Improvement of the quality of the ozone profiles from Brewer Spectrophotometers by the neural network method based on Belsk and Warsaw Umkehr data, 2010-2015

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Vertical profiles of atmospheric ozone have been measured in two places in Poland:at Belsk, (51N;21E) and in Warsaw, (52N;21E) by using Brewer spectrophotometers Mark II and Mark III respectively. UMK04 ozone profile retrieval algorithm has been used to calculate the ozone content in 10 Umkehr layers. About 1600 profiles have been used for analysis. Comparison of results obtained by the Umkehr method with those obtained by other methods - ozone soundings performed at Legionowo (52N;21E) - Umkehr layers 1-6 and ozone profiles from Microwave Limb Sounder - layers 2-10 showed that significant differences occur, especially in the lowest Umkehr layer covering the troposphere. To improve the quality of vertical ozone profiles obtained by the Umkehr method, the entire set of data has been recalculated using neural networks method.

Umkehr N values were used as input parameters while data from ozonesondes and satellite served as reference profiles. The ozone profiles obtained by the new method are in the excellent agreement with the reference ones (systematic differences do not exceed a few percent),particularly in the troposphere, showing the potential of the new method.