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## ***Interactive comment on “First experimental evidence for the CO<sub>2</sub>-driven origin of Stromboli’s major explosions” by A. Aiuppa et al.***

### **Anonymous Referee #1**

Received and published: 13 May 2011

General Comments The paper deals with a substantially novel topic that regards the estimate of crater CO<sub>2</sub> fluxes from Stromboli based on the combination of measured SO<sub>2</sub> fluxes and measured CO<sub>2</sub>/SO<sub>2</sub> ratios. The data shown in the paper are interesting (despite their large error probably due to the low number of CO<sub>2</sub>/SO<sub>2</sub> sensors around Stromboli crater) and the scientific questions addressed are certainly within the scope of SE. The conclusions reached are sound and substantial, the methods used are valid and the results validly support the interpretations and conclusions. The abstract is concise and represents a complete and clear summary of the paper. The manuscript is well structured and the language is fluent and precise. The overall quality of the paper is good. Only minor modifications are required in my opinion, so the paper can be accepted after minor revision.

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Specific comments As mentioned above, a large error (40%) is associated with the data presented in the paper. This is probably due to a small number of CO<sub>2</sub>/SO<sub>2</sub> devices and SO<sub>2</sub> UV scanners deployed around the crater/volcano. Probably, indicating the prevailing direction(s) of local winds would help defining where to improve the monitoring networks. Considering the large distance between the craters and the UV scanning DOAS spectrometers, did the Authors consider the time shift between the moment when the gas exits the craters and the moment when it is really measured from a UV station in calculating the SO<sub>2</sub> flux and hence the corresponding CO<sub>2</sub> flux? When describing the trends of cumulative curves of CO<sub>2</sub> flux in Fig. 5, no mention is given to curve No. 3, that is the only one that does not follow the pattern of pre-explosive degassing. I think it would be necessary and interesting to have some explanation for that behaviour, inasmuch as it is coupled with a “strange” behaviour of the corresponding cumulative curve of SO<sub>2</sub> flux, as well.

Technical corrections On page 412, line 26, the citation to Chouet et al., 1974 is not in the references list; On page 413, line14, the citation to Aiuppa and Federico, 2005 should be corrected to 2004; On page 418, line 29, just the acronym bsv should be left, as it was already discussed on page 213, line 22; On page 424, line 3, the citation to Andronico et al., 2008 is not in the text; On page 424, line 23, the citation to Burton et al., 2007b is not in the text; In Figure 5, the words “Days passed” in the x-axis text should be changed into “Time interval”. Furthermore, in the caption to the same figure the 5 periods cited should be clearly identified by indicating the respective starting and ending dates.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/3/C117/2011/sed-3-C117-2011-supplement.pdf>

Interactive comment on Solid Earth Discuss., 3, 411, 2011.

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