

Can Low-Temperature Thermochronology Constrain Quaternary Glacial Erosion? A Case Study from the Tauern Window, Eastern European Alps

Isabel Wapenhans¹, Peter van der Beek¹, Cody Colleps¹, Maxime Bernard^{1,2}, Lingxiao Gong¹, Apolline Mariotti³, Julien Amalberti¹

1 Institute of Geosciences, University of Potsdam, Germany
2 Faculty of Geosciences and Environment, University of Lausanne, Switzerland
3 GFZ German Research Centre for Geosciences, Potsdam, Germany



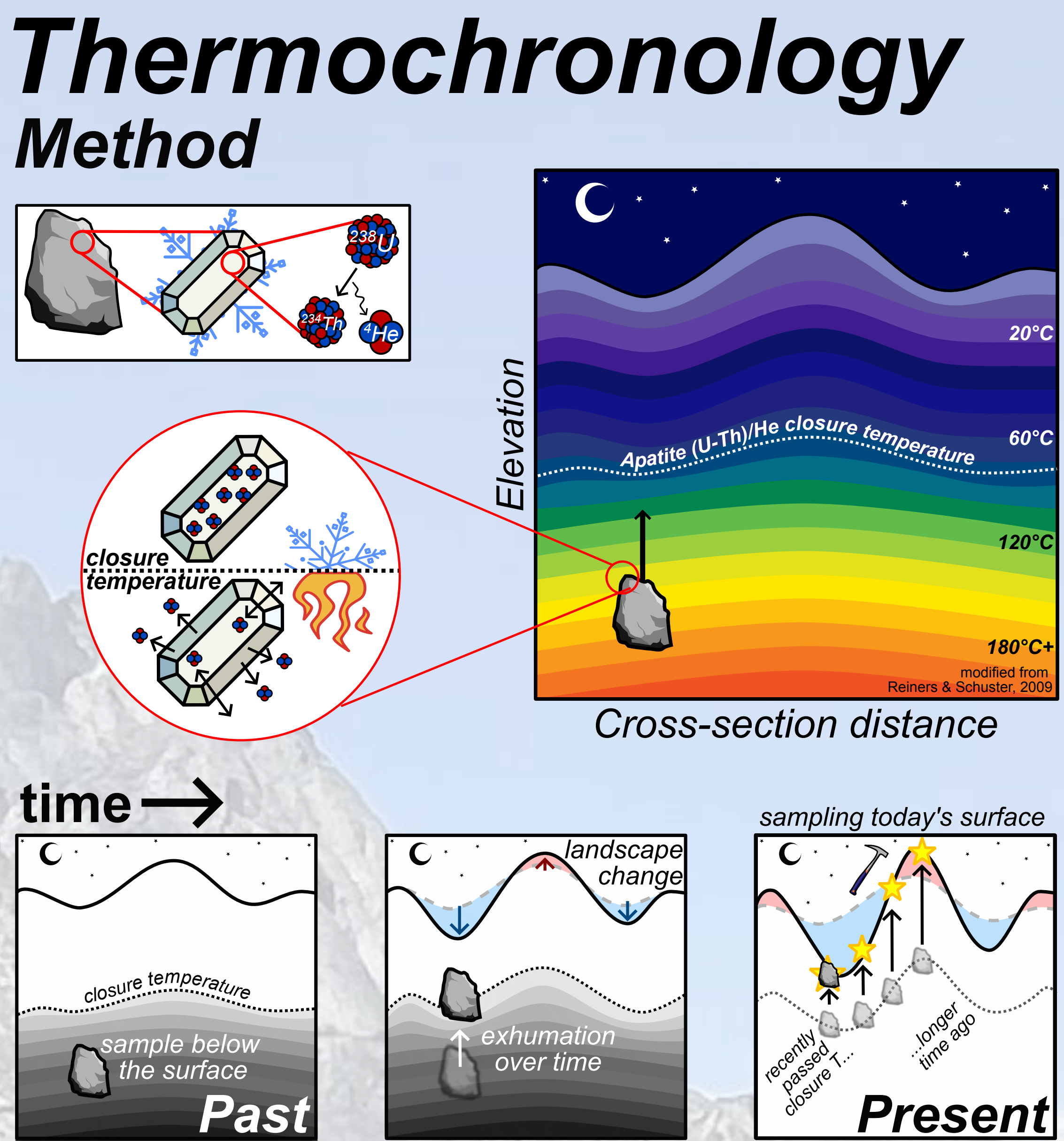
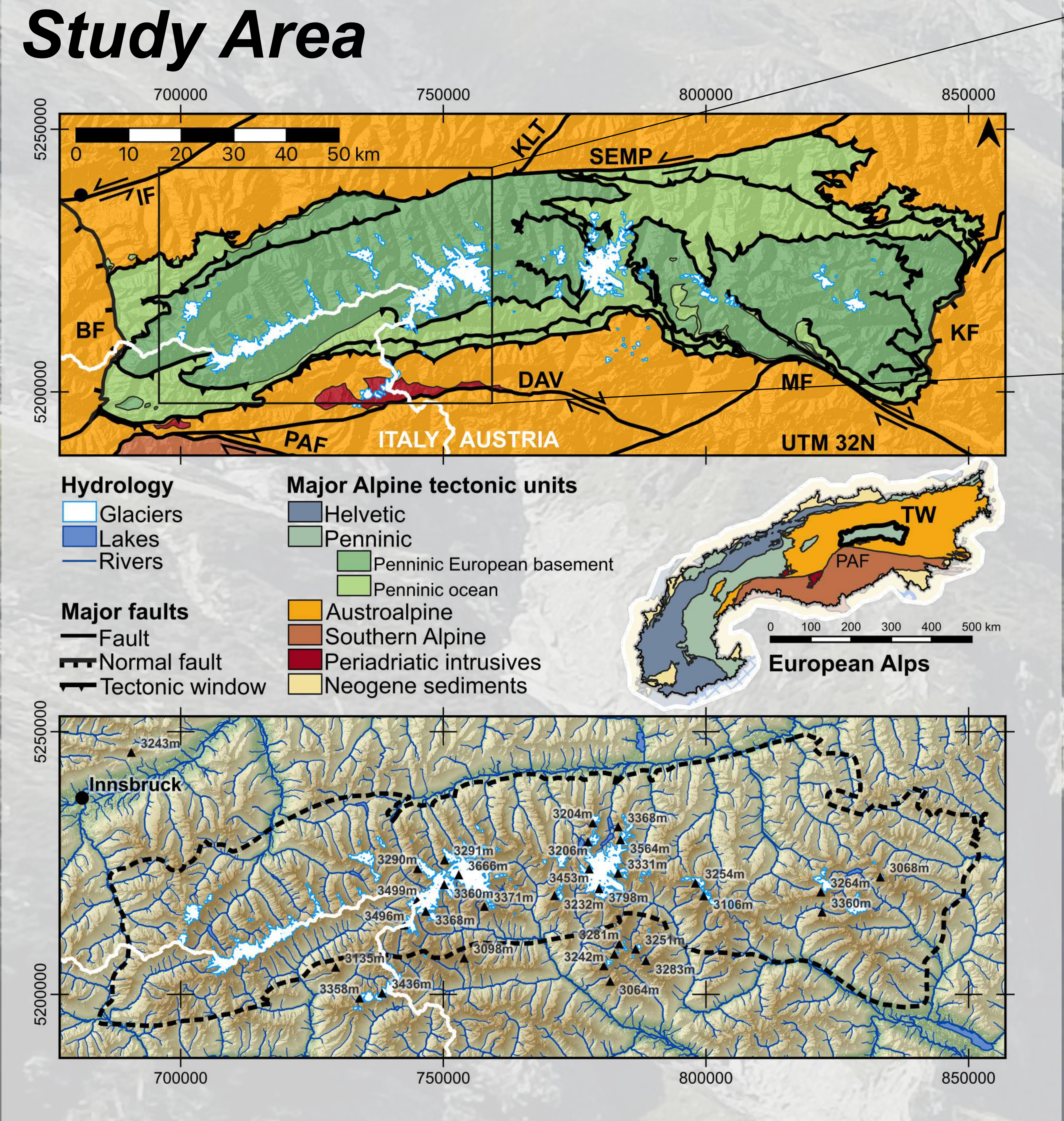
Motivation

- Quantify Pliocene-Quaternary glacial erosion in a study area that records recent exhumation with low-temperature thermochronology

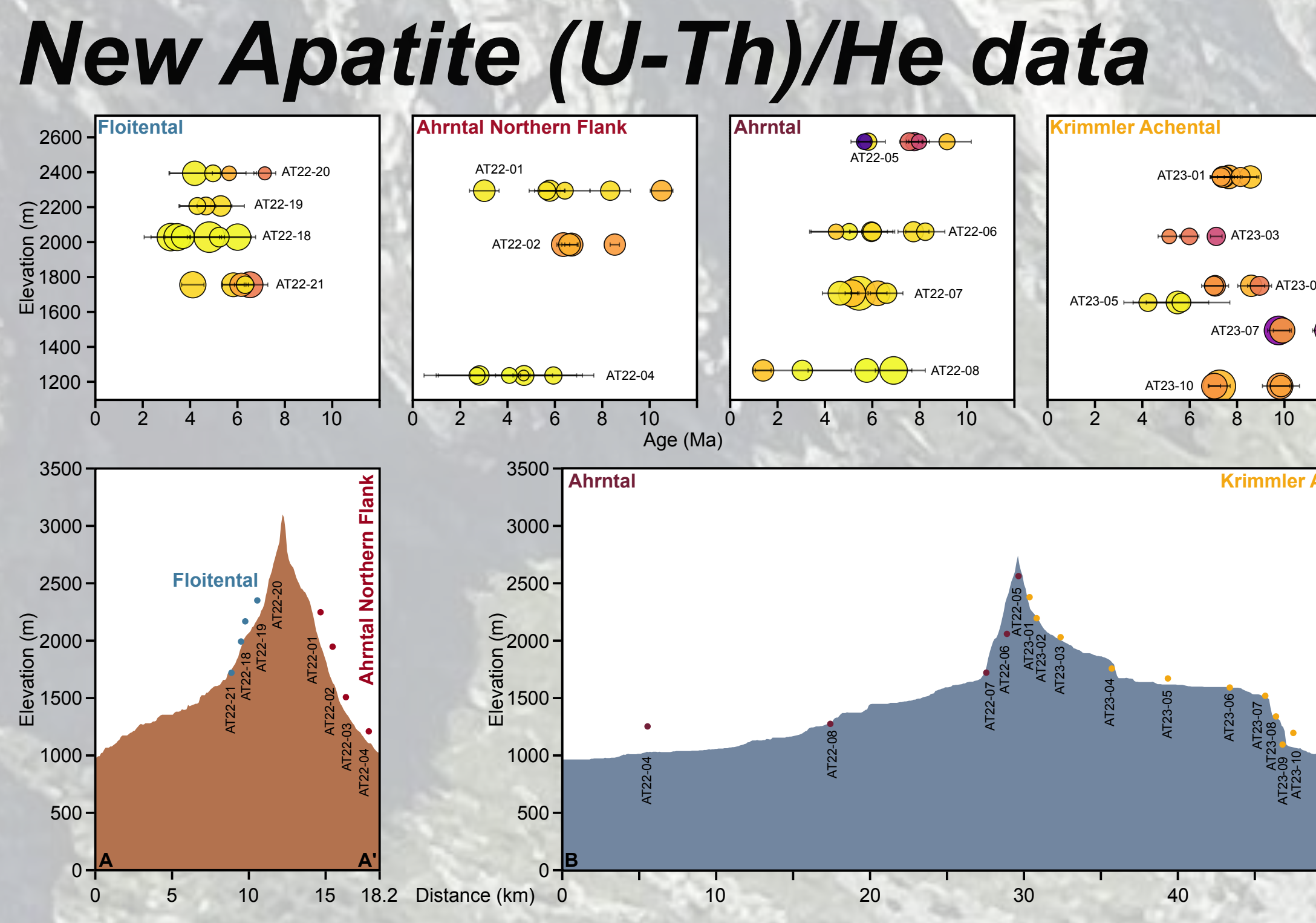
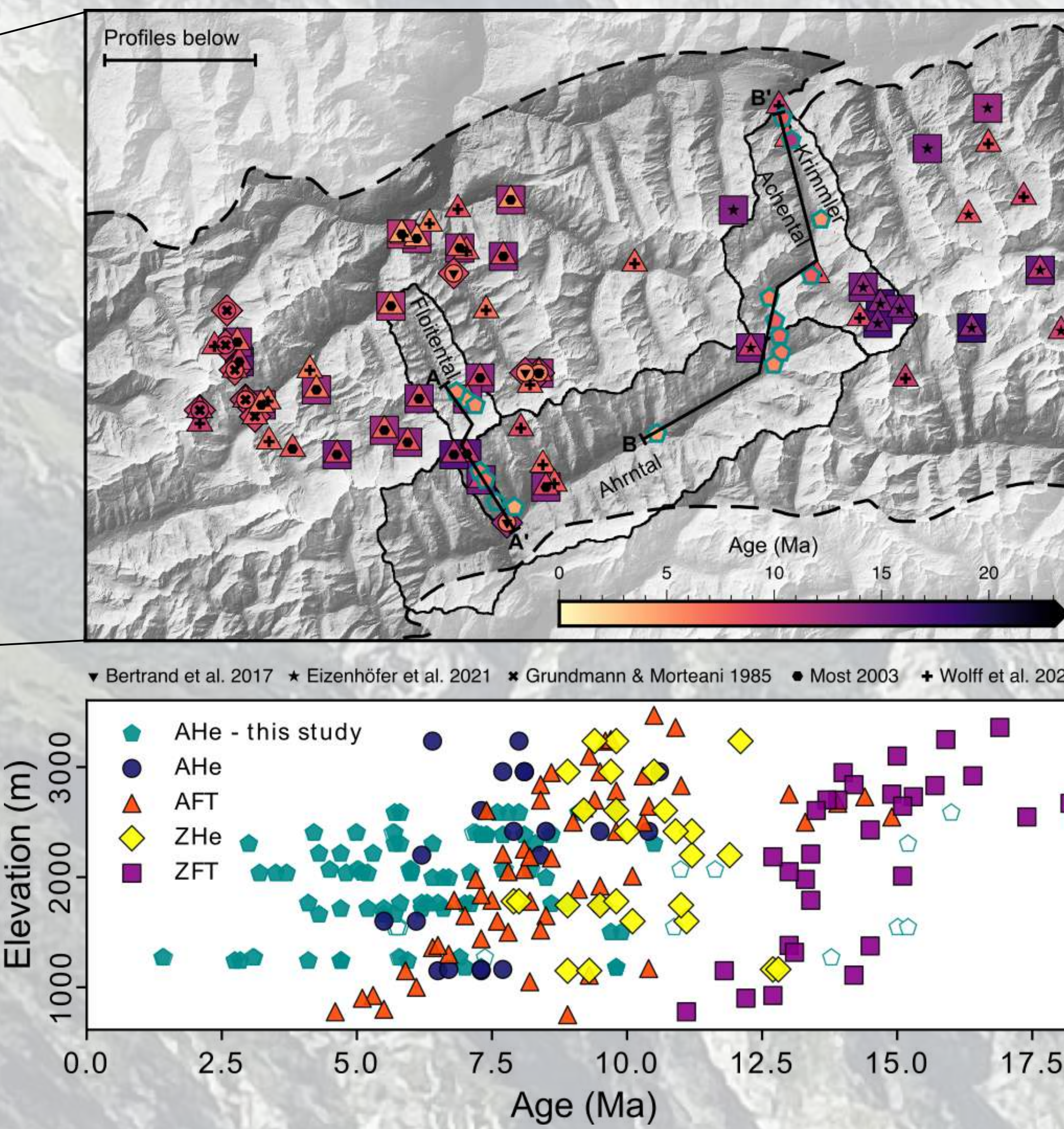
Aims

In the recently exhumed Tauern Window we:

- Improve constraints on tectonic exhumation using large published dataset
- Investigate the data's ability to resolve glacial landscape incision at various scales
- Compare $^4\text{He}/^3\text{He}$ results to (U-Th)/He results

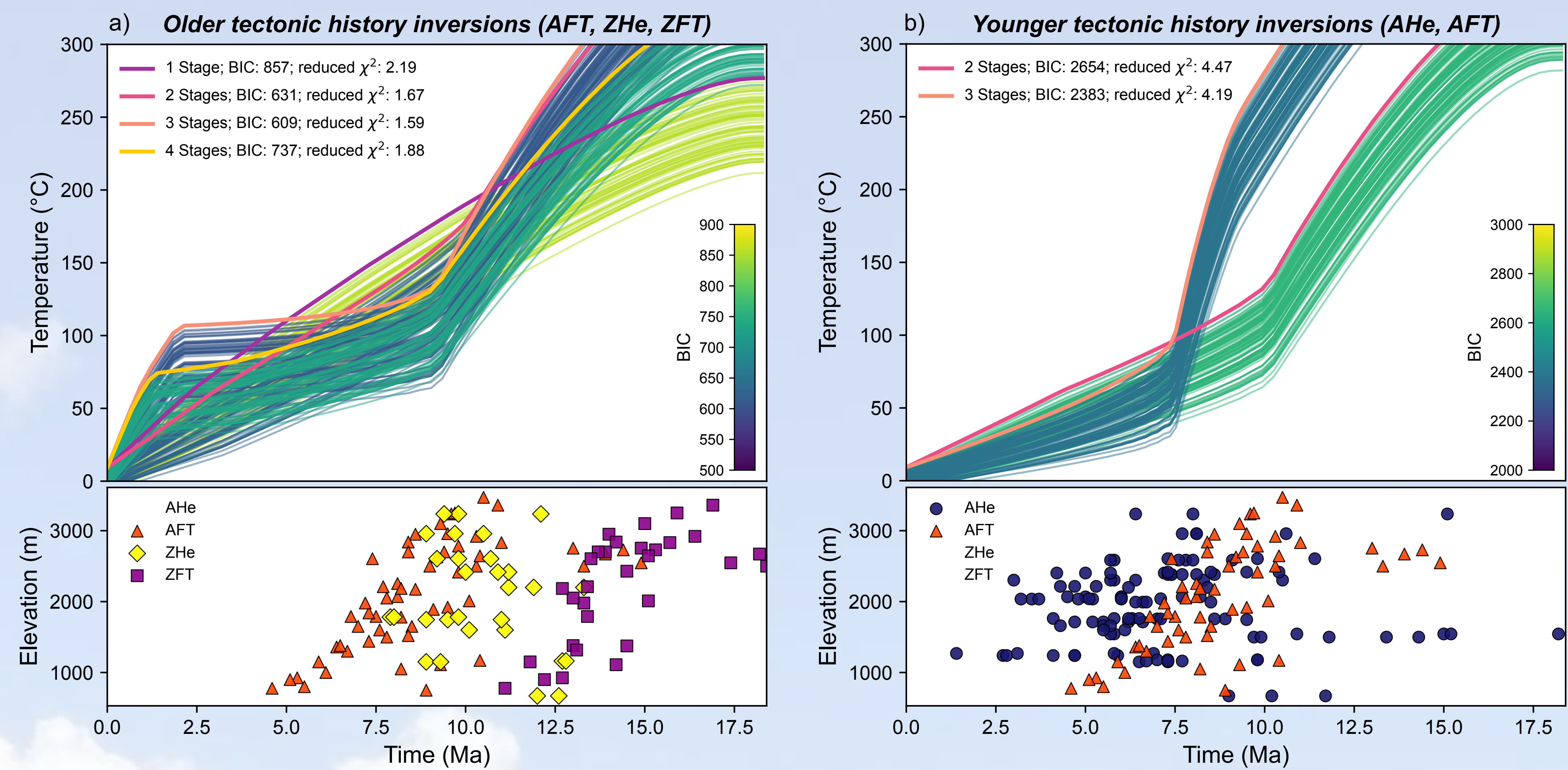


In the Western Tauern Window

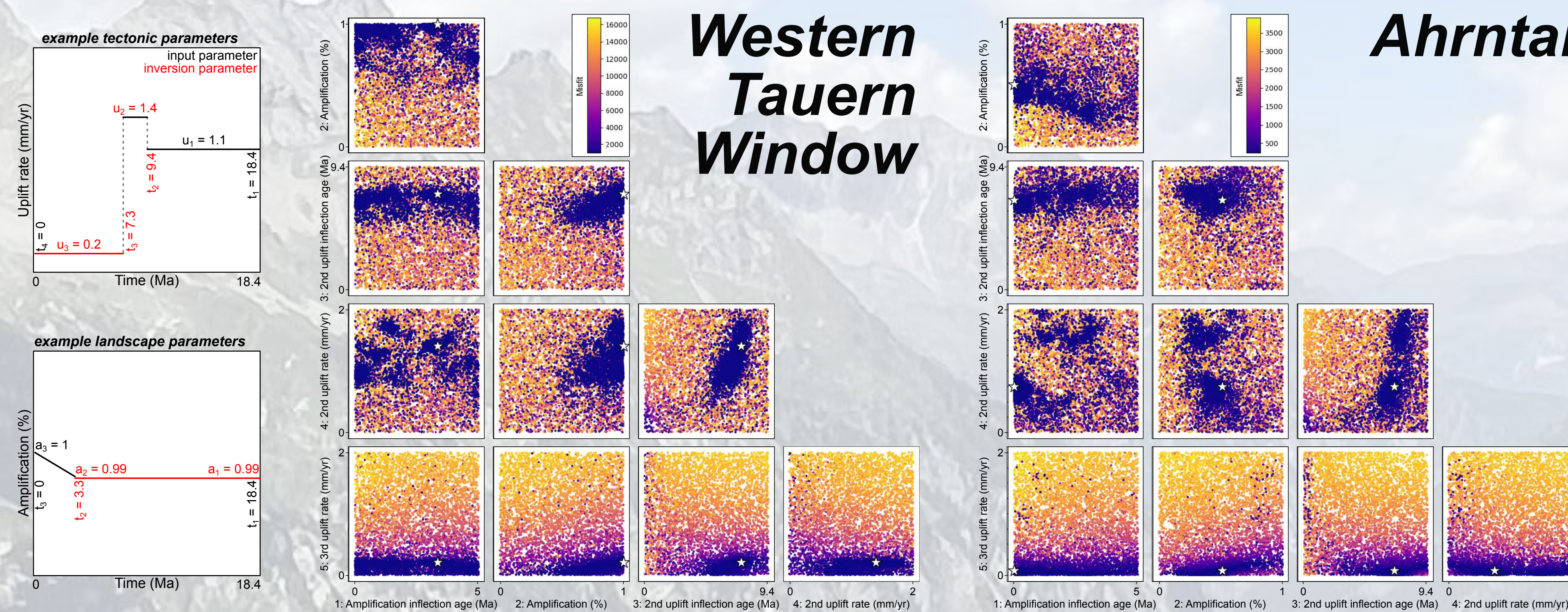


3D Thermal-kinematic Modelling

Tectonic history in PecubeGUI

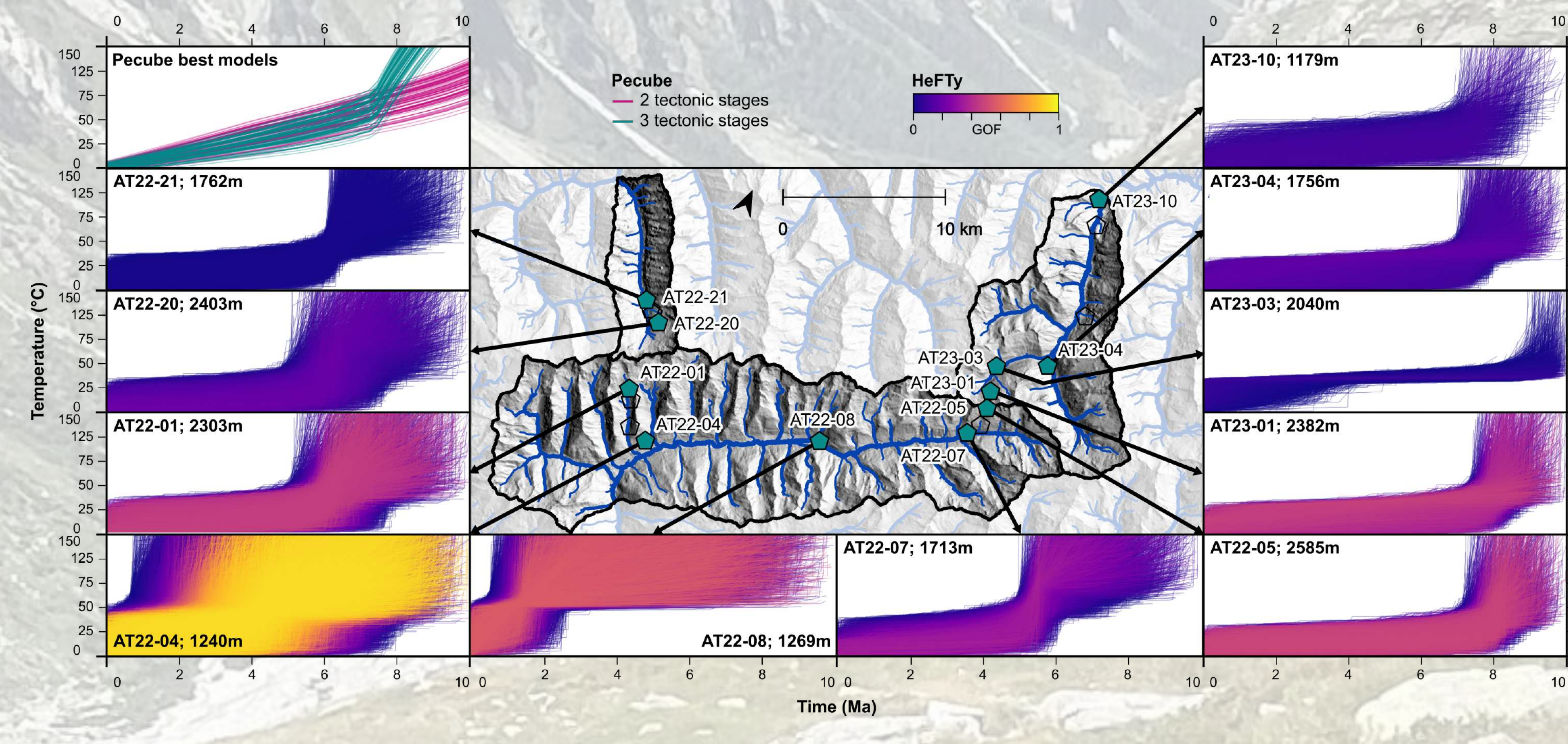


Landscape Incision



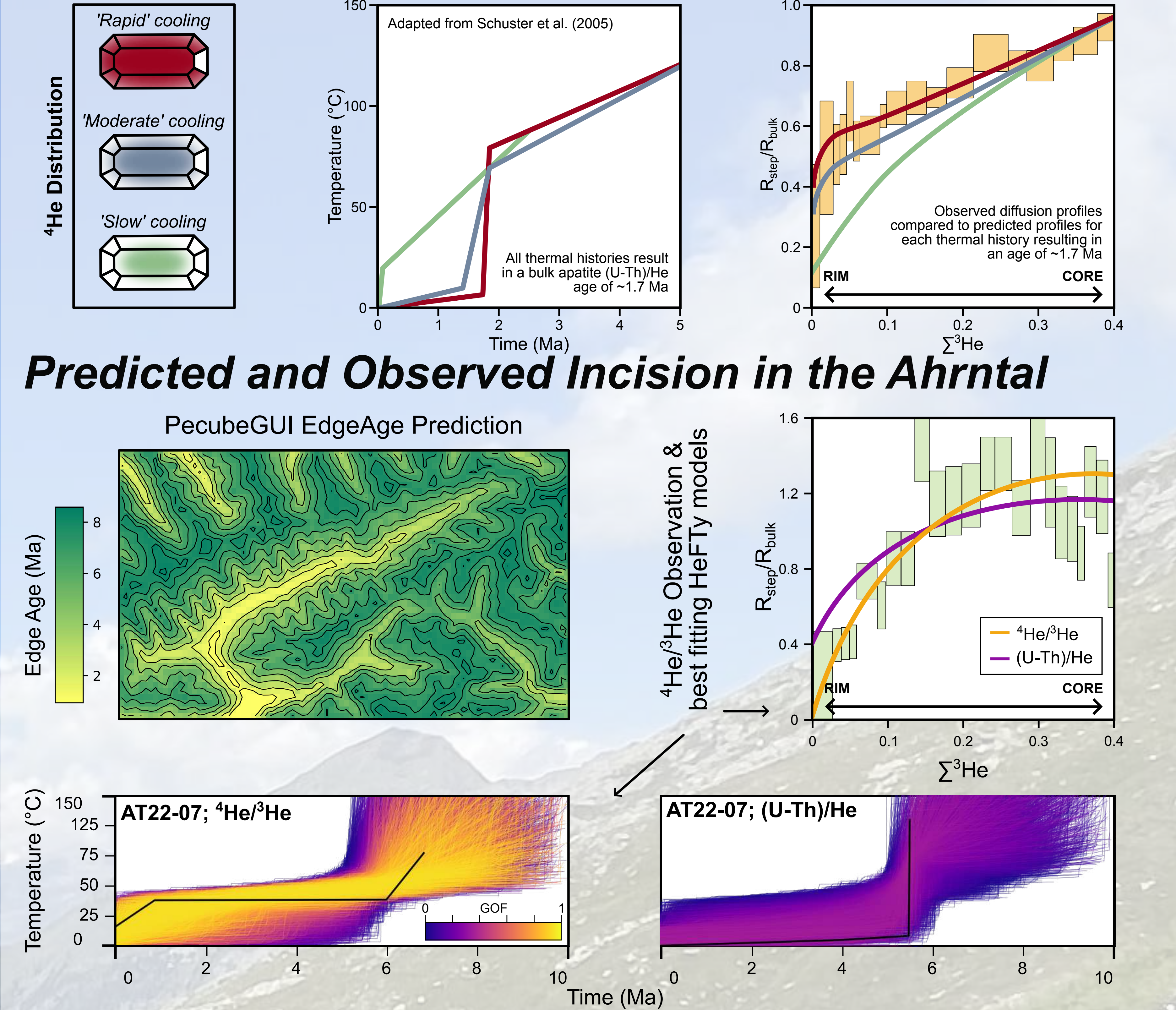
1D Thermal Modelling per sample

Stronger incision along valley bottom (HeFTy)



Improvements with $^4\text{He}/^3\text{He}$

Method



Conclusions & Outlook

- Overlooking effect of landscape change results in overestimated tectonic uplift rates
- Glacial incision is elevation- & valley scale-dependent; this signal is drowned out in studies using large datasets
- $^4\text{He}/^3\text{He}$ significantly constrains exhumation

wapenhans@uni-potsdam.de

