Atmos. Chem. Phys. Discuss., 14, C13004–C13006, 2015
www.atmos-chem-phys-discuss.net/14/C13004/2015/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Formaldehyde (HCHO) in air, snow and interstitial air at Concordia (East Antarctic plateau) in summer" *by* S. Preunkert et al.

Anonymous Referee #2

Received and published: 16 April 2015

The manuscript presents a state of art study of HCHO measurements in ambient air, snow, and interstitial air at Concordia in Antarctica during Austral summer. The authors derived the flux of HCHO from snow from vertical gradient measurements. The authors used additional model simulations to drive their conclusions about the HCHO budget. The topic is well suited for publication in ACP. However some sections need to be improved in their logic in order make the manuscript more easily understandable.

General comments: - There is no real delimitation between the part about experiment, model, field campaigns. . . and the part about results and discussion and this is making the reading not so easy.

- I also suggest reorganize the first part about measurements description: Section 2.1 is common to both field campaigns, right? If yes add a sentence about that. Section 2.2 and 2.3: There is a mix between measurements description, first results and field description (location, metrological data. . .). I suggest if it is possible to include a part about measurement description (if possible with a table with the common parameters between the 2 fields (altitude, depth of measurements, precision, flow. . .) separating between air and snow measurements.) and a part with the field campaign description (location, metrological condition. . .) and particularity of each field campaign in the measurements.

- Section 2.2: "Two major North wind direction periods took place": 2 comments: Why do you not consider the episode between the 18/12/11 and 20/12/11? Not long enough or does it not influence the HCHO measurements? I am confused with the wind direction. Maybe I do mistake or we use another convention to read wind direction, but a wind from North have a direction of 180°. So for me, on the 01/01/2012, the direction is 300°-360° so it is a wind from the South-East to the North-West. But maybe I use a different convention or I made a mistake.

- Section 2.4: How is the model initialised for CH4, BrO, OH fields. . .? I suggest to put here the part situated page 32049 line 11 to 26.

- Section 3: 2 comments about this part: Field campaign on Dec 2012/Jan 2013 are not discussed in the part as you said in section 2.3. So I suggest to not include reference to this campaign in this part and change the title to "Ambient air of HCHO mixing ratio at Concordia in summer 2011-2012". You clearly state that the emissions will be discussed on section 6 but you repeat it at the end of this section. You should only discuss about air measurements and not flux results as you did for section 4 about snowpack.

- Section 4.3.1: At the end, you speak about the slope of the linear regression, could you please add your value of the slope or the expression of the Q(T) constant?

- Section 5.1: You calculate the flux of HCHO from the MOST theory. You compared the flux between two periods but you did not compare the wind speed to interpret the difference between both fluxes. Is the gradient in vmr between 1m and 1cm not influenced by the wind speed?

Technical comments:

You used ppbv, ppbc and ppbw, I am familiar only with ppbv, it will be appreciable to have once in brackets the definition of these parameters.

Fig 2: Are the detection limits are available for this field campaign? Fig 2: the scale used for the panel a) should be between 0 and 400 pptv (as in Fig1 a) or are there data higher than 400 pptv? Fig 4: January 1998 corresponds to Hutterli et al. (2002) study, right? There is no relation between plot and caption. Fig 7: The characters and psym are too small or the scale not adapted. Fig 9: You put observed HCHO, but you do not indicate for which campaign and period, is it an average for the overall measurements?

Table 2: 129 pptv (in the table) or 130 pptv (in the text)

P 32037, line 16: sect. 2.3 and not 2.2 P 32040, line 7: 1999 (in the text) or 1998 (in Fig 4)

Add references to Salmon et al. (2008), Jacobi et al. (2001), Albert (2002), Schwander et al. (1989), Wagner et al. (2002), Eisele et al. (2008) in the final references. The reference France et al. is cited in the text in 2012 (p 32045, line 5) and in the reference 2011. Is it the same article?

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 32027, 2014.