

Post-Eruption Recovery in Southern Chile

*Alexandra McKee (140125159), Rebecca Leitch (140188741), and Diana Luke (14362628)

BSc Geography, BSc Physical Geography



Introduction

The Calbuco volcano is classed as the third most active volcano in Chile (Lopez-Escobar *et al.*, 1977), yet there was only basic monitoring equipment and little public warning prior to the eruption in April 2015. A small pyroclastic flow, lahar and ash expulsion dominated the immediate products (Romero *et al.*, 2016) however little is known about the effects post-eruption once normative fluvial and ecological processes begin to dictate. Our interest is focused in this time period on the study of the fluvial and environmental processes affected by the Calbuco eruption.

Aims

- Analyse the geomorphology of the Río Blanco Este to assess whether the river will return to its pre-eruption state
- Characterise stratigraphic columns to determine the chronology of the recent deposits from the lahar flow
- Survey the ecological disturbance on flora and fauna and examine how the impacts differ due to topography and elevation



Location



Río Blanco Este

Results



Figure 1A: July 2015



Figure 1B: July 2016



Figure 1C: August 2016

Figure 1 shows comparative imagery of the lower site at various timescales. Since July 2015 the main channel has avulsed away from the bank. Between July 2016 and August 2016, the channel has again altered, returning to previously-cut palaeochannels.

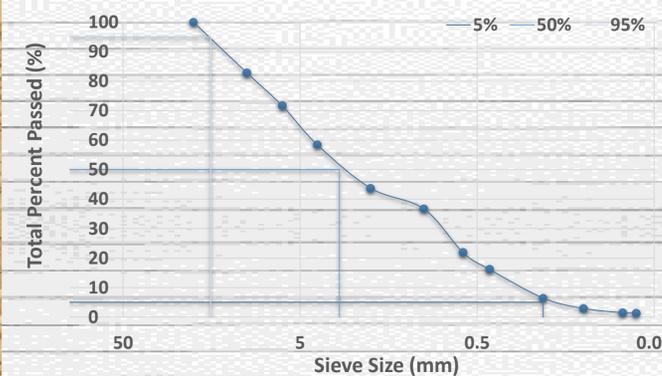


Figure 2: Grain-size distribution curve taken from the first stratigraphic column analysed

Figure 2 shows that less than 5% of sample 1 can be classified as silts (<0.0625mm), according to Wentworth's (1922) class sizes. The majority of the sample consists of sands, granules and pebbles.

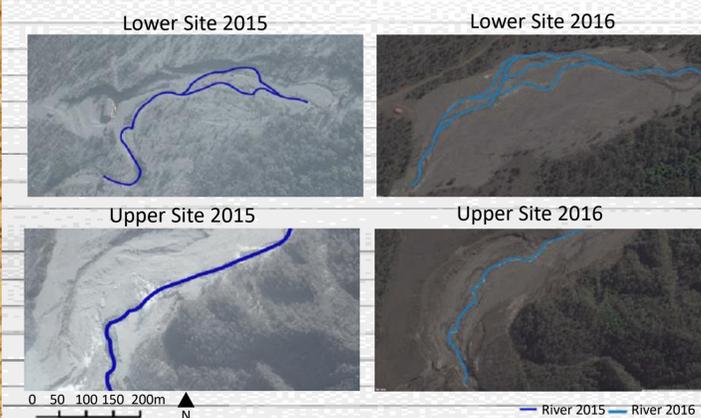
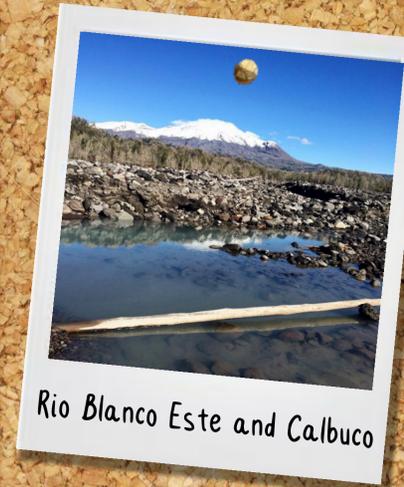


Figure 3: A comparison of the impacts of the eruption using aerial imagery on QGIS.

Figure 3 shows that more vegetation was closer to the river at the upper site pre-eruption, therefore more vegetation loss has occurred at this site since 2015. Both sites featured extensive lateral erosion of the Río Blanco, up to 121m at the lower site.



Río Blanco Este and Calbuco



Team photo

Conclusions

- The Río Blanco Este cannot return to its pre-eruptive state due to excessive geomorphic change since April 2015
- Sand, granules and pebbles dominate the majority of sediment within stratigraphic columns at both sites
- Greater vegetation loss at the upper site due to the proximity of the vegetation to the eruption and river

References

- Lopez-Escobar, L., Frey, F., Vergara, M. (1977) Andesites and high-alumina basalts from the central-south Chile high Andes: Geochemical evidence bearing on their petrogenesis. *Contributions to Mineralogy and Petrology*, Vol. 63 (3), pp. 199 – 228.
- Romero, J. E., Morgavi, D., Arzilli, F., Daga, R., Caselli, A., Reckziegel, F., Viramonte, J., Díaz-Alvarado, J., Polacci, M., Burton, M., Perugini, D. (2016) Eruption dynamics of the 22–23 April 2015 Calbuco Volcano (Southern Chile): Analyses of tephra fall deposits. *Journal of Volcanology and Geothermal Research*, Vol. 317, pp. 15 – 29.
- Wentworth, C. (1922) A Scale of Grade and Class Terms for Clastic Sediments. *The Journal of Geology*, Vol. 30 (5), pp. 377 – 392.

For more information, please contact A.G.McKee1@ncl.ac.uk or visit our blog: <http://amckee11.wixsite.com/chileexpedition>