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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Impact of particle shape on the morphology of noctilucent clouds" *by* J. Kiliani et al.

Anonymous Referee #2

Received and published: 9 July 2015

GENERAL COMMENTS

This paper addresses the issue of ice particle shape effect on noctilucent cloud (NLC) behavior by implementing different combinations of shapes in microphysical model calculations, evolving a population of ice particles using a 3-D atmospheric model, and determining the impact on observable NLC properties. These results are then compared to multi-wavelength lidar measurements that provide information on ice particle size and shape distributions.

The 3-D atmospheric model used in this study (MIMAS) is an extension of the LIMA-ICE model described in previous papers, and the issues associated with introducing non-spherical ice particles are carefully described. The implications of particle shape

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for the “color ratio” of scattering intensity between two different wavelengths are also presented. This discussion provides a framework for interpreting the lidar measurements. The analysis of ALOMAR lidar observations explains in detail which combination of particle shapes is most effective in matching the data. The impact of non-spherical ice particle shapes on larger scale ice layer properties typically derived from satellite measurements is also discussed.

This paper is very thorough and well-written. A few specific comments are listed below.

SPECIFIC COMMENTS

p. 16023, lines 2-4: This is a good example of the clear summary statements for key results that appear throughout this paper.

p. 16024, lines 13-15: It is not clear to this reviewer why each of the colored solid curves for different equivalent radii in Figure 3 all have inflection points that lie on the epsilon = 1 curve.

p. 16026, lines 5-6: Any specific reason for using only strong NLC detections? Just to have more confidence in color ratio results?

TECHNICAL CORRECTIONS

p. 16028, line 13: “prelimiary” should be ‘preliminary’.

p. 16028, line 27: “extend” should be ‘extent’.

p. 16033, line 1: “best” should be ‘most’?

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 16019, 2015.