Home
Online Library ACP
- Recent Final Revised Papers
- Volumes and Issues
- Special Issues
- Library Search
- Title and Author Search

Online Library ACPD
Alerts & RSS Feeds
General Information
Submission
Review
Production
Subscription
Comment on a Paper

Volumes and Issues | Contents of Issue 5

Atmos. Chem. Phys., 9, 1779-1793, 2009
www.atmos-chem-phys.net/9/1779/2009/

Evaluation of upper tropospheric humidity forecasts from ECMWF using AIRS and CALIPSO data

N. Lamquin[1], K. Gierens[2], C. J. Stubenrauch[1], and R. Chatterjee[3]
[1]Laboratoire de Météorologie Dynamique, Ecole Polytechnique, Palaiseau, France
[2]Deutsches Zentrum für Luft- und Raumfahrt, Institut für Physik der Atmosphäre, Oberpfaffenhofen, Germany
[3]National Institute of Technology, Tiruchirappalli, Tamil Nadu, India

Abstract. An evaluation of the upper tropospheric humidity from the European Centre of Medium-Range Weather Forecasts (ECMWF) Integrated Forecast System (IFS) is presented. We first make an analysis of the spinup behaviour of ice supersaturation in weather forecasts. It shows that a spinup period of at least 12 h is necessary before using forecast humidity data from the upper troposphere. We compare the forecasted upper tropospheric humidity with coincident relative humidity fields retrieved from the Atmospheric InfraRed Sounder (AIRS) and with cloud vertical profiles from the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO). The analysis is made over one year, from October 2006 to September 2007, and we discuss how relative humidity and cloud features appear both in the IFS and in the observations. The comparison with AIRS is made difficult because of the vertical resolution of the sounder and the impossibility to retrieve humidity for high cloudiness. Clear sky relative humidities show a rather good correlation whereas cloudy situations reflect more the effect of a dry bias for AIRS increasing with the relative humidity. The comparison with CALIPSO shows that the IFS predicts high relative humidity where CALIPSO finds high clouds, which supports the good quality of the ECMWF upper tropospheric cloud forecast. In a last part, we investigate the presence of ice supersaturation within low vertical resolution pressure layers by comparing the IFS outputs for high-resolution and low-resolution humidity profiles and by simulating the interpolation of humidity over radiosonde data. A new correction method is proposed and tested with these data.

Final Revised Paper (PDF, 2152 KB) | Discussion Paper (ACPD)

Citation: Lamquin, N., Gierens, K., Stubenrauch, C. J., and Chatterjee, R.: Evaluation of upper tropospheric humidity forecasts from ECMWF using AIRS and CALIPSO data, Atmos. Chem. Phys., 9, 1779-1793, 2009. Bibtex | EndNote | Reference Manager

Recent Papers
01 | ACPD, 12 Mar 2009:
A new insight on tropospheric methane in the Tropics – first year from IASI hyperspectral infrared observations

02 | ACP, 12 Mar 2009:
HOCl chemistry in the Antarctic Stratospheric Vortex 2002, as observed with the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS)

03 | ACP, 12 Mar 2009:
Comparison of tropospheric gas-phase chemistry schemes for use within global models