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Discussions

Interactive comment on "Limited impact of El Niño – Southern Oscillation on the methane cycle" *by* Hinrich Schaefer et al.

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Review of Schaefer et al. for BG

Schaefer and coworkers investigate the influence of ENSO on the methane cycle. They use methane concentration records both globally and at several sites along with d13CH4 and HCN (for biomass burning) records. The d13CH4 records are helpful as they can better constrain the methane sources since pyrogenic sources are very 13C-enriched while biogenic methane is usually 13C-depleted with thermogenic sources somewhere in between. Their study uses correlation analysis to attempt to tease out the impact of ENSO on the methane cycle but they find little evident influence. The paper is generally well written and I think that the overall story is of interest to the com-

munity as there have been other papers using other means to suggest that parts of the methane cycle (particularly wetlands and fire) are influenced by ENSO. There are some typos etc. that I leave to a copy editor. I have a few comments below but I think that the paper should be published after some revisions to address some questions/concerns.

Main comments:

1. I didn't see a discussion of significance level for the correlation coefficients. Without one I have trouble understanding if a value of 0.25 is significant or not. Is there a reason that was not done? Otherwise, while all of the r2 are low, it might help understand what are just noise and what is representing a true signal.

2. There is relatively little discussion on possible changes in the main sink of methane - hydroxyl radicals. The dynamics of this sink has been highlighted in recent studies (McNorton et al. 2016, Turner et al. 2017, Rigby et al. 2017). Is it possible that ENSO would have an impact upon local concentrations of OH? Is it a safe assumption to assume a constant sink strength? Given the power of this sink, and its recent importance (at least in the studies just mentioned) perhaps it is worthwhile to give more consideration to how a changing sink due to ENSO could impact upon the methane cycle. Or at least expand the discussion of the sink to demonstrate why a constant assumption is valid.

Smaller comments:

- What about using the GFED4(s) burned area product to investigate changes in burning? It would have the advantage that it is global and extends further back in time than the HCN record. However the caveat is that burned area is not the same as C emitted as CH4, however it might be a reasonable test since they would be closely related. A recent study highlighted the continual decrease in burnt area over the course of the record (Andela et al. 2017) which then should have some impact upon the methane cycle and perhaps can be used to tease out any ENSO influence.

- Can we have a table with the various tests laid out (det-nom, det-gro, nominal mm, nominal run, etc.)? It is difficult to keep them all in the head and then interpret some very busy figures.

- p. 2 line 30 - What is aggregate source here?

- Author contributions - there is no E.D author.

- Data avail - raw data is little use. Best approach would be to make the actual analysis available.

Refs cited:

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