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Climate of the Past Discussions

Interactive comment on "Environmental and climatic changes in Central Chilean Patagonia since the Late Glacial (Mallín El Embudo, 44 S)" *by* M. E. de Porras et al.

Anonymous Referee #2

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This is an interesting manuscript that presents a new record of fire history and palynological reconstruction of vegetation dynamics located in Central Chilean Patagonia in an isolated valley of the eastern side of the Andes. The study is methodologically correct and provides new insights on regional vegetation and fire history with climatic changes during the end of the last deglaciation and the Holocene. Notwithstanding those positive aspects, I have a major concern about the discussion. In general, while it is well illustrated using different records, this part lacks precisions and sometimes, the results of other studies differ from their original interpretations.

In the LGM termination paragraph (P.17 l.12), the authors explain that on the eastern side, the glacial retreat generally occurred between 19-18 ka. Why the beginning of

the last deglaciation is at 15 ka on the Fig.6? In the same paragraph (l.15), the authors wrote that the glacial retreat on the western side occurred at around 17.5-16.5 ka. However I think it would be more precise to specify that the local ice cap has persisted up to ∼17.3 ka, see (Heusser, 2002; Lumley and Switsur, 1993). Then, following the location of palaeorecords in Taitao and Chonos (Bennett et al., 2000; Haberle and Bennett, 2004), the expansion of vegetation began between this date and ∼16.5 ka. Between 22 and 17.6 ka, following the result of core MD073088 the authors explain that the vegetation is dominated by Nothofagus dombeyi type (P.18 l.12). These are the pollen spectra that are dominated by Nothofagus dombeyi type which is over-represented during this period (Montade et al., 2013). Consequently, this shows the presence of this taxa but not necessarily the dominance of Nothofagus trees in the vegetation. In addition, some continental pollen records from the same area, also show the presence of Nothofagus when grasslands are dominant before 17 ka (see Laguna Lincoln or Laguna Stibnite) (Bennett et al., 2000). In P.18 l.22, the authors explain that low values low values of the smectite/(illite+chlorite) is recorded between 19 and 15 ka suggesting low precipitation. However, that does not respect the original conclusions of (Siani et al., 2010): low values of the smectite/(illite+chlorite) are generally recorded between 22 and 18 ka showing an increase of physical erosion of the Coastal Range. Then, after 18 ka the smectite/(illite+chlorite) values increasing show a higher influence of the Andean source rocks.

In the deglaciation part (from P.19 l.7), the authors explain that (western CCP records), continuous warming is characterized by no reversal trend in forest development (Bennett et al., 2000), whereas marine record show a reversal trend in forest development suggesting a slight cooling or a pause during the ACR (Montade et al., 2013). However, concerning the precipitation these records seem to show the same result, the simultaneous presence of Pilgerodendron (Bennett et al., 2000) and Astelia (Montade et al., 2013) show precipitation increase. (As shown by the transect in figure 1c, the presence of Pilgerodendron or Astelia is characterized by high moisture conditions). Consequently, it would be more interesting to separate the temperature and precipita-

tion signal and to insist on this point (while temperature changes seem to be different, the precipitation changes seem to be similar). In P.19 l.18, I think it would be preferable to remove this paragraph or to add references and better explain the different scenarii. Information are lacking and the results of other studies differ from their original interpretations. For example, marine pollen record has not been interpreted as a northward shift of SWW during the deglaciation, but a southward shift interrupted by a northward shift during the ACR. Such a scenario is also proposed by (García et al., 2012; Moreno et al., 2012).

In the Holocene part, the increase in dominance of Tepualia and Weinmannia in Taitao and Chonos indicate the onset of warmer conditions. However these data do not indicate an increase in precipitation as it has been suggested in the MS (P.20 l.4) but drier conditions see (Haberle and Bennett, 2004). Furthermore, in the discussion of (Markgraf et al., 2007), warmer and drier conditions are also suggested at 11 ka.

Other comments and questions:

- P.3, l.22 “A recent .... Insolation changes.” This sentence needs a reference.

- Figure 1c would be better if the authors add the location of the different sites (Lago chaman, Mallin El Embudo)

- In P.8 l.4, it would be more informative if the authors specify the mean of temporal resolution of the pollen analysis.

- Figure 2, it is difficult to see the different layer in the stratigraphic column such as the “sandy with peat” or “gyttja”. Perhaps the authors can use color or different symbols.

- Escallonia and Gunnera must be written in italic (P.12 l.4). The same error occurs with different taxa in P.14, l.2 and l.20.

- This sentence is not clear (P.14 l.27): “Cyperaceae increase and ferns sharply decrease also support the later”

- What do you mean by “under seasonal equable climatic conditions” (P.15 l.13)? In addition, as it has been specified by C. Whitlock the following sentence is not clear.

- P.16 l.12 “A trend to less severe fires in the mRCV between 4.2–3 ka”. Following the Fig.5, it seems that a trend of “less severe fire” seems to occur between $\sim$3.8 and 3 (and not from 4.2).

- P.17, l.12 “whereas glacial retreatment .... at Lago Augusta area (47 S; Fig. 1a)” This part needs a reference.

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