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Biogeosciences Discussions

Interactive comment on "Impact of annual and seasonal precipitation and air temperature on gross primary production in Mediterranean ecosystems in Europe" *by* Svenja Bartsch et al.

Svenja Bartsch et al.

bertrand.guenet@lsce.ipsl.fr

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General Answer to the Reviewer: We thank the anonymous reviewers for reading and reviewing our manuscript. We agree with both reviewers that our site selection could benefit from improvement and that we mainly concentrated on the vegetation types, not respecting the applied management or treatment of each site. We also agree that more information has to be provided concerning the selected sites. Correspondingly, we corrected our site selection by excluding sites where the management is difficult to reconcile with our statistical analysis. As given in table 1 (Tab.1, see below) we ended up having 16 sites left (instead of the original 23), representing four different vegetation types (evergreen needleleaf trees; evergreen broadleaf trees; deciduous

broadleaf trees & shrubs) and three countries (Spain; France & Italy). In addition we included missing information such as the total elevation; climate information (KGCC); the number of years of observations included per site, as well as publications that are relevant to the sites' description (this column will be completed) in table 1. Based on this updated site selection, we will re-run all statistical analysis on the data.

Reply to the comments of reviewer 1:

We understand the first concern of reviewer 1. Nevertheless there already have been publications (see below) using GPP of water-limited systems out of the FLUXNET data sets, e.g.:

Ross, I., Misson, L., Rambal, S., Arneth, A., Scott, R. L., Carrara, A., Cescatti, A., and Genesio, L.: How do variations in the temporal distribution of rainfall events affect ecosystem fluxes in seasonally water limited Northern Hemisphere shrublands and forests?, Biogeosciences, 9, 1007–1024, doi:10.5194/bg-9-1007-2012, 2012.

Quotation from Ross et al. (2012): "Flux tower data allow direct quantification of NEP and its decomposition into GPP and RE (Reichstein et al., 2005) and make it possible to analyze relationships between ecosystem fluxes and rainfall characteristics across ecosystem types and sites in a robust way."

We think however, that it is still a quite interesting point to consider in our manuscript. Therefore, we have decided to run all our statistical analysis also for NEE (as a 'real' measurement). We will compare the results on NEE and GPP to see if it will underline effects such as e.g. additionally flux components as described in the literature presented by reviewer 1. Finally, our discussion on this particular point was rather poor and we will discuss these aspects more carefully in the new version of the manuscript.

For the second point, we want to emphasize that we included 'site' as a random factor into our statistical analysis. Hence, if there is a site-specific effect it will be considered in our analysis. Nevertheless, the discussion section will be completed in the next

version of the manuscript.

For the third point, as given in the new table 1 we added several columns including relevant publications as well as some additional site information. We also want to apologize at this point that we did not yet acknowledge the FLUXNET network and its tremendous achievements. We highly appreciate this work and the opportunity to use these very well organized data sets. The FLUXNET network will be properly acknowledged in the next version.

Finally, we do not fully agree that our results are generally discussed in an unbalanced way. However, we are planning (as mentioned previously) to add several aspects pointed out in the reviewers' comments, such as potential accumulation of CO_2 in the underground, to our discussion part.

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Tab.1: Site description (NEW SITE SELECTION). Further site information is available at: https://fluxnet.ornl.gov/.

Nr.	SITE ID	SITE NAME	COUNTRY	COORDINATES (Lat., Long.)	VEGETATION	ELEVATION	KGCC *1	YEARS *2	REFERENCES
1	ES-ES1	El Saler	Spain	39.3460, -0.3188	evergreen needleleaf trees	10 m	Csa	1999 - 2006	Sanz et al. (2004)
2	ES-LgS	Laguna Seca	Spain	37.0979, -2.9658	shrubs	2267 m	Csa	2007 - 2008	-
3	ES-LJu	Llano de los Juanes	Spain	36.9266, -2.7521	shrubs	1600 m	Csa	2005 - 2011	Serrano-Ortiz et al. (2007)
4	ES-Ln1	Lanjaron-Non intervention	Spain	36.9721, -3.4739	shrubs	2301 m	Csa	2009	-
5	FR-FBn	Font-Blanche	France	43.2408, 5.6792	evergreen needleleaf trees	436 m	Csa	2009 - 2011	-
6	FR-Pue	Puechabon	France	43.7414, 3.5958	evergreen broadleaf trees	270 m	Csa	2001 - 2011	Rambal et al. (2004)
7	IT-Bon	Bonis	Italy	39.4778, 16.5347	evergreen needleleaf trees	1170 m	Csa	2005 - 2009	-
8	IT-CA3	Castel d'Asso3	Italy	42.3772, 12.0222	deciduous broadleaf trees	197 m	Csa	2012	-
9	IT-Cpz	Castelporziano	Italy	41.7052, 12.3761	evergreen broadleaf trees	68 m	Csa	1997, 2000 - 2008	Garbulsky et al. (2008)
10	IT-Lec	Lecceto	Italy	43.3036, 11.2698	evergreen broadleaf trees	314 m	Cfa	2005 - 2009	Chiesi et al. (2011)
11	IT-Non	Nonantola	Italy	44.6902, 11.0911	deciduous broadleaf trees	20 m	Cfa	2001 - 2003, 2006 - 2008	Reichstein et al. (2003)
12	IT-Pia	Island of Pianosa	Italy	42.5839, 10.0784	shrubs	18 m	Csa	2002 - 2006	-
13	IT-Ro1	Roccarespampani1	Italy	42.4081, 11.9300	deciduous broadleaf trees	235 m	Csa	2000 - 2008	Rey et al. (2002)
14	IT-Ro2	Roccarespampani2	Italy	42.3903, 11.9209	deciduous broadleaf trees	160 m	Csa	2002 - 2008, 2010 - 2012	Tedeschi et al. (2006)
15	IT-SRo	San Rossore	Italy	43.7279, 10.2844	evergreen needleleaf trees	6 m	Csa	1999 - 2010	Chiesi et al. (2005)
16	IT-Tol	Tolfa	Italy	42.1897, 11.9216	evergreen broadleaf trees	473 m	Csa	2005 - 2006	-

*1 KGCC = Climate abbreviations follow the Koeppen-Geiger-Climate-Classification: Cfa - warm temperate fully humid with hot summer, Csa - warm temperate with dry, hot summer. *2 Note all years from which we used information (even we didn't use the year in total) are included in the table.

Fig. 1.