

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-285

Anonymous Referee #2

Referee comment on "Temporary pause in the growth of atmospheric ethane and propane in 2015–2018" by Hélène Angot et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2021-285-RC2>, 2021

GENERAL COMMENTS

In this study, Angot et al. present an analysis of the long-term dataset (2008-2010, 2012-2020) of NMHCs in the arctic site of GEO Summit. Their findings show that the observed increasing trend of ethane and propane from mid 2009- to mid 2014 reversed from 2015-2018 temporarily. They found the decreasing trend likely due to a slowdown in U.S. natural gas production and a decrease in the leaking rate per unit of production. The paper is generally well written and is detailed when presenting data, findings, plausible explanations, and conclusions. This paper contributes to the scientific understanding of the impact of oil and gas emissions on atmospheric trace gases. Moreover, observations in the arctic regions are particularly important for models, which tend to misrepresent polar regions. I recommend this paper for publication after minor revisions.

My biggest concern is how section 3.3 is presented. I found the whole section confusing to read. First, the title says there is no evidence for change in transport from source regions, but the HYSPLIT analysis and the same section mentions there are important interannual changes in the transport from source regions. Also, I was surprised to see that HYSPLIT results showed that the site was mostly impacted by local/regional air masses. This made me wonder if the decision of a 5-day backward trajectory should be revised and increased in order to capture the transport from source regions as the title suggest.

SPECIFIC COMMENTS

The authors miss to provide references in various sentences. Sometimes it is unclear whether the results presented correspond to this study or a previous one. I marked the most important sentences where references are missing and suggest doing a thorough revision of the paper by the authors to correct this.

Change wording of Lines 429-431 because it is almost copied word by word from the first line in section 3.1.1 in Tzompa-Sosa et al., 2019. Also, I suggest adding Roest, G., & Schade, G. (2017) as a reference.

Lines 277-279. Reference needed in this sentence.

Lines 279-282. It is unclear these results correspond to the present study or to a previous one. If the latter, reference is needed.

Lines 405-409. There is no reference to the time frame and sampling locations/areas of ATOM observations considered here. A detailed explanation of the data considered is needed.

TECHNICAL CORRECTIONS

Line 289. Suggest changing "on the year 2015 reversal" to "on the 2015-2018 reversal period."

Lines 293-294. Suggest adding "(dotted lines)" to this sentence, because the solid line is the predominant line, it tends to be the one the reader focuses on.