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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Chlorine Nitrate in the Atmosphere" *by* Thomas von Clarmann and Sören Johansson

Anonymous Referee #2

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The paper gives a very nice and detailed overview on atmospheric ClONO2. The authors have spent a lot of time on collecting all the different pieces of information to give a complete picture on atmospheric ClONO2. The paper is very well written, and the reference list is very good.

I have only one major comment. Since ClONO2 shows a high variability in the atmosphere, and its concentration in the stratosphere is directly linked to HCl and the CFCs, the authors might think about showing the long-term trend of HCl and may be one of the CFCs. Otherwise Fig. 3 gives the impression as if the long-term trend of ClONO2 is small.

Minor comments: Page 2, line 30: It would make sense to give here already the NDACC reference (deMaziere et al., 2018).

The two papers mentioned by M. J. Tang in his review should be included.

The authors might think about including the paper by Rex et al (Prolonged stratospheric ozone loss in the 1995/96 Arctic winter, Nature, 389, p. 835-838, 1997), where ClONO2 is also shown.

Figure 1, Table 1, Table 2: It would make sense to give here a reference.

Regarding the stratospheric ozone chemistry, the most important trace gas resulting from reactions of ClONO2 is ClO. The authors might think about writing a bit more on the ClO molecule, and not only give the important reactions.

Page 9, line 18: I do not fully understand the sentence: The reason is that there is typically much less reactive chlorine available than released from the chlorine source gases. May be rewording it a bit?

Page 15, line 3: Instead of: a spectrally highly resolving Fourier transform spectrometer. better: a high resolution Fourier transform spectrometer

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