

**Generally** I believe this is a most useful and well-researched paper that will add valuable data to the, as yet, scarce knowledge we have of glacier retreat in the North Patagonian Andes. However a few details first need attention. Apart from these, the remaining corrections all concern minor textual points.

### **Specific comments**

The most crucial problem concerns dating accuracy. There is no mention of how or why the authors derived the generalized 20-year addition to ring counts in cases where a core failed to reach pith. Did they measure the circumferences of tree stems at coring heights? And how can they apply a generalized 20-year rule to species as widely different as *Nothofagus* and *Fitzroya*? What evidence have they that these species possess the same growth rates (maybe they show the same average ring widths? If so, this needs saying).

How did they estimate years to pith ‘based on ring curvature’? Did they fit clear acetate rings to curvature?

The ecesis estimate seems entirely reasonable in relation to the last few decades, however (page 4080, line 12) ecesis delay before colonization could have been much longer following the LIA maximum when climatic conditions were far harsher. Some references that could help: Winchester, V. and Harrison S. 2000: Dendrochronology and lichenometry: an investigation into colonization, growth rates and dating on the east side of the North Patagonian Icefield, Chile. *Geomorphology*: 34 (1-2): 181-194.

Winchester, V., Harrison S., Warren, C.R. 2001. Recent Retreat Glaciar Nef, Chilean Patagonia, Dated by Lichenometry and Dendrochronology. *Arctic, Antarctic and Alpine Research*, 33(3): 266-273.

Concerning dating accuracy: Table 1 needs extending and reorganizing. It is not ‘user friendly’. The word ‘trees’ in 2 of the columns needs to be placed above in the titles row. It is not clear (without tiresome calculations) what extra years have been added to each date (only two dates have 20+13 years added, other variations suggest a good deal of estimating was required). An extra column could help. Additionally, which of the 3 species you selected relates to which date (unless they are all the same species, in which case this should be mentioned (or add symbol beside each date?). Maybe it would be better to give only the oldest dates for each moraine?

A critical section on dating accuracy in the Discussion is needed.

Fig 1 labelling almost invisible: needs to be in black. Volcano names in text should be included. The elevation key is not really helpful. The high mountain/volcano tops don’t show up well in white and the dark-shaded valley-sides are more of a visual aid than an elevation guide. The word “cities” in the caption = towns (unless they have a cathedral).

Fig. 2A Change font to black where it is superimposed on yellow/pink background. Giving scale of ‘boulder’ is not helpful among all the detail. Caption error “(see also Fig 2)” = Fig 3?

Fig. 5. Consider changing solid lines showing icefall to another type of line (they look like moraines). Black font for dates instead of grey which is hard to read – especially the oldest dates.

Fig. 7. Remove “two” from caption insert ‘adjacent’ data points.

## Technical

Page	line	out	insert
4074	21	is	are
4075	21	very	-
“	22	not emerged yet	has yet to emerge
4076	5		insert - latitude and longitude
“	12	the	-
“	17/18	very rare	limited
“	18	on	glaciers around
“	21		where is Castaño Overo on Fig.1?
“	27	in	as
“	28	information	is an underestimation of
4079	6	length,	length and area
“	7	includes	include
“	9	‘historical documents (Fig.2)’	Reference? Fig. 2 doesn’t look historical
“	13	in	of
“	14	the	-
“	24	from the tree’s collar	to the root collar (but better to say “from the tree base” – since the root collar is lost in mature trees).
“	25		ring curvature – how was this estimated? Please elaborate.
4080	2		(
“	14		refs needed
“	23	nearby	near
4081	12		missing reference to Rivera et al 2002
“	15	the	-
“	17	the	-
“	18	was	we
“	18	approximation	assumption
“	19	are	would thus be
“	20		not visible in the satellite images?
“	21	remains	fragments
“	26		add reference
“	27	presented	established
4082	7	actual	present
“	8	position	-
“	10	in	on
“	13	Group A ... Group B	– what/where is this? Suggest removal
“	14	4b	4A?
“	16	and concentric	-
“	18	outside	upslope
“	19		insert - Fig 4B.
“	23	at the bottom	in the lowest part
“	24	Group B	suggest removal – as suggested line 13
4083	1	in longitudinal position.	Parallel to the valley side
“	1	Group C	If you keep these groups show them on a figure
“	11	applied upon	against
“	12	re-order wording	“earthquake centred in Valdivia and...”
“	19	which is filling	currently infilling
“	19	and	-

<b>Page</b>	<b>line</b>	<b>out</b>	<b>insert</b>
4083	20	The	-
“	26	yr	35 years
“	27	certain number	period of
4084	4/5	re-order text – “indicating that most of GEN’s area (85%) was...	
“	9	2a	3a
4085	1	re-order text -	“large almost 400-year-old trees..”
“	5	as	since
“	5	may	could
“	7	Suggest insertion of a new paragraph after 2010.	
“	9	Suggest insertion of (Fig. 5) after “...19 <sup>th</sup> centuries”	
“	11	outer	southern
“	14		See specific comments
“	15	discussed	described
“	20	with that obtained from	-
“	22	presently	currently
4086	4		‘has had trees’ .... ‘since at least..’
“	16	this	these... issues
“	26		‘of the North P...’
“	10	estimative	estimates of minimum age
“	11	surface	surfaces
“	22	in spite of	despite
“	28	at Esperanza	of GEN – you need to be consistent. Either call the glacier ‘Esperanza’ all through – or GEN.
4088	4	not	neither
“	25	Esperanza	GEN?
4089	3	dated at	of
“	7	certain	any particular
“	8/9	(	moraines, which
“	9	of the	for deposits (see...
“	10		2001). Another
“	16		advances of GEN dated to the...
“	23	to	for understanding or characterizing
“	24	at a certain	of a
“	27	more	better protected than Frias from solar radiation, with a south...
4090	22	a	the

References to check: “Jarvis et al 2008” “Luckman 2000” and “Villalba et al. 1998”. I couldn’t find these in the text. Neumeyer 1949 needs to be referenced properly in text. Page 4081 line 26.