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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "A twenty-year study on natural and manmade global interannual fluctuations of cirrus cloud cover" *by* K. Eleftheratos et al.

**Anonymous Referee #2**

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General Comment

The study examines the interannual variability of cirrus cloud cover, and, through correlation analyses, identifies the close relationship of the variability with the large-scale vertical winds and relative humidity. The manuscript provides some useful insights into the cirrus cloud cover interannual variability.

Specific Comments

1. The title reads more like taking 20 years to complete the study. 2. The "Introduction" can be shortened, a few examples: a. The last few sentences of the second paragraph

sidetracks the focus; b. Again the second-to-last paragraph can discuss the usage of ISCCP data within the framework of the present study, rather than side track to the radiative effect. c. The last paragraph does not fit in here, and the usefulness from climate model evaluation is already in the “Summary and Conclusions” section. 3. Since the study focuses strictly on cloud “cover”, the use of cirrus “properties” is not appropriate. Along this line, it is not clear whether the cirrus cloud cover here really means the “effective” cirrus cloud, i.e., considering both the cover and optical properties. 4. In the first two paragraphs of Section 2, more elaboration is needed on the use of optical thickness ($<$3.6) and cloud top pressure ($<$440 mb), and the choice of vertical wind and relative humidity at 300 hPa for the correlation study. For the latter, there is a need to explicitly discuss the differences in the variability at other levels. 5. There is a lot of information in Section 3.1, but not quite sure about what they are intended for. There is no need for footnotes. 6. The statements in Section 3.2, “VV300 and RH300 are not independent variables” raise more questions, see #4 above. 7. The discussion in Section 3.3 on the distinction between natural and manmade cirrus in the second-to-last paragraph is inadequate, leaving the impression of many uncertainties and speculations. 8. Section 4 can also be shortened by focusing on the issues relevant to the data sets used and key findings. The aspect of model evaluation in the last paragraph is important, but it needs to be more focused following the more concrete findings from the study.

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