Atmospheric Chemistry and Physics
An Interactive Open Access Journal of the European Geosciences Union










Atmos. Chem. Phys., 4, 255-273, 2004
www.atmos-chem-phys.net/4/255/2004/


# Retrieval methods of effective cloud cover from the GOME instrument: an intercomparison

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Abstract. The radiative scattering by clouds leads to errors in the retrieval of column densities and concentration profiles of atmospheric trace gas species from satellites. Moreover, the presence of clouds changes the UV actinic flux and the photo-dissociation rates of various species significantly. The Global Ozone Monitoring Experiment (GOME) instrument on the ERS-2 satellite, principally designed to retrieve trace gases in the atmosphere, is also capable of detecting clouds. Four cloud fraction retrieval methods for GOME data that have been developed are discussed in this paper (the Initial Cloud Fitting Algorithm, the PMD Cloud Recognition Algorithm, the Optical Cloud Recognition Algorithm (an in-house version and the official implementation) and the Fast Retrieval Scheme for Clouds from the Oxygen A-band). Their results of cloud fraction retrieval are compared to each-other and also to synoptic surface observations. It is shown that all studied retrieval methods calculate an effective cloud fraction that is related to a cloud with a high optical thickness. Generally, we found ICFA to produce the lowest cloud fractions, followed by our in-house OCRA implementation, FRESCO, PC2K and finally the official OCRA implementation along four processed tracks (+2%, +10%, +15% and +25% compared to ICFA respectively). Synoptical surface observations gave the highest absolute cloud fraction when compared with individual PMD sub-pixels of roughly the same size.

Final Revised Paper (PDF, 1633 KB) Discussion Paper (ACPD)

Citation: Tuinder, O. N. E., de Winter-Sorkina, R., and Builtjes, P. J. H.: Retrieval methods of effective cloud cover from the GOME instrument: an intercomparison, Atmos. Chem. Phys., 4, 255-273, 2004. Bibtex EndNote Reference Manager