

## ***Interactive comment on “Global inverse modeling of CH<sub>4</sub> sources and sinks: An overview of methods” by Sander Houweling et al.***

### **Anonymous Referee #3**

Received and published: 17 August 2016

#### General comments:

The paper presents a comprehensive overview of inverse modeling of methane sources and sinks, describing the state-of-the-art of research in this field, including the 'historical' development, and giving future perspectives. The manuscript will also serve as an instructive introduction to the field. The paper is very well written and is recommended for publication after only few minor revisions.

#### Specific comments:

Page 4, line 27: CH<sub>4</sub> is not absent in the stratosphere, although concentrations are low and a steep vertical gradient exists. Are you referring to CH<sub>4</sub> sources, which are absent in the stratosphere?

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Although the authors refer to Rayner et al. (2016) for the notation of variables and terms of the equations, it would be helpful for the reader (and better suit the didactical purpose of the paper) to include the definitions directly in the paper.

Page 8, line 1: Isn't this the  $^{13}\text{C}$  analogue of the more general equation 2.

Page 17, eq. A1, A3: For consistency subscripts should be used for M.

Technical comments:

Page 5, line 31: ...(as in equation 1). ...the state vector components...

Page 16, line1: ... representation of wetland hydrology,...

Page 16, line 16: from -> for

Page 18, line 14: Röckmann

Page 19, line 18: Please check editor name.

Page 22, line 30: 2. Inverse modeling of  $\text{CH}_4$  fluxes...

Page 23, line 24-27: Please check spelling of co-author names

Figure 1: It could be helpful to indicate in the graphs whether isotopic information was used. Please specify for references 19 and 20 the scenario that was used in this graph.

Figure 3: ... January (left) and July (right). The middle and bottom panel show ... top panel.

Figure 3: Better not use a divergent color scale because in particular a blue-white-red color scale suggests negative and positive values or deviations from a central value.

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Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-572, 2016.

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