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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.

K. Eleftheratos et al.

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We would like to thank Mrs. Jane Hurley for the useful comments and suggestions.

Comment 1: How exactly are the seasonal and long-term trends removed from the data?

Response to Comment 1: On Page 99, lines 3-4 have been improved: "The deseasonalized time series of CCC at each grid box was calculated by subtracting from each individual monthly value the overall mean monthly value for the whole period 1984-2004. The trend component was removed with linear regression analysis which was applied at each grid box between the deseasonalized time series of CCC and the time."

Comment 2: Acronyms such as NAO, SOI, ENSO etc should be defined the first time that they appear, with brief explanations of the physics behind them.

Response to Comment 2: The acronyms ENSO and NAO and the physics behind them are provided in the Introduction (see page 94, lines 25-26): "Large-scale natural fluctuations such as the El Nino/Southern Oscillation (ENSO) and North Atlantic Oscillation (NAO) are known to alter the distribution and natural variability of various atmospheric parameters (i.e. temperature, precipitation) including cloudiness". Also, the acronym SOI is provided in Section 2 where it appears for the first time (see page 98, line 20).

Comment 3: Don't understand how you can account for the unresolved dynamics/thermodynamics when correlating with NAO.

Response to Comment 3: We do not account for the unresolved dynamics. We only account for the large-scale resolved dynamics related to NAO.

Comment 4: Presumably the ISCCP cirrus data comes from nadir-viewing instruments, which are not well-suited to detecting cirrus in conjunction with other, lower cloud. Can you be sure that the observed correlations in CCC are REAL correlations with atmospheric dynamics and not simply errors in the ISCCP cirrus measurements?

Response to Comment 4: There are uncertainties which are mentioned in the text (see page 104, lines 21-25).

Comment 5: Would you expect any diurnal variability in CCC associated with convection?

Response to Comment 5: In this study the variability in CCC is examined on a monthly basis. However, yes we expect diurnal variability in CCC associated with convection particularly in the tropics. Information on the diurnal cycle of convection and clouds can be found in [Soden, B. J., 2000: The diurnal cycle of convection, clouds and water vapour in the tropical upper troposphere. Geophys. Res. Lett., Vol. 27, No. 15, pages 2173-2176].

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Comment 6: Overall, a nice review of current understanding of cirrus' global distribution.

Response to Comment 6: Thank you for the comment.

Comment 7: Not clear how limb sounders like HALOE and SAGE have been used to locate increased cirrus coverage during El Nino conditions and at what altitude the cirrus occurrence was.

Response to Comment 7: The methods how limb sounders like HALOE and SAGE have been used to locate increased cirrus coverage during El Nino can be found in the related papers in the References section (Massie et al., 2000; Wang et al., 2003). We do not target at describing these methods in the Introduction; we are interested only in the results.

Massie, S., Lowe, P., Tie, X., Hervig, M., Thomas, G., and Russell III, J.: Effect of the 1997 El Nino on the distribution of upper tropospheric cirrus, J. Geophys. Res., Vol. 105, No. D18, 22 725-22 741, 2000.

Wang, P.-H., Minnis, P., Wielicki, B. A., Wong, T., Cess, R. D., Zhang, M., Vann, L. B., and Kent, G. S.: Characteristics of the 1997/1998 El Nino cloud distributions from SAGE II observations, J. Geophys. Res., 108(D1), 4009, doi:10.1029/2002JD002501, 2003.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 93, 2007.