## GENERAL COMMENTS

**Overview**

The paper "Pollen-based reconstruction of Holocene vegetation and climate in Southern Italy: the case of Lago di Trifoglietti" by Joannin and colleagues is supported by new and consistent data from a region poorly investigated from a palynological point of view. Moreover, the Calabria region, in the heart of Mediterranean, has high mountains very close to the sea featuring its environment and climate. The Trifoglietti record fills a gap existing not only in southern Italy, but in the whole Mediterranean.

I liked the integration between present and past vegetation visible in the whole manuscript draft.

Pollen analysis is accurate and precise, and supplied with basic sediment data. I regret the fact that a concentration/influx diagram, at least for AP and main taxa was not included.

The radiocarbon dating was carried out properly too, and on a good number of terrestrial plant macroremains.

There are some important mismatchings between palynological data (presence of high water demanding trees like fir and beech) and reconstructed $P_{ann}$ (pollen-based annual precipitation). Present-day mean annual precipitations do not fit with the reconstruction for pollen top-samples. I do suggest to check the climate reconstruction procedure you followed to check if there was something wrong.

Once the quantitative reconstruction of past precipitation is adjusted, some sentences in the discussion should be better addressed too.

The bibliography is updated, even if some recent articles can be added and few ones are misquoted. I just wonder why most pollen records from Latium (Lagaccione, Vico, Stracciacappa, Mezzano, Albano and Nemi) are not considered, while you refer to northernmost Italian sites.

**Paper organization**

I wonder if the paragraphs 4.2.2 (Pollen sequence and terrestrial vegetation dynamics) and 4.2.3 (Pollen sequence and hygrophilous vegetation) could be joined. It's not easy to start again with the diagram description, even if I under stand that the authors want to link water plant remains data and lake level oscillations.

Is Table 3 necessary? This information can be read in the pollen diagram. I wonder if it could be included as supplementary file.

## SPECIFIC COMMENTS

**2225 line 16**

"… and the Neoglacial climate cooling at ca. 6000–5000 cal.BP (Magny et al., 2006b; Miller et al., 2010)."

**Have also a look at the very recent paper by Zanchetta and colleagues (2012), Quaternary Research.**

**2226 line 20**

"Lago di Monticchio (656m a.s.l.; Allen et al., 2002) and Lago di Pergusa in Sicily (667m a.s.l.; Sadori et al., 2011) are located in the collinean belt, but they are separated by 450 km and therefore provide a forest development asynchronism of ca. 4000 yr." **it's not the distance to make the difference, but the very different clmatic and geomorphological features of the sites. In my opinion it's not proper to speak of asynchronism.**

**2227 line 8**

"Lake Trifoglietti" **Lago Trifoglietti. Can you call it properly at least when you describe its**

**geographical features?**
**line 14**
"… parallel along the Tyrrhenian coast for 70 km with altitudes ranging from 1060 and 1541m (Amici della Terra, 2004)". **I wonder if there are other papers available!**

**2231 line 12-14**
To emphasise the correlation between pollen rain and vegetation, we provide the corresponding phytosociological relevés of actual vegetation (Pignatti, 1953) (Table 2) along with the five surface samples, using the TILIA 1.12 programme. A semi-detailed pollen diagram of surface samples is provided in Fig. 6.
**I do not understand the phrase, Was Tilia used to draw pollen diagrams? What do you mean with a semi-detailed diagram?**

**2232 line 17**
**"***Cyperaceae***" Not Italic, also in the following for families and subfamilies.**

**2233 lines 13-24**
4.1.1 Lithological and magnetic susceptibility changes
**I think it would be better to have a table with this information.**

**2238 lines 20-22**
"From 11 000 to 8900 cal.BP (T-3), abundant *Botryococcus* **(what, colonies?)** are recorded, typical of an open lake with deep water and gyttja sedimentation.
**Please correct and add a reference for this ecological feature.**

**2240 lines 20-21**
"…induced paleohydrological changes as evidenced in Central Italy and in Sicily (Ariztegui et al., 2000; Giraudi et al., 2011; Magny et al., 2007a, 2011a, b)." **Have also a look at Sadori et al. 2004, QI 113: 5-17.**

**2242 lines 19-20**
"…(e.g. Lago Alimini Piccolo, Di Rita and Magri, 2009; Lago Grande di Monticchio, Allen et al., 2002; 2002; Lago di Pergusa, Sadori et al., 2008; Fig. 1), though most of these concern lowlands. Lake Trifoglietti, however, appears as a unique example of well-dated pollen sequences from the mountain belt of Southern Italy." **Please add Lago Battaglia, Caroli and Caldara, 2007. If you quote 4 of them (and I wonder what could be added) lakes Monticchio and Pergusa are in the mountain belt and former lake Battaglia and lake Alimini Piccolo are by the coast? If yes, no problem, I agree that it is the best dated record. I think that these phrases should be changed.**

**2251 lines 24-25**
"Clear disturbances in forest ecosystems are observed (drop in pollen percentages of Abies and Fagus…". **You should mention the drop in *Abies* curve recorded at Monticchio (alle net al. 2002)**

## TECHNICAL REMARKS

**2225** though, nethertheless
**2234** *Quercus caduc.***, change to deciduous *Quercus***
**2235,** Thoughf, Cichorio¨ıdeae

**2236, line 26**
This is also **(true for?)** the extremely rare Pistacia.
**2246**, **line 13** change onland to **inland**
**2251** ostrya, **use the common name or the Latin one**
palaeoenvironemental
**2253 line 27**
**delete** "are thanking"

**Tables and figures**

**table 1**
"Wood-Peat-Charcoal "
**Why the distinction between the three was not carried out?**

**Table 3**
**Deciduous not Italic**

**Fig. 1**
I would prefer to see Calabria centered in the figure, and not at the southern border of Europe
Caption: Location of study site and other sites considered in the text: Lago Albano and Nemi (Ariztegui* et al., 2000), Lago Battaglia** and Lago Alimini Piccolo (Di Rita and Magri, 2009), Lago*** di Monticchio (Allen et al., 2002), C106 (Di Donato et al., 2008), Grotte di Latronico (Colonese et al., 2010), Canolo Nuovo (Schneider, 1984), Lago di Pergusa (Sadori and Narcissi****, 2001), Biviere di Gela (Noti et al., 2009), Grotte***** di Carburangeli (Frisia et al., 2006), Gorgo Basso (Tinner et al., 2009), Lago Preola (Magny et al., 2011b), AD91-17 (Sangiorgi et al., 2003), BS7938 (Sba et al., 2004), MD90-917 (Siani et al., 2012).

* Please consider also Lowe et al. 1996 and Mercuri et al 2003.
** Caroli and Caldara, 2007
*** Grande
**** Narcisi
***** Grotta

**Fig. 3**. Ombrothermic diagram of the meteorological station nearest to Fagnano Castello.
**Which is the name of the station. Is it Fagnano Castello? In the case you should write nearest to Trifoglietti**

**Fig. 7**
**The curves are so thin that Iwonder if it would be better having trees and herbs in two separate figures.**
**The ages in the scale are not calendar, but radiocarbon!**
**Why don't you use the chronological scale of fig. 8? Please add it in fig. 7**

**Additional refrences**
**The following articles should be considered:**

Calò C, Henne PD, Curry BB, Magny M, Vescovi E, La Mantia T, Pasta S, Vannière B, and Tinner W. 2012. Spatio-temporal patterns of Holocene environmental change in Southern Sicily. Palaeogeography, Palaeoclimatology, Palaeoecology 323-325, 110-122.

Caroli I., Caldara M. (2007) Vegetation history of Lago Battaglia (Eastern Gargano coast, Apulia Italy) during the Middle-Late Holocene. Vegetation History and Archaeobotany 16, 317-327.

Colonese A.C., Zanchetta G., Russell D., Fallick A., Manganelli G., Lo Vetro D., Martini F., di Giuseppe Z., 2011 Stable isotope composition of Late Pleistocene-Holocene Eobania vermiculata (Müller, 1774) (Pulmonata, Stylommatophora) shells from the Central Mediterranean basin: Data from Grotta d'Oriente (Favignana, Sicily). Quaternary International, 244, 76-87, doi:10.1016/j.quaint.2011.04.035.

Di Rita, F., Simone, O., Caldara, M., Gehrels, WR., Magri, D. 2011. Holocene environmental changes in the coastal Tavoliere Plain (Apulia, southern Italy): A multiproxy approach Palaeogeography, Palaeoclimatology, Palaeoecology 310: 139 – 151.

Lowe JJ, Accorsi CA, Bandini Mazzanti M, Bishop A, van der Kaars S, Forlani L et al. (1996) Pollen stratigraphy of sediment sequences from lakes Albano and Nemi (near Rome) and from the central Adriatic, spanning the interval from oxygen isotope Stage 2 to the present day. In: Guilizzoni P and Oldfield F (eds) Palaeoenvironmental analysis of Italian crater lakes and Adri- atic sediments. Memorie dell'Istituto Italiano di Idrobiologia 55: 71–98.

Mercuri A.M., Accordi CA., Bandini Mazzanti M. 2002. The long history of Cannabis and its cultivation by the Romans in central Italy, shown by pollen records from Lago Albano and Lago di Nemi. Veget. Hist. Archaeobot., 11, 263-276.

Mercuri A.M., Bandini Mazzanti M., Torri P., Vigliotti L., Bosi G., Florenzano A., Olmi L., Massamba N'siala I., 2012 - A marine/terrestrial integration for mid-late Holocene vegetation history and the development of the cultural landscape in the Po Valley as a result of human impact and climate change. Vegetation History and Archaeobotany. DOI: 10.1007/s00334-012-0352-4.

Zanchetta G., Giraudi C., Sulpizio R. Magny M., Drysdale R.N. Sadori L. 2012. Constraining the onset of the Holocene "Neoglacial" over the central Italy using tephra layers. Quaternary Research, in press. Doi 10.1016/j.yqres.2012.05.010

Yours sincerely

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