

***Interactive comment on* “Pollen-based reconstruction of Holocene vegetation and climate in Southern Italy: the case of Lago di Trifoglietti” by S. Joannin et al.**

**Anonymous Referee #4**

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The paper by Joannin et al. on “Pollen-based reconstruction of Holocene vegetation and climate in Southern Italy: the case of Lago di Trifoglietti” is a very interesting work on the development of vegetation and climate at a high altitude site in Calabria. It is clearly written, well organized and informative.

In my view, the following points need reconsideration:

1. the Pann reconstructions of Fig. 9 for the present time (800 mm at year 0) show a very strong discrepancy with the modern annual precipitation values presented in Fig. 3 (1850 mm). Considering that the present time is the only control point allowing verification of the climate model, such a discrepancy invalidates the entire climate

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reconstruction. This problem needs to be fixed or discussed.

2. “The climate reconstruction is quantified on the basis of terrestrial vegetation” (page 2241 – line 3), therefore it cannot be used back to explain the behaviour of terrestrial vegetation. Circular argumentations should be avoided especially at page 2247 – lines 7-8 (More arid conditions recorded in Pann (150 mm, Fig. 9f) may have reduced fir and beech woods), page 2248 – lines 24-26 (the regression of fir to the benefit of beech also suggests a dry episode, as supported by the ca. 100 mm annual precipitation decrease inferred by quantitative climate reconstruction (Fig. 9f)), and page 2250 - lines 4-6 (This more humid phase corresponds to peaks in annual precipitation (Fig. 9f; Peyron et al., 2012) that favoured beech/fir forest restoration).

3. The quasi-disappearance of *Abies* from the local forest is considered as due to selective exploitation beginning in Roman times (cf. page 2237 – lines 25-27, page 2252 – lines 3-4, and page 2253 – lines 1-2). It would be important to support this interpretation with archaeological data. In central Italy, where *Abies* is currently almost completely absent, all botanists used to ascribe this lack to timber exploitation by the Romans, until various long pollen records in the region demonstrated that *Abies* quasi-disappeared already 70 ka BP (Follieri et al., 1998; Quaternary International 47/48: 3-20). A regional reduction of *Abies* in southern Italy is also recorded at Lago Salso (Di Rita et al., 2011 *Palaeogeogr. Palaeoclim. Palaeoecol.* 310: 139-151) and Lago Grande di Monticchio (Allen et al., 2002, Quaternary International 88: 69-80). In the light of these results, can you exclude that the recent reduction of *Abies* in Calabria is the effect of a natural process?

Minor corrections:

1. “Pollen grains of *Castanea* are produced by plants absent from around the lake” (Page 2234 – lines 20-21), but Fig. 2 shows that there are communities of *Castanea sativa* located less than 500 m from Lago Trifoglietti!

2. There is some confusion in quoting the interpretation of pollen sequences from

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southern Italy by Di Rita and Magri (2009), who reported “an aridity crisis combined with increasing human impact”, but did not describe it as “marked by 1) during the middle Bronze age, the use of fire to clear land for agricultures and grazing (Pteridium spores), 2) in Roman times, the exploitation of *Abies* for timber, and 3) since the Middle Ages, the cultivation of *Castanea*, *Juglans* and *Olea*” (page 2252 – lines 1-5).

3. The increases in cereals at 6800-6500 cal BP have been interpreted as effect of human activity (page 2248, lines 14-15). However, even higher increases are recorded around 11,000 cal BP, which are not considered as effect of human activity. One single line of interpretation should be followed throughout the work, in the absence of independent evidence.

4. In Italy there are many cases of woodstands able to withstand changes for more than 11,000 years (page 2224 – line 8; page 2252 – lines 18-19), for example deciduous oaks at Lago Grande di Monticchio, Lago dell’Accesa, Lagaccione, Lago di Martignano, Lago Albano, Prato Spilla, Core C106, and so on.

5. Fig. 9f: an arrow may be added to indicate the clear increase in Pann of the last 2000 years. Include also some comments in the text, for example modifying the sentence at page 2253, lines 10-11, indicating “a general trend towards drier climate conditions that prevail up to the present”.

6. Page 2241 – line 12: early Holocene

7. If possible, add a time scale in calibrated years next to the depth scale of Fig. 7.

8. *Quercus caduc.* is not a proper scientific name. Use “deciduous *Quercus*” instead

9. Table 2: *Pinus nigra* subsp. *laricio*: subsp. not in italics

10. Table 3: the names of families should not be written in italics

11. Fig. 6: Ericaceae

12. Caption of Fig. 9: Lake Grande di Monticchio (di in small letters), or Lago Grande

di Monticchio.

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