

Interactive comment on “Simultaneous observations by sky radiometer and MAX-DOAS for characterization of biomass burning plumes in central Thailand in January–April 2016” by Hitoshi Irie et al.

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Received and published: 26 December 2018

We thank the reviewer very much for reading our manuscript carefully and giving us valuable comments. Detailed responses to the comments are given below.

My first comment concerns the lack of some relevant information: Description of the site, location of the instruments, description of the MAX-DOAS instrument (e.g. is it thermally stabilized? If not, how often was the DC measured?). The MAX-DOAS of the PREDE Co. Ltd. contains a MAYA2000Pro? Please specified the technical details of

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the spectrometer (e.g. it uses a slit or just an optical fiber?).

Reply: In response to this comment, a description of the site and the location of the instruments is now given at the beginning of section 2 of the revised manuscript. We combined the MAX-DOAS of the PREDE Co. Ltd. with the Maya2000Pro spectrometer (temperature-controlled, with a slit of 25 μm). This is also mentioned in the revised manuscript.

The measurements were done at 2°, 3°, 4°, 6°, 8°, 70° elevation angles and the measure at 70° elevation angle was used as reference. Is that correct? Please justified and describe the method.

Reply: Yes, that is correct. Instead of 90°, the 70° elevation angle was adopted as reference to reduce a variation range of signals measured at all the elevation angles, while the integration time was kept constant. In the vertical profile retrieval, the elevation angle setting was fully considered in the computation of differential air mass factors (e.g., Irie et al., 2011, 2015). These are now mentioned in the revised manuscript.

There are also no details about the fitting windows and the cross section used for the trace gas analysis. A table may be useful.

Reply: We used fitting windows and cross section data identical to those described by Irie et al. (2011, 2015) and Hoque et al. (2018a). This is now mentioned in the revised manuscript.

My second comment concerns meteorological information, which is not mentioned in the manuscript. Has NCEP a meteorological station at the site? Since the RH was in January over 60% to include a scale factor in the DOAS analysis?

Reply: Meteorological information has been stated in detail in the paper of Hoque et al. (2018a), which is now referenced at the beginning of section 2. For NCEP, more information (reanalysis, 2.5-degree grid, 6-hourly) is now given in the revised manuscript. Since no RH information is needed for our DOAS analysis, we do not think

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that any scale factor is needed.

My last comment concerns the missing information of the used parameters to retrieve the vertical column of the trace gases: which were the inputs used to retrieve the lower tropospheric vertical profiles? Where do they come from the estimated errors? The site by Irie et al. 2015 is Cabauw, so the parameters are probably different as the parameter used in Phimai.

Reply: The input parameters used for the vertical profile retrievals are the same as those used by Irie et al. (2015) for Cabauw, the Netherlands. The corresponding error estimates have also been done in their work and references therein. This is now stated in the revised manuscript.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-276, 2018.