimed to ozone monitoring. Microtops II "ozone meter" is a small hand-held manually operated instrument designed for the measurement of ozone atmospheric columnar content. The instrument operates in five spectral channels centred at 305.5, 312.5, 320.0, 936 and 1020nm wavelengths. The firsts three channels (UV) are used to obtain the ozone content, the 936nm channel is used to water vapour retrieval and the last one permit to obtain the AOD at 1020nm. The aim of this work is to use the UV ozone channels to assess the capability of Microtops II "ozone monitor" to retrieve AOD at 312.5, 305.5 and 320nm. On this way we can improve substantially the performance of Microtops II for the characterization of important components present in the atmosphere using only its own measurements.

The methodology used to carry out the AOD retrieval is based on the application of the Beer-Lambert-Bouguer law to the Microtops II UV channels. A very good calibration is needed to apply this kind of methodologies since they show an important dependence on the calibration factors. The AOD is calculated eliminating the ozone contribution (using the ozone content from the combination of 305.5 and 312.5 channels) and the molecular one (Rayleigh).

The AOD retrieval has been tested in a 15-days field campaign carried out at Lampedusa Island (35.52ºN, 12.63ºE, 45m a.s.l.) in the framework of the GAMARF (Ground-based and Airborne Measurments of the Aerosol Radiative Forcing) project. The results obtained during the campaign show, for a background atmospheric situation, AOD values of 0.10 $\pm$ 0.03, 0.17 $\pm$ 0.03 and 0.05 $\pm$ 0.03 at 305.5, 312.5, 320nm respectively, that are quite low. The AOD become higher in case of desert dust air masses influence with values of 0.65 $\pm$ 0.03, 0.68 $\pm$ 0.03 and 0.52 $\pm$ 0.03 at 305.5, 312.5, 320nm respectively.

Furthermore the AOD results from Microtops II have been compared with those obtained from Brewer measurements at 320.0nm during the campaign. The comparison shows a very good agreement between both instruments yielding differences smaller than 0.03 that fall into the AOD error range for all the days analyzed.

From the operational point of view, apart from the errors that may result from unperceived cloud contamination, with a correct calibration and an experimented operator, the Microtops II can be quite accurate and stable to obtain AOD at UV wavelengths, with an RMS deviation of 1.8% from Brewer measurements at 320.0nm.