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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of the HadGEM2 climate-chemistry model against in-situ and SCIAMACHY atmospheric methane data" *by* G. D. Hayman et al.

Anonymous Referee #2

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A study by G. Hayman and co-authors makes an attempt to use Sciamachy observations of atmospheric methane as a tool for evaluating the JULES model simulated methane emissions from wetlands. The use of the satellite data to get the information about fluxes in areas remote from the observations has been tried before in the frame work of inverse modeling, but this study use the observations directly to compared with transport model simulated fields. This makes a step towards wider use of the remote sensing data from Sciamachy and other missions for validation the ESM-estimated CH4 fields, reducing the space for uncertainties of the simulated fluxes in the tropical and subtropical regions where the wetland emissions are high. Authors showed good

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amount of effort and creativity dealing with difficult problem of simulating stratospheric CH4 content. There are some weaker points in the study design, such as the choice of the FUNG emission scenario, which doesn't seem optimal in high latitudes, as better results were reported with other datasets, notably by Patra, et al, (2011)

Overall the paper is well written and provided a valuable contribution. I recommend to publish it after minor corrections.

Detailed comments

Page 12988, line 12, Providing a numerical value for annual stratospheric loss rate would give some extra sense to the discussion on simulated stratospheric methane content.

Page 12988, line 5, Is it better to say "mapping-based" instead of "mapped-based"?

Page 12988. When comparing with Amazon emissions it is useful to add comparison to results by Beck, V., et all, (Atmos. Chem. Phys., 13, 7961-7982, 2013)

Page 12986, line 24. A need to reduce non-wetland emissions over India was cited by Patra et al, (J. Meteorol. Soc. Jpn., 87(4), 635-663, 2009), adding the citation may help convincing the reader that the JULES estimates are going in right direction.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 12967, 2014.