

Reply to Reviewer 2:

Reviewer's comments are reported in red and our reply is reported in black.

This manuscript analyses the impacts of tephra fallout on population, infrastructures and environment following the 2011 Cordón Caulle eruption in Chile. On its present form, the paper is composed of two clearly differentiated parts that do not merge coherently. Part 1 (~80% of the text) is essentially a compilation of information and data on different aspects from a variety of different sources. In my opinion, this first part is too long and merges information that could be relevant and of broad interest to potential readers with a lot of anecdotic and secondary aspects of much less scientific interest. The compilation effort and work is substantial, but the information is not filtered and ranked properly and, in many cases, lacks of referencing. It is unclear which parts are original contributions (if any) and looks more a report than a scientific paper.

As already discussed in our reply to Reviewer 1, we agree that the paper is mostly composed of one section describing the observations found in technical reports and newspapers and a second describing the comparison with other eruptions including some considerations on the potential hazard associated with a future eruption of similar size. As mentioned in the reply to Reviewer 1, we feel that the first section is as important as the second in order to better appreciate the whole impact. The strength of the first section is exactly the complex compilation of critical information and observations from a large and varied number of sources. This represents a unique and valuable attempt to create a detailed and extended dataset that can be used by the whole international community on which fundamental future studies of risk and impact can be based. In fact, most of the technical reports and newspapers used for this manuscript are not available anymore and, therefore, are not accessible to the international community.

Nonetheless, we agree that some of the references were not clear. As a result, we have improved the referencing and we have described how we have assessed the reliability of the source. In particular, as mentioned above, the data published in the newspapers about the characteristic of the tephra deposit was not considered reliable as large discrepancies were observed between deposit thickness measured in the field versus those reported in the media. When possible, newspaper articles were corroborated with MODIS and/or GOES satellite images.

Part 2 (essentially section 13 and parts of 14) is more quantitative, although short and not fully convincing methodologically (particularly last paragraph of sec, 13).

We have now extended section 13 in order to clarify the main assumptions and results. The methodology follows already published papers, which have already been widely accepted by the community:

Bonadonna, C.: Probabilistic modelling of tephra dispersion, in: L. J. (eds) Mader, H. M., Coles, S. G., Connor, C. B. & Connor (Ed.), *Statistics in volcanology (Special Pu.)*. London: Geological Society of London, 243-259, 2006.

Bonadonna, C., Macedonio, G. and Sparks, R.: Numerical modelling of tephra fallout associated with dome collapses and Vulcanian explosions: application to hazard assessment on Montserrat, in: Druitt T. and Kokelaar B. (Eds.), *The eruption of Soufrière Hills Volcano, Montserrat, from 1995 to 1999 (Memoirs of., Vol. 21, pp. 483–516)*, London: Geological Society of London, 2002.

- Bonadonna, C., Connor, C. B., Houghton, B. F., Connor, L., Byrne, M., Laing, A. and Hincks, T. K.: Probabilistic modeling of tephra dispersal: Hazard assessment of a multiphase rhyolitic eruption at Tarawera, New Zealand, *J. Geophys. Res.*, 110(10.1029), 2005.
- Biass, S., Frischknecht, C. and Bonadonna, C.: A fast GIS-based risk assessment for tephra fallout: the example of Cotopaxi volcano, Ecuador - Part II: vulnerability and risk assessment, *Nat. Hazards*, 65(1), 497–521, 2013.
- Biass, S., Scaini, C., Bonadonna, C., Folch, A., Smith, K., and Höskuldsson, A.: A multi-scale risk assessment for tephra fallout and airborne concentration from multiple Icelandic volcanoes - Part 1: Hazard assessment, *Nat. Hazards Earth Sys.* , 14(8), 2265–2287. doi:10.5194/nhess-14-2265-2014, 2014.