

Interactive comment on “Fire history in western Patagonia from paired tree-ring fire-scar and charcoal records” by A. Holz et al.

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By comparing records of fire scars on trees with peat bog charcoal records from SW Patagonia (47 to 48S) this study discusses two aspects: 1) the temporal and spatial correlation between the two fire proxies for the last 400 years, and 2) the climatic forcing of past intervals of high fire activity going back 4k (2 records) and 11k (1 record), respectively, as reconstructed from sedimentary charcoal.

It is impressive how high the frequency of fires is in this dense rainforest environment, where human occupation did not occur until the 20th century. Thus perhaps it is not too surprising that both fire proxies are comparable for the 20th century when forest clearing also opened up the forest, allowing for more wide spread atmospheric distribution of charcoal particles to be deposited onto the bogs. The far lower correlation between

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fire scar records and peat bog charcoal during the preceding four centuries thus may be related to generally more dense forest, preventing wide distribution of atmospheric charcoal. It would be interesting to know in this context why the Casanova bog charcoal record relates more closely to the fire scar record than the other two records; more open topography than the other two sites?

As to the second part of the study explaining bog charcoal records with climate parameters it would be helpful to have a map showing the latitudinal precipitation differences related to ENSO (warm phase) and SAM (positive) to understand the complex Fig. 7. This would make it clearer why a marine proxy for erosion (Fe) and SST's from latitude 41S should relate to the charcoal records from 47/48S. Or why terrestrial carbon in a marine record from 53S should relate to the charcoal record. In this case, how would high precipitation during the early Holocene relate to high fire activity? There is a contradicting statement on p. 17 (3219) line 5 versus 15: "*increase in charcoal at all mallines at ca. . . occurs concomitantly with reconstructed **dry** periods at 41S, .. 44S and 53S*" versus "*coincided with both **higher** precipitation at 41-44S and **lower** precipitation at 53S*". You cannot have it both ways.

Details: References listed in text (e.g. Markgraf et al. 2007, 2009) not in reference list (I did not check if this applies to other references). For Tierra del Fuego fire records Markgraf & Huber 2010 could be listed (p. 5 (3207) line 17, p. 17, line 2)(Heusser was not the only one). On p. 11 (3213), line 22, p. 12 (3214) line 6 and 11: "mallín" is not a sediment term; specify what type of peat, *Sphagnum* or sedge peat. Unclear what is meant by the sentence: "charcoal may not reach the deep sediments of bog interiors" (p. 14 (3216) line 18). Do you imply that charcoal is transported downwards into a peat section? Peat grows upwards and airborne charcoal is incorporated at the surface during the growth season; Huber et al. (2004) and Markgraf et al. (2007) show that charcoal peaks in peat records are clearly defined without any "reworking" down core. There could be instances when inorganic sediment influx (silty or sandy layers) could relate to slope wash onto the bog that could contain charcoal; this would be clearly

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shown by the sediment structure, however.

Vera Markgraf, November 20 2011

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