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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A fast H_2O total column density product from GOME - validation with in-situ aircraft measurements" *by* T. Wagner et al.

Anonymous Referee #1

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The paper describes a new method to retrieve the vertically integrated atmospheric water vapour content from GOME measurements. The method is based on the simultaneous observations of the oxygen dimer O4 and H2O absorption bands. As such it does not use any a priori information on the ground and the atmosphere contrary to other already published algorithms. However the paper suffers from an insufficient validation that do not permit to conclude on the 'high accuracy' of the method. This should be considered before publication in ACP as the comments listed below.

Specific comments

The authors claim that the obtained retrievals of water vapour content might be of great value for weather forecast. However they show results of vertical column density (VCD; in molec./cm2) while meteorologists are more familiar with total water vapour content

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(in kg/m2 or g/cm2). At least, an additional scale (in g/cm2) in the related figures would be of great help.

All along the paper, subjective comments (e.g. 'high accuracy' l 14 p3 24, 'excellent agreement' l 15, p 324, l 11 p 328, l 24 p 337; 'moderate spectral resolutions' l 9 p 330; etc.) should be replaced by quantitative information. Moreover, an estimation of the error on VCD retrieval should be summarized in the abstract: is it 45% as given in Table 1 for pixels with 70% of cloud fraction or is it excellent? What about the underestimation given in the conclusions, but not reported in the abstract?

The results presented in section 3 are not sufficient to validate the method. In particular, more comments and details are needed in section 3.1 when using ECMWF data (p 336). This comparison is very important as it covers various areas (whereas the comparison with MINOS measurements is restricted to Greece). Please quantify the bias, the standard deviation and the potential sources of errors (cloud fraction, surface and atmospheric heterogeneity, difference in the absorption strength for 04 and H20, ...).

Technical comments

-p 325, l 14: write molec./cm2 instead of molec./cm-2

-p 325, l 23: the paper of Jedlovec has been published in 1985, not in 1987

-p 331, l 10: write '273 K and 900 hPa' instead of '273 K of 900 hPa'

-p 349, title of Fig. 4: write 'vapour' instead of 'vopour'

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 323, 2003.

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Interactive Comment