

Lessons learned from a large number of samples collected at Ruapehu and analysed for cosmogenic nuclide analyses.

At Ruapehu, most lava flows (andesites or basaltic andesites in their vast majority) are 'a'ā flows, and as such, present no ropy texture. In contrast, surface morphologies can be recognized by their rough, irregular texture.

Here, we present a variety of pictures displaying:

- [Samples interpreted to show original surface morphologies with similar cosmogenic \$^3\text{He}\$ concentrations compared to other samples from the same flow](#)
- [Surfaces with evident erosion or broken parts, not ideal for surface exposure dating.](#)
- [Samples that yielded low cosmogenic \$^3\text{He}\$ concentrations compared to other samples from the same flow \(outliers\)](#)
- [Samples that yielded slightly higher cosmogenic \$^3\text{He}\$ concentrations compared to other samples from the same flow.](#)

Samples interpreted to show original surface morphologies with similar cosmogenic ^3He concentrations compared to other samples from the same flow



Above: sample SC-PD002.

Below: sample MN-PD217





Above: sample PR-PD083. Detail of spatter sheet surface.

Below: sample BR-PD014.

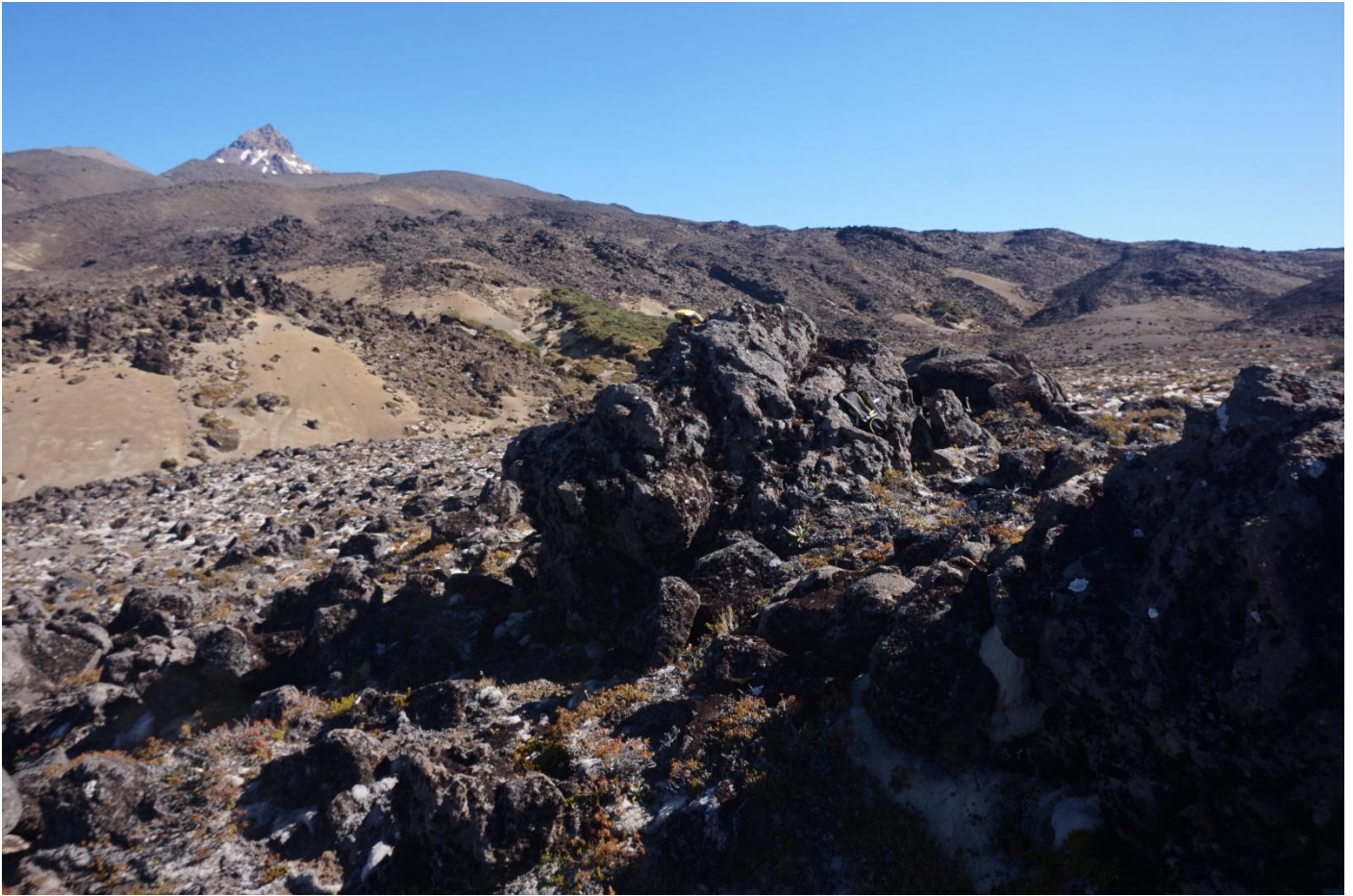




Above: sample SC-PD093

Below: sample MA-PD058





Above and below: sample NR-PD053





Above: sample RTm-PD045

Surfaces with evident erosion or broken parts, not ideal for surface exposure dating.



Above: lava flow surface with rough, irregular surface (in front of notebook) and smooth surface (behind the notebook), suggesting that part of the original deposit has fallen.

Below: tumuli with smooth surfaces and/or broken blocks visible around should be avoided.





Not well-consolidated deposits are not suitable for surface exposure dating.

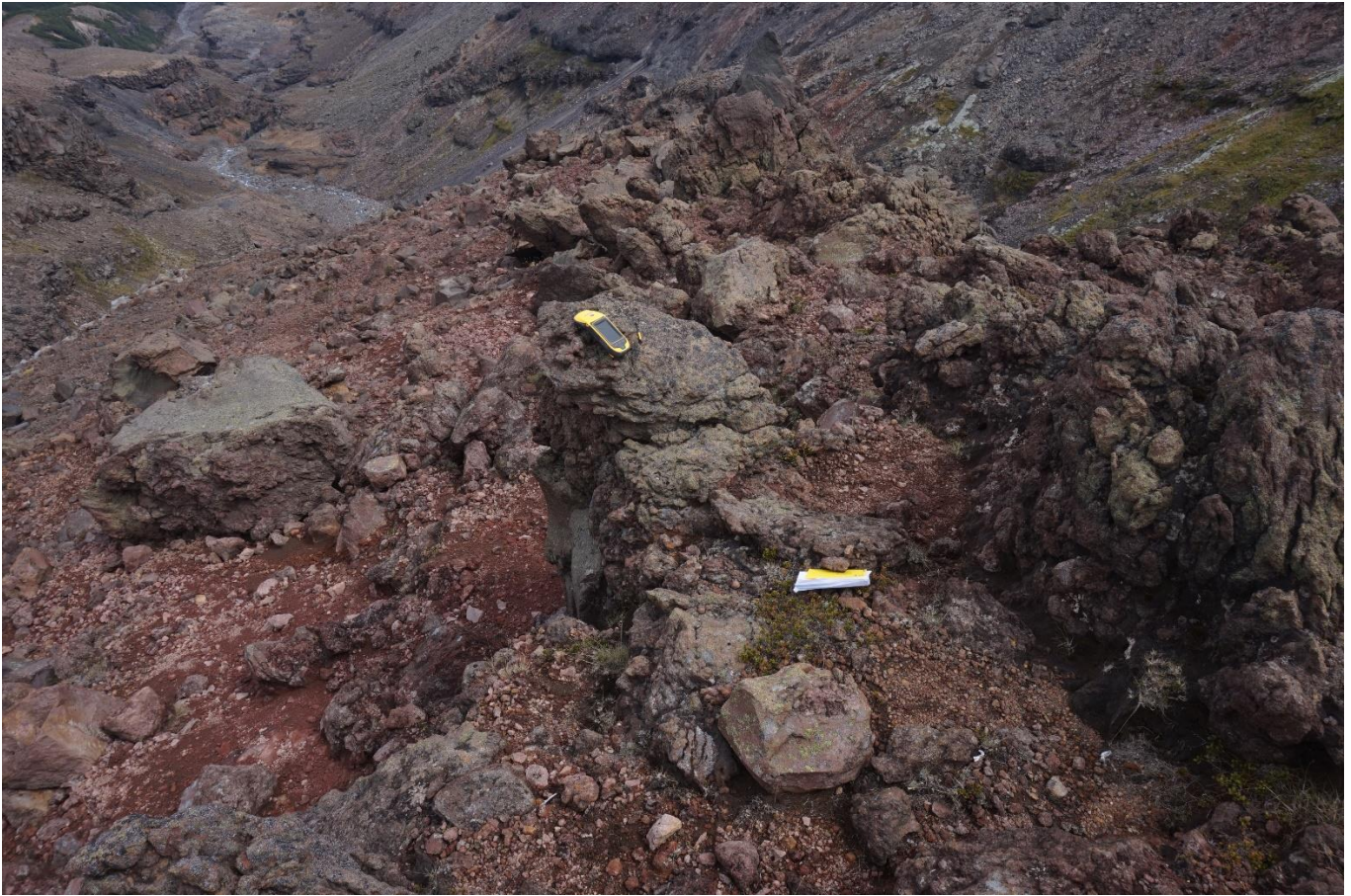


Lavas with smooth (likely eroded) surfaces, not suitable for surface exposure dating.

Lava flows covered with debris are not suitable for surface exposure dating. Photo from the Whakapapa ski field.



Samples that yielded low cosmogenic ^3He concentrations compared to other samples from the same flow (outliers)



Above: sample MN-PD219. The fresh surface (below and left from GPS) could explain a recent change in the cosmogenic ray influx on the rock's surface.

Below: sample LC-PD256. The outlier could be explained by a small amount of local erosion, shielding from a now collapsed neighbouring lava tumuli (and hence an underestimation of the shielding factor) or a period of tephra cover that could have reduced the ^3He production on the surface of LC-PD256





Above and below: sample RTm-PD048. A fresh surface below the sampled block could indicate rotation of an adjacent block.





Above and below: sample CTb-PD231. A fresh surface next to the sampled site (where the GPS lies) block indicate a possible erosion of part of the outcrop. Additionally, remaining debris suggest possible past cover of the surface in the past.





Above and below: sample TC-PD066. A fresh surface next to the sampled site (left from the GPS on the bottom photography) block indicate a possible erosion of part of the outcrop.



Samples that yielded slightly higher cosmogenic ^3He concentrations compared to other samples from the same flow.



Above and right: sample BR-PD018. The narrow spike from where the sample was taken from (see notebook in picture above) could have resulted in an overestimation of the real sample thickness, which in turn would mean an older exposure age based on its cosmogenic ^3He concentration.

