Atmos. Chem. Phys. Discuss., 12, C7806–C7807, 2012
www.atmos-chem-phys-discuss.net/12/C7806/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Dynamical characteristics of ice supersaturated regions" *by* K. Gierens and S. Brinkop

Anonymous Referee #1

Received and published: 4 October 2012

Review of "Dynamical characteristics of ice supersaturated regions" by K. Gierens and S. Brinkop.

This manuscript examines forecast output from the ECMWF model for one-month simulation over Europe and the tropics. The correlation between dynamical fields and ice supersaturated regions is examined using a statistical approach. The main findings are that ice supersaturation occurs under conditions of upward and divergent flow, but also in anti-cyclonic flow.

Overall this manuscript is clear, concise, and well written. The concept is relatively simple (to use the model output to examine relationships between dynamic fields and ice supersaturation). The statistical methods are a standard approach (mean, standard deviation, skewness, and kurtosis) and appropriate for the task. The overall scientific

impact of this paper is incremental and the results are somewhat expected, but also not conclusive. The authors state several times that dynamic variables alone are insufficient to predict the presence of ISSRs.

In general, considering mid-scale dynamic features is an important consideration for studies of ISSRs and models provide a useful tool for examining the correlation. However, as presented here, the duration of the study and limited results diminishes the usefulness of the conclusions.

A few questions/comments for the authors:

1) What are the relative spatial scales of the ECMWF model output and the satellite data (MLS and AIRS) used for comparison? Are they comparable? The MOZAIC data (also used from comparison to the ECMWF output) is aircraft based. What is done to match the spatial scales of the MOZAIC data to the ECMWF output? The comparison to satellite/aircraft data is somewhat hand waving because there are no direct comparisons to the specific time period examined in this study.

2) Only 1 month of data is considered in this study. ISSRs occur throughout the year for different reasons (convective seasons, frontal systems, ridges etc). It is insufficient to only consider 1 month of data to be able to draw any conclusive results. Seasonal influences impact the dynamic atmosphere, which is not captured here. I suggest extending the study to cover a 1-month time frame (1-month per season may not sufficient).

3) The study does not adequately address the role of deep convection in moistening the upper troposphere, particularly in the tropical belt. A separation of data between convective and non-convective regimes is needed to determine if vorticity, divergence, or cyclonic conditions influence tropical regions.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 19871, 2012.