Neural Network Ozone Retrieval System for Total Ozone and Ozone Profile Retrieval from Gome Uv/Vis Spectra (Nnorsy-gome)

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The Neural Network Ozone Retrieval System (NNORSY) was developed during the last years for total ozone and ozone profile retrieval from UV/VIS spectra of ERS-2 GOME and total ozone column retrieval from IR NOAA-TOVS satellite data. Version 1 of NNORSY GOME ozone profile retrieval was implemented for real-time processing of GOME data at the DLR-DFD up to the failure of the tape recorder of ERS-2 in July 2003 ($http://wdc.dlr.de/data_products/SERVICES/GOMENRT/index.html$). Latest developments for NNORSY-GOME Version 2 yielded further improvements of retrieval accuracy and was applied to the whole GOME data time range in order to generate a more than 9 year global ozone profile data set with high vertical resolution.

For training ozonesonde data are used reaching from ground up to about 25 km and satellite ozone profile measurements from SAGE, HALOE and POAM covering the height range from 60 km down to tropopause height level. This means that the neural network have to deal with incomplete target data during training. Therefore training algorithms have to be developed to handle partial training with incomplete target vector.

This paper first presents the solution we developed for partial training as well as application to ozone profile retrieval from GOME UV/VIS spectra for reprocessing whole GOME level 1 data set ranging from July 1995 to the end of 2004. These yields to a consistent global ozone profile data set stretching from ground up to 60 km height at 1 km sampling rate. Comparison with other independent satellite ozone profile data products (e.g., MLS) as well as extensive geophysical validation against ozonesonde data will also be shown.

NNORSY processing is very fast and resulting GOME ozone profile product has about the same or better accuracy as classical optimal estimation based retrieval schemes which makes NNORSY a candidate for further real-time processing on current or upcoming satellite sensors like OMI on EOS-AURA or GOME-2 on METOP.