

## SUPPORTING INFORMATION - FIGURE AND TABLE CAPTIONS

**Figure SI 1.** Apatite fission track data from samples; including radial plots displaying single grain AFT age distributions for each sample and confined fission-track length histograms for each sample and other parameters, where  $n$  = number of confined fission-track length measurements included in the histogram and MTL = the mean track length for that sample. Radial plots (Galbraith, 1990) were constructed using RadialPlotter (Vermeesch, 2009). The age for each point on a radial plot is obtained by projecting a line from the origin through the single-grain age (circles) to the radial age axis. All points have the same size error bar corresponding to the axis about the origin on the left showing  $\pm 2\sigma$ . The further a point plots to the right of the origin, the more precise the individual grain age, as seen by the horizontal precision axis directly below the plot. The color assigned to each individual point shifts from yellow to red with increasing Dpar value. Next to each sample name,  $n$  = number of grains analysed to obtain the age.

**Table SI 1.** Detailed apatite fission track information for all samples analysed. Table information is in a similar format to that for HeFty modeling (note Pcorr = U content in ppm).

**Table SI 2.** Electron microprobe analyses of representative D- and A-apatite grains.

**Table SI 3.** Step heating data and calculations of parameters arising from the diffusion experiments.

