

## ***Interactive comment on “Chronology and impact of the 2011 Puyehue-Cordón Caulle eruption, Chile” by M. Elisondo et al.***

### **Anonymous Referee #1**

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This paper covers an important and growing area of research and there is certainly value in reporting the impacts of such explosive eruptions. However, the paper as it stands reads like two separate reports:

- Sections 1 through 13, which catalogue the impacts by sector.
- Sections 14 onwards, which assess the likely ash dispersal in a future eruption, catalogues some of the impacts from other recent eruptions, and discusses the findings in more detail.

The second part is more interesting and insightful than the first. I would suggest removing much of the former sections to an appendix and including more discussion and exploration of the identified impacts throughout the paper in order to achieve the level

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of analysis and new scientific insight required for a journal article.

Main comments below:

1. It is not entirely clear how the authors “study the local impact of the 2011 eruption of Cordón Caulle volcano (Chile)”. The paper would benefit from more detail on whether any fieldwork or personal experience was incorporated, or whether this is simply a compilation of impacts from reading other’s reports and looking at local media and satellite images. More interpretation of the data sources in the main body of the paper would also be valuable. How reliable are the sources? For example, are media sources taken as definitive? Were any sources found to be contradictory?

2. Much of the listing of impacts appears to be an amalgamation of previous information, e.g. technical reports and information from the media. The reader needs to be clear where the new content in these sections is. For example, how does this build upon the technical reports on ‘Impacts of the June 2011 Puyehue-Cordón Caulle volcanic complex eruption on urban infrastructure, agriculture and public health’ by Wilson et al., 2013?

3. Many of the impacts are listed without clear reference to the ash thickness or characteristics at that site, or a description of the fragility of the component, system or network. Most, if not all, of the impacts have been recognised in previous eruptions and so to better constrain the relationship between natural phenomena and society response there needs to be a discussion within the paper of how the tephra characteristics or asset in question are influencing the level of impact. Figure 9 goes some way towards this but the analysis and extra information would be better expanded and discussed throughout the paper to avoid the feeling of reading a list of impacts, with no analysis or commentary on the data quality. A few non-exhaustive examples:

a) page 5402 clearly states that the production of wool and animal loss is related to the amount of accumulated ash – this is really valuable information if quantified, but Figure 5 is a photo of a sheep. Could the authors not provide quantitative relationships? If

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not, why not? Lack of observations? Lack of accessibility? Too late or little fieldwork? Weather problems?

b) Page 5405 and 5406: Steppes showed initial impact proportional to the amount of ash deposited. This is also interesting and potentially valuable but it is difficult to identify a clear relationship in the text that could be used to “better constrain the relationship between natural phenomena and society response”.

c) Section 8.2, and others: a discussion of the ash fall characteristics in the areas impacted would be useful, even though some information is available in the maps. This would help limit the report feeling like a listing of impacts.

d) Page 5402, lines 12-13: “The northern departments of Chubut Province were also affected with ash accumulation between 0.3–4 cm”. Does this belong with the following paragraph? Otherwise, what are we learning about the impact on livestock from this sentence?

e) Where was the 1.5 M m<sup>3</sup> of ash removed during the first 8 months (page 5409) removed to? Any problems in identifying a location, or in transporting it there? Or is there no information on that?

f) Did the crisis management (Section 12) result in any changes in strategy? How did it compare with previous eruptions in the area?

g) The authors recognise that impacts were identified qualitatively but more discussion on the limitations of this and how this could be improved in future eruptions may be useful?

Minor comments:

- Page 5386, lines 11-12: Some of the earlier studies of eruption impact should surely be referenced here as well as the Wilson papers? e.g. any of those within Blong, 1984 and those from subsequent eruptions.

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- Page 5392, line 14: evacuating 3647 people is incredibly precise, presumably this comes from a technical report that uses census data or population records. It is almost certainly incorrect and should be rounded.

- Page 5397, line 3: incomplete sentence at the end of the paragraph. Should it read shops and public transport were closed?

- Page 5413, line 29: for exceeding the tephra accumulation.

- Page 5416, line 5: please explain that the occurrence of fine ash on top of the deposit can form a hard crust which then promoted the high rainfall.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 5383, 2015.

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