**Appendix 4.** Thermal history model input table

|  |
| --- |
| 1. **Thermochronologic dataSamples and data used in simulations**
 |
|  | Used for modelling? | All data used for modelling published? |
| (U-Th)/He data | Not used for modelling (no appropriate geometry setting available for all crystals) | Table 3 and 4 (this paper) |
| AFT data | Yes | Appendix 2 |
| Track length data | Yes | Appendix 2 |
| Kinetic parameter: Dpar (4 manual measurements/grain) | Yes | Appendix 2 |
| **Data treatment** | Details |  |
| *AHe data* |  |  |
| Standards used during analysis | Durango apatite standard bracketing | Protocol: see methods and Appendix 1 of Wildman *et al.* (2017) |
| AHe data reduction | FT correction factors calculated based on the geometry of each single crystal using using HelioCalc (<https://www.ucl.ac.uk/~ucfbpve/heliocalc/>) designed by P. Vermeesch using the model of Ketcham *et al.* (2011) He ages discarded based on incomplete degassing after second laser treatment |  |
| *AFT data* |  |  |
| Apatite fission track counting analysis  | 5.5M HNO3 etchant, 21°C, 20swell-thermalized channel X26 (Mol, Belgium)none of the single grain analysis were deleted after analysis in order to retain the samples possible populationsRepositioning technique, Goodfellow U-free micaIRRM-540 U-doped glassesTINTs, TINCLEs and 252Cf tracks are used for some samples due to the low spontaneous track densityDpar: 4 measurements/grain | Protocol: see Nachtergaele *et al.* (2018) |
| Standards used during analysis  | Fish Canyon Tuff apatite and Durango apatite |  |
| 1. **Additional geologic information**
 |
| No temperature constraints were added. Prior was chosen as central age ± central age, as argumented by Van Ranst et al. (re-submitted) to reduce the “prior-effect”.  |  |  |
| 1. **System and model-specific parameters**
 |
| Optical configuration | Nikon Eclipse Ni-E microscope equipped with a DS-Ri2 camera using 2000x magnification |  |
| FT annealing model: (Ketcham *et al.* 2007b) |  |  |
| c-axis projection is used for modeling  | See Ketcham *et al.* (2007a) |  |
| Cf-irradiation for some samples | Only KM-14B benefited from Cf-irradiationAppendix 5: KM-07, KM-14A and KM-15 also benefited from Cf-irradiation |  |
| Optical configuration | Nikon Eclipse Ni-E microscope equipped with a DS-Ri2 camera using 2000x magnification |  |
| QTQt version 5.6.0 (January 2017) | Prior: central age ± central age; 70±70°C Burn-in: 104; post-burn-in: 106 iterationsMCMC chain converged when acceptance rates were reasonable and in balanceKM-14B: proposal step of 10 Ma and 14°C NT-02: proposal step of 10 Ma and 14°CAppendix 5: KM-07: proposal step of 10 Ma and 14°CAppendix 5: KM-14A: proposal step of 10 Ma and 14°CAppendix 5: KM-15: proposal step of 10 Ma and 14°CModel predictions vs. observed: see Figure 7 and appendix 5 |  |

References:

Ketcham, R.A., Carter, A., Donelick, R.A., Barbarand, J. & Hurford, A.J. 2007a. Improved measurement of fission-track annealing in apatite using c-axis projection. *American Mineralogist*, **92**, 789–798, https://doi.org/10.2138/am.2007.2280.

Ketcham, R.A., Carter, A., Donelick, R.A., Barbarand, J. & Hurford, A.J. 2007b. Improved modeling of fission-track annealing in apatite. *American Mineralogist*, **92**, 799–810, https://doi.org/10.2138/am.2007.2281.

Ketcham, R.A., Gautheron, C. & Tassan-Got, L. 2011. Accounting for long alpha-particle stopping distances in (U-Th-Sm)/He geochronology: Refinement of the baseline case. *Geochimica et Cosmochimica Acta*, **75**, 7779–7791, https://doi.org/10.1016/j.gca.2011.10.011.

Nachtergaele, S., De Pelsmaeker, E., et al. 2018. Meso-Cenozoic tectonic evolution of the Talas-Fergana region of the Kyrgyz Tien Shan revealed by low-temperature basement and detrital thermochronology. *Geoscience Frontiers*, **9**, 1495–1514, https://doi.org/10.1016/J.GSF.2017.11.007.

Van Ranst, G., Pedrosa-Soares, A.C., Novo, T., Vermeesch, P., De Grave, J. (re-submitted). New insights from low-temperature thermochronology into the tectonic and geomorphologic evolution of the southeast Brazilian highlands and passive margin. *Geoscience Frontiers*

Wildman, M., Brown, R., et al. 2017. Contrasting Mesozoic evolution across the boundary between on and off craton regions of the South African plateau inferred from apatite fission track and (U-Th-Sm)/He thermochronology. *Journal of Geophysical Research: Solid Earth*, **122**, 1517–1547, https://doi.org/10.1002/2016JB013478.