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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Do tropospheric clouds influence Polar Stratospheric cloud occurrence in the Arctic?" *by* P. Achtert et al.

Anonymous Referee #1

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This manuscript presents an interesting issue about the link between PSC and tropospheric clouds. Some previous studies reported by the authors have already suggested such potential links, and in this context the present studies exhibit a more global study using satellite data from Calipso. This new investigation confirms a potential simultaneous occurrence of both clouds. This study is interesting however it does not bring much new understanding of the link between occurrences of both cloud types. No new results are provided to make progress about the causality between both events. Authors suggest that PSC occur when tropospheric clouds are present, but from this study the reverse could also be true: tropospheric cloud may occur when PSC are present. Similarly no direct link may exist but their simultaneous occurrence can result from a similar dynamical process. So I suggest to modify slightly the title in something like "Do tropospheric clouds and Polar Stratospheric Clouds occurrence linked"

which corresponds better to the results presented here. The discussion can also extend the possible links on the reverse directions or any other common causes. Also it is suggested that tropospheric clouds could change the microphysical properties of the PSC. This point is not clear to me and I think if this discussion is based on factual information, it should be developed and better explained. It is not reasonable to group all the tropospheric clouds in a single category to study the potential link with PSC while all the tropospheric clouds occur through very different processes. At least cirrus and liquid clouds could be separate to test the robustness of the correlations. It seems interesting to investigate why these simultaneous occurrences failed sometime. Probably temperature (and temperature history) may help in this context. In conclusion I found this study interesting while it confirms on a larger scale, previous results and open new questions for future studies. A larger focus should be given on the method itself and details about the conditions of occurrences. Discussions (also title) should be performed with more cautions while it is not based on factual results. However, I think these results are valuable and should be published, and I recommend the publication of this manuscript with however some adjustments in the presentation of the results.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 32065, 2011.

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Interactive Comment