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Biogeosciences Discussions

Interactive comment on "The ACCENT-VOCBAS field campaign on biosphere-atmosphere interactions in a Mediterranean ecosystem of Castelporziano (Rome): site characteristics, climatic and meteorological conditions, and eco-physiology of vegetation" *by* S. Fares et al.

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We are grateful to the reviewers for the insightful comments to our paper “The ACCENT-VOCBAS field campaign on biosphere-atmosphere interactions in a Mediterranean ecosystem of Castelporziano (Rome): site characteristics, climatic and meteorological conditions, and eco-physiology of vegetation”.

As mentioned by one of the reviewers we tried to accommodate in the same report two ambitious objectives: first, to introduce the International experimental campaign

which took place in 2007 in Castelporziano, explaining the rationale of the campaign and introducing the companion reports, and, second, to present original data on eco-physiology and isoprenoid emissions by the poorly investigated dune ecosystem.

The referees observed a certain unbalance in the wealth of information contained in the paper. Reviewer 1, in particular, suggested to make more punctual and short the discussion about ozone level, and more detailed the description of the field site. We rearranged the discussion on ozone levels and their dependence on urban plumes, biogenic emissions and air circulation, hopefully making it more clear and concise, and also considering the comments from a third external scientist (see below for the specific points). With regard to the specific information on the field site, we examined more deeply the current literature, and added to the introduction more information, although were unable to find specific studies on the dune ecosystem which could be used to describe more in detail the features of the site. As also suggested, especially by reviewer 2, we also outlined more thoroughly the differences between the ACCENT campaign and the BEMA campaign, which took place in a site more distant from the coast, on a different ecosystem and on a different season. We also edited figure 1 which now shows the many different vegetation types present in the Castelporziano area. They represent almost the totality of Mediterranean ecosystems all over the Mediterranean basin, but, as highlighted in the paper, the coastal ecosystem has been poorly investigated in comparison with the inland Pine and Oak ecosystems. Finally, we further highlighted the importance of our emission inventory for modeling and upscaling purposes, especially when considering the seasonality of the emission and the emission of BVOC other than isoprene.

The text was also amended to incorporate the specific comments of the referees, as below specified by single item.

Anonymous Referee #1 Received and published: 5 March 2009

- p 1189 line 10: Loreto et al 2007 - shouldn’t this be Loreto et al 2006?

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P4 l 12: Yes, the correct publication year has been introduced.

- some more details on the ecosystem would be necessary: what is the elevation of the dunes; how stable are the ecosystems for e.g. mechanical damage by tramping;

P 7 l 24: The dune elevation has been added to the text, unfortunately no other information on the site characteristics is available.

are there specific abiotic or biotic disturbances potentially present; soil nutrients (other than Ca) We did not find any other works describing other potential disturbances.

Materials and Methods: - specific information on how the vegetation composition was assessed is missing (p. 1195): was it evaluated by species or at genera level; only vascular plants ?

P 10 l 12: Vegetation composition refers only to vascular plants and was assessed at species level. This is now specified in the text.

- how many plants were used for projected and sapwood area determinations; were they destructively sampled from the site or from somewhere else (and how this influences the ecosystem BVOC fluxes?); were the sample leaves for LA from same or different plants and if latter then the number should be given; why were they dried over a week (normally three days is sufficient)? A number between 12 and 17 plants per species were used for calculations of PA and SA. Plants were taken from outside the plot in order to avoid wound-induced isoprenoids emissions inside the footprint of the experimental area. 20 leaves from different plants were used for calculations. There was no special reason for keeping leaves inside the oven for a week besides wanting to be sure of their complete water loss. - what was the time of the day in photosynthesis and isoprenoid emission measurements?

P 12 l 10: We specified in the text that the measurements were done in the central hours of the day.

did you wait until a steady state for emissions was reached in the leaf cuvette?

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P 12 l 18-19: Yes we waited, and more information is now included in the text, also to answer to the comment of reviewer 2.

was there any VOC sampling from incoming air to check the filtering efficiency or other potential error sources?

P 12 l 19-25: We tested the air at the inlet of the instrument, and with empty cuvettes in order to exclude any sample contamination. More information was included in the text.

- In the abstract the month (May) is given for measurements, but in the materials and methods there is no such information available for physiological measurements. This should be added.

P10 l 14; P 12 l 9: The month of measurement was added in the M&M section.

Results and Discussion: - some of the subtitles are numbered, while others are not. Unify!

All subtitles have been now numbered.

p. 1197 line 25: the authors give 200 mm rainfall month-1 as a threshold for drought BUT see figure 2 where the maximum monthly sums are around 120 mm, and summer precipitation values below 20! Is there a typo here or am I misunderstanding something?

P 14 l 11: The value of 200 mm was wrong, we thank the reviewer for spotting the mistake. The correct estimate ($<$60 mm) was added in the text.

- For readers not so familiar with these indexes, it might be good to discuss a bit the high evaportranspiration which produces the plant water deficit under these conditions.

P 14 l 16-20: We included in the text information about link between drought, high temperature and evapotranspiration. Hopefully the text is clearer now.

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Measurements of leaf or soil water potential would have helped to quantify the stress level, but obviously they are not available?

P 19 l 15: This aspect is well described in another contribution to the special issue (Mereu et al. 2009), and reference to this paper is now made in the text.

- p. 1198 line 20: fig 5 should be refereed before fig 6

The figure number has been rearranged according to the reviewer suggestion.

- Contrary to the other referee, I find the lengthy discussion (pages 1999-02) about ozone levels during the campaign perhaps not necessary for this background paper

P 15-16-17: Two contrasting recommendations by the two reviewers, both of which arise from reasonable considerations. We reworked the ozone section, also to respond to the other comment we have recived in the discussion session. Overall the section has been shortened, but we still wanted to include some considerations about ozone formation in relation to air circulation and pollution coming from the urban areas, that are not presented elsewhere in the special issue papers and we believe could be of interest to BG readership.

- p.1203-4 discussion on water table depth is too speculative for this paper: only very few measurements on soil water table level are presented, in order to draw conclusions of the causes of abiotic stress during dry periods

P 19 l 1: We explained in the text that this is a hypothesis which requires further verification, but, with this caution statement, perhaps it is still worth to leave this information in the text.

- p 1204-5 also too speculative discussion on ozone and acid deposition effects on plants (no data shown although something was obviously measured), not necessary here unless elaborated more

We do not have direct measurements on acidification processes, thus we followed the

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reviewer‘s suggestion and deleted this paragraph.

- p 1208 irrigation should be described in Materials & Methods –section

P13 l 13-23: We added a new section in M&M describing the irrigation procedure.

- The language needs revisions (I found numerous typos and unclear sentences)

- many latin names e.g. Phillyrea latifolia are spelled in several different ways –

Text has been amended according to the reviewer suggestion, and also reviewed by a native speaker.

should be checked throughout the text - indexing Lab, LMtot etc is not uniform

The format of indexes was unified as correctly suggested.

- table 1: some confusion with units table 1: height of Oxicedrus macrocarpa hardly is 4032 cm?

Indeed the plant size of the plants described is short. We found only two Juniperus Oxycedrus individuals, definitely at a juvenile stage and not representative of the field site.

- table 2: adult = mature

Corrected in the table.

- Fig 1: explain Montelibretti in the fig legend and show the locations of the meteorological stations in the detailed map

The new figure 1 includes the location of Montelibretti.

- Fig 2: explain axes P, T in legend. Is the upper graph 2005?

P and T meanings are now explained in the legend of Figure 2. The right title of the upper graph (2005) was added.

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- Fig 3: show the period of campaign also here

Also this figure was edited according to the reviewer‘s suggestion.

- Fig 4: why do you present results from different stations for different parameters? They are difficult to compare

The reviewer is right, but we could not find all needed information from the same station. However, the two test sites were only 500 m distant, and we verify that no meteorological conditions were the same at the two stations.

- Fig 5: peak O3 level should be shown in the figure

The data shown are 30 min averages. In case of Montelibretti, we do not have a higher resolution of data because the datalogger in the monitoring station was programmed for long term measurement to return 30 min averages. For this reason we decided to show only the 30 min averages for both experimental sites.

- References: Ciccioli et al 2007: name of the book is missing P 29 l 15-16: Book information has been added in the reference list.

Interactive comment on Biogeosciences Discuss., 6, 1185, 2009.