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Interactive Comment

Interactive comment on "A flexible three-dimensional stratocumulus, cumulus and cirrus cloud generator (3DCLOUD) based on drastically simplified atmospheric equations and Fourier transform framework" *by* F. Szczap et al.

Anonymous Referee #1

Received and published: 19 March 2014

Review for: "A flexible three-dimensional stratocumulus, cumulus, and cirrus cloud generator (3DCLOUD) based on drastically simplified atmospheric equations and Fourier transform framework"

This paper describes a 3DCLOUD algorithm to generate stochastic 3D cloud fields to be used as a tool to understand cloud-radiation interactions.

Overall, I found the paper to be a very good and thorough description of the 3DCLOUD algorithm and feel the paper is a nice fit for this journal. It is also wonderful that the authors provide a link to access the code described in this paper. My recommendation

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is to accept this paper after the minor points mentioned (below) are addressed.

Minor points:

1) It would be helpful to reader to describe some fundamental differences between this 3DCLOUD generator and LES. While these may appear fairly obvious it would be nice to list them explicitly in the introduction and/or conclusions section for readers who are more familiar with LES and not so much stochastic cloud generators. For example, it would be nice if the authors would state how long it takes to run the matlab code for some of the cases at different spatial resolutions (perhaps in a table). Surely, it is much faster than LES.

2) Figure 6, it is not clear to me which curve represents the 3DCLOUD generator. The figure caption states the bold curve but the color in the legend doesn't quite seem to correspond to the color of the bold curve.

3) 3DCLOUD gen has been compared to time averaged LES profiles, which agree satisfactorily. Have the authors compared the simulated cloud fields (such as those shown in top row of fig. 7) to those produced by LES? If so do they also agree satisfactorily?

4) Figures 2 through 4, please state which cases are being examined in the figure captions.

5) Throughout the paper there are frequent minor grammatical errors. In addition, some paragraph breaks (or lack of them) are awkwardly chosen.

6) At the bottom of page 303 the authors state "This method gives satisfactory results for stratocumulus and cumulus clouds cloud fields but not for cirrus fields". A short explanation follow this statement of why it wouldn't work for cirrus fields would be helpful.

Interactive comment on Geosci. Model Dev. Discuss., 7, 295, 2014.