

Magma transport in the shallow crust

The dykes of the Chachahuén volcanic complex (Argentina)

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1. Introduction

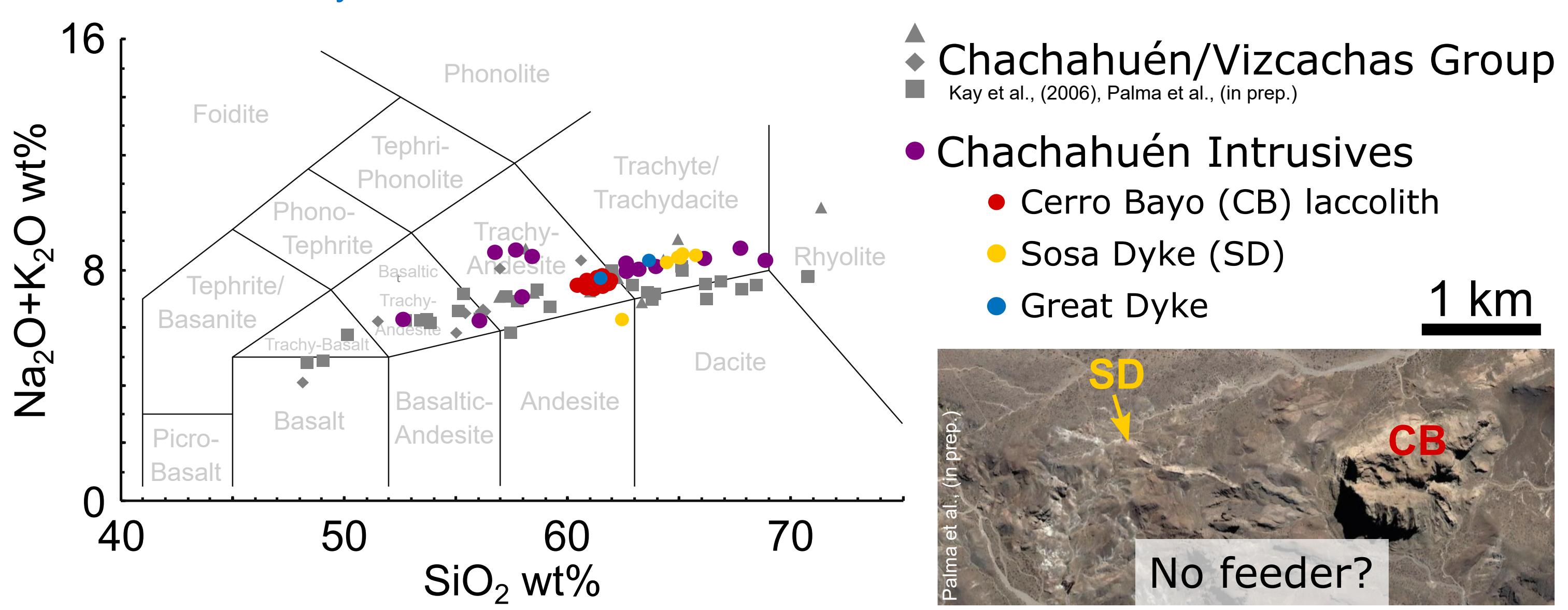
Question: What controls lateral magma transport?



Hypothesis: Magma rheology is one of the primary parameter for magma transport

How to test: Analysis of intrusion geometry in comparison with the magma rheology

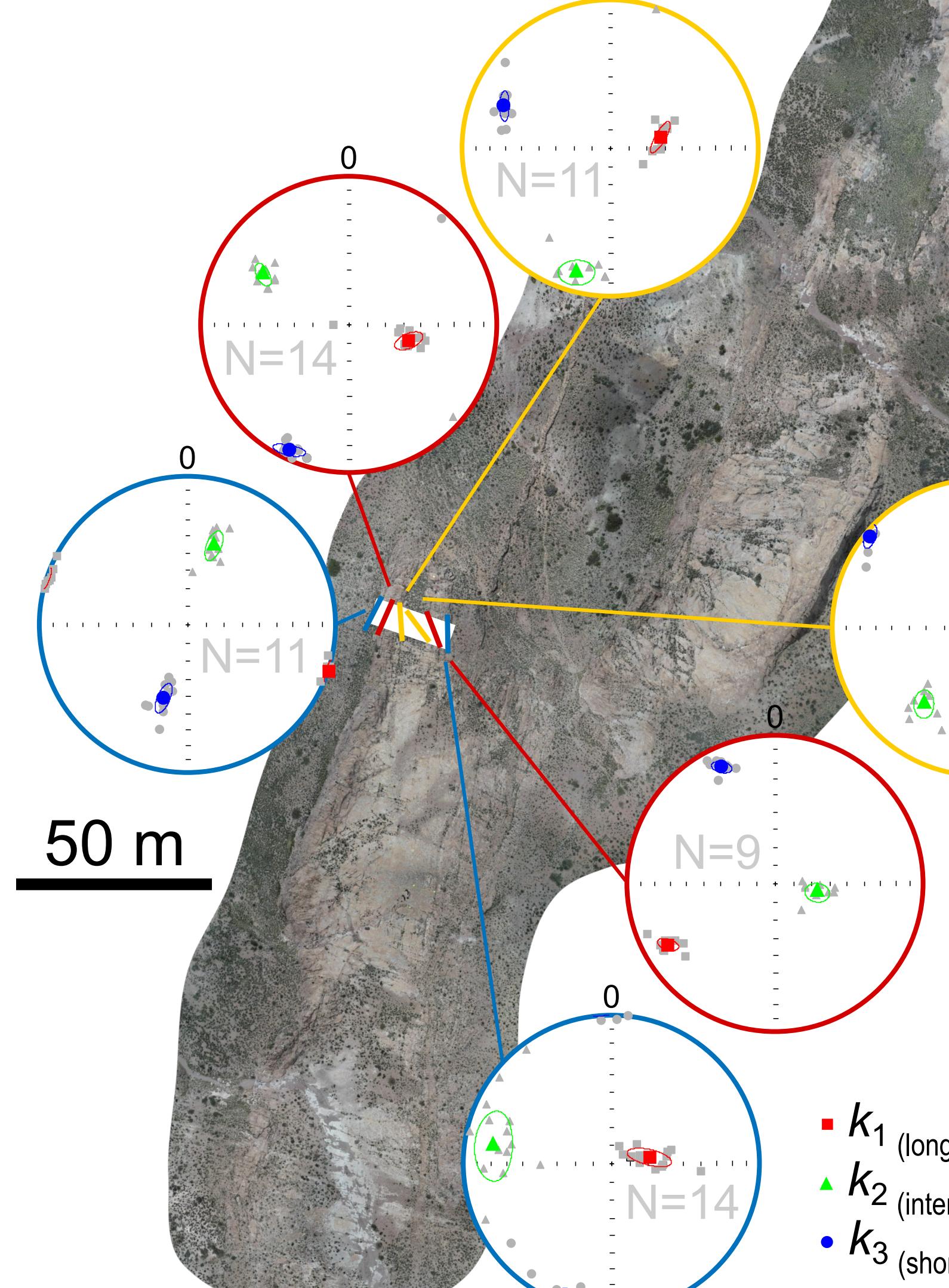
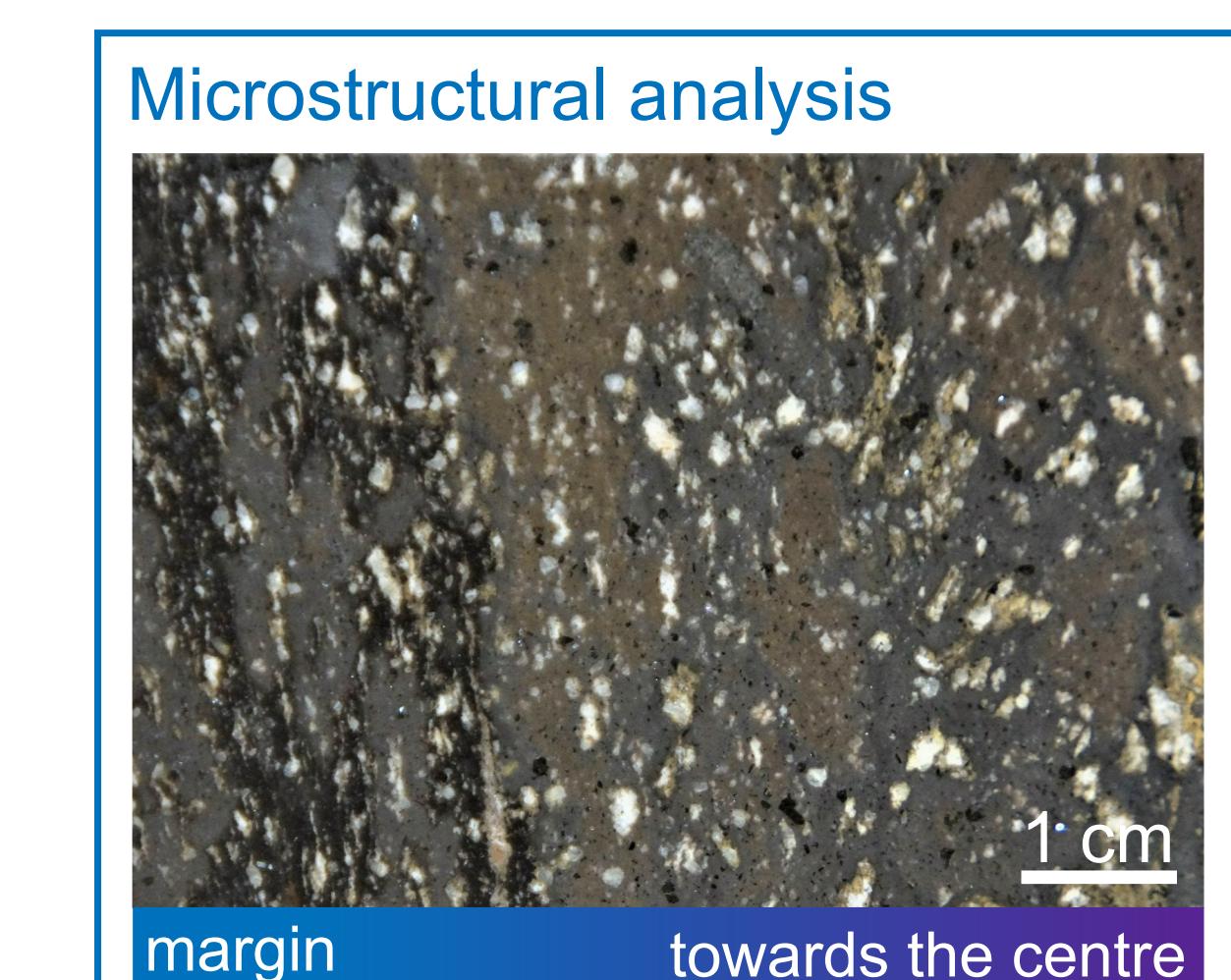
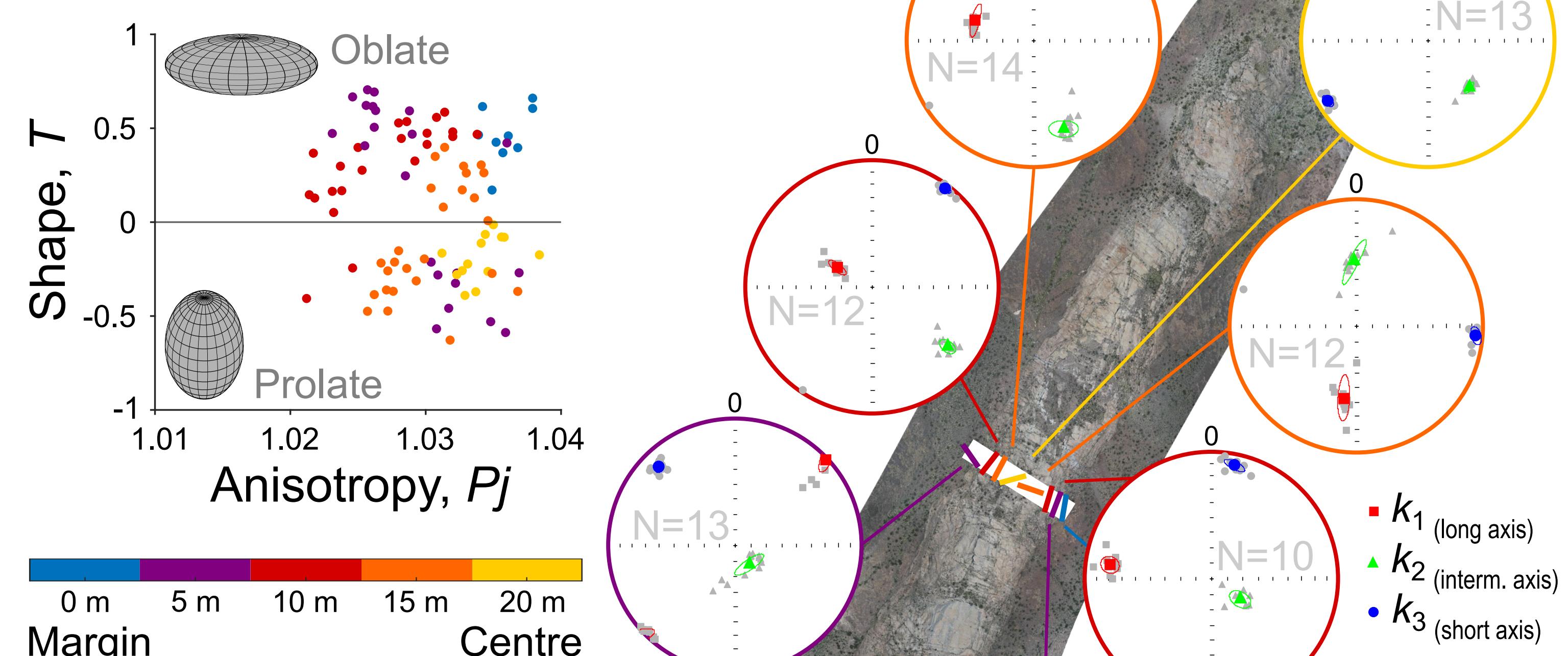
Geo-chemical analysis



2a. The Sosa Dyke

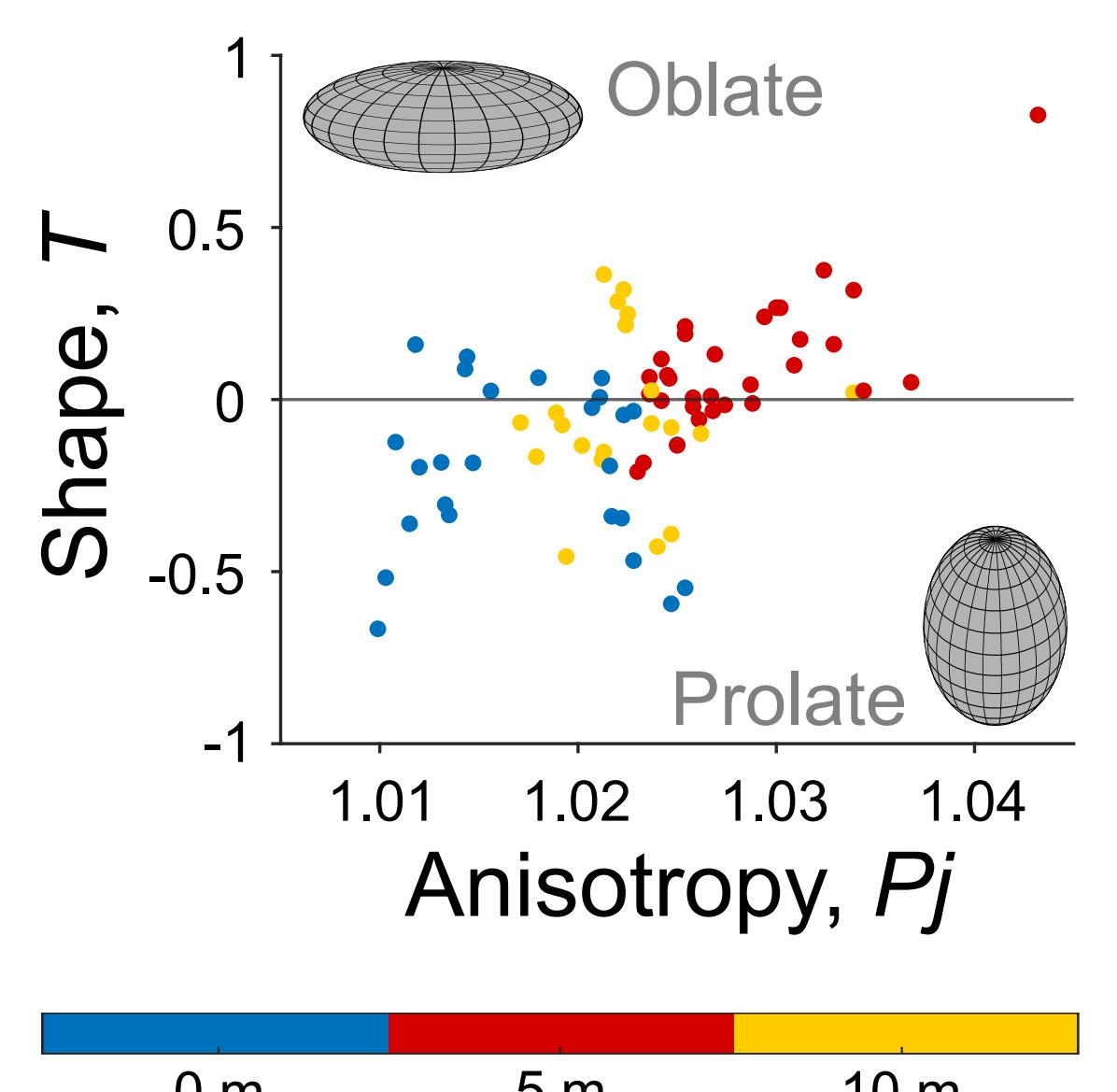
Traverse 1 (sample spacing: 5 m)

Anisotropy of magnetic susceptibility (AMS)

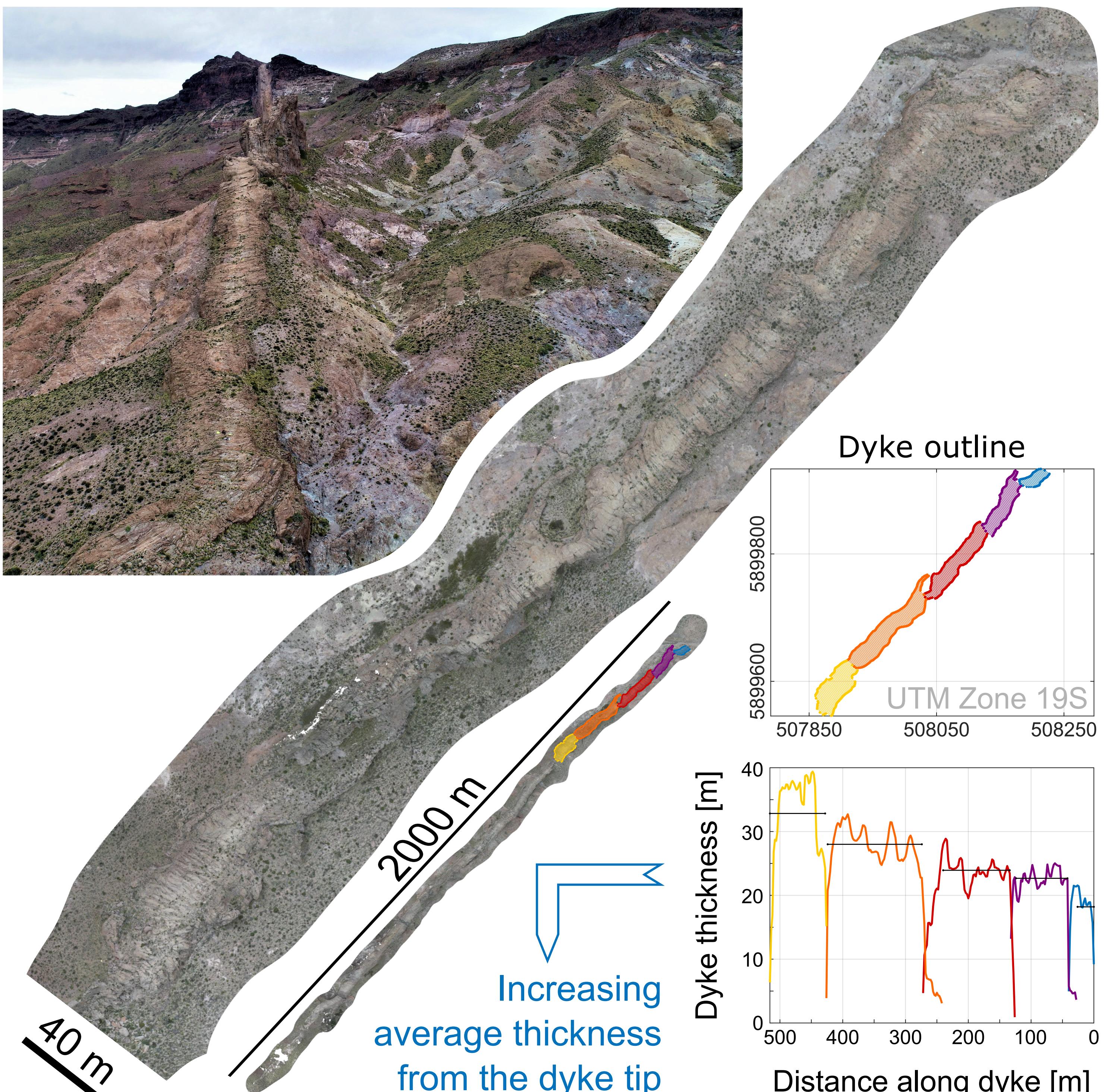


Traverse 2
(sample spacing: 5 m)

Anisotropy of magnetic susceptibility (AMS)



2b. The Great Dyke



3. What's next?

Fourier Transform InfraRed Spectroscopy

H₂O of the glassy margin
► Initial meltviscosity

Microstructural analysis (TS, EBSD)

Crystal size/shape/volume
► Flow properties

Magma-viscosity/rheology

Magma-Transport Model

2D/3D structural mapping

Dyke morphology

References:

- Burchardt, S., Mattsson, T., Palma, J.O., Galland, O., Almqvist, B.S.G., Mair, K., Jerram, D.A., Hammer, Ø. and Sun, Y. (2019) Progressive growth of the Cerro Bayo cryptodome, Chachahuén volcano, Argentina - Implications for viscous magma emplacement. *JGR - Solid Earth*, 124.
- Kay, S.M., Mancilla, O., and Copeland, P. (2006) Evolution of the late Miocene Chachahuén volcanic complex at 37°S over a transient shallow subduction zone under the Neuquén Andes, in Kay, S.M., and Ramos, V.A., eds., *Evolution of an Andean margin: A tectonic and magmatic view from the Andes to the Neuquén Basin (35°–39°S lat)*: GSA Special Paper 407, p. 215–246, doi: 10.1130/2006.2407(10).
- Palma, J.O., Burchardt, S., Galland, O., Schmiedel, T., Jerram, D.A., Mair, K., Lanza, H.A. (in prep.) Structure and evolution of the shallow plumbing system of a back-arc volcano -The case of Chachahuén Volcano, Argentina.

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