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Corrigendum

Corrigendum to "A helium-based model for the effects of radiation damage annealing on helium diffusion kinetics in apatite" [Earth Planet. Sci. Lett. 477 (2017) 195–204]

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The authors regret to have found two typographical errors in the publication, both of which preclude interested readers from reproducing Figure 1. None of the conclusions or findings presented in the original publication is influenced by these typographical errors.

The original publication includes a pair of expressions of the same form, each with the same error. The argument inside the natural logarithm on the left-hand side of Equations (1) and (2) should indicate the addition of 1, not the subtraction. The corrected expressions read:

$$\ln\left[-\ln\left(\frac{\Delta E_a}{c_3\_E_a}+1\right)\right]=c_1\_E_a+\ln(t)+c_2\_E_a * T^{-1} \quad (1)$$

and

$$\ln\left[-\ln\left(\frac{\Delta \ln D_0/a^2}{c_3\_D_0}+1\right)\right]=c_1\_D_0+\ln(t)+c_2\_D_0 * T^{-1} \quad (2)$$

When used with the constants listed below, temperature is in units of Kelvin and time in units of 10^6 years for these expressions.

The second typographical error is in the reported value for $c_2\_E_a$, which had two digits reversed. The corrected value for $c_2\_E_a$ is listed below in **bold**. Furthermore, some of the constants that define the best-fit solution for the equations carry units, which were not clearly stated in the original publication. The constants are:

$c_1\_E_a = 58.6$

$c_2\_E_a = -\mathbf{21820}$ K

$c_3\_E_a = 18.7068$ kJ/mol

$c_1\_D_0 = 58.4$

$c_2\_D_0 = -21700$ K

$c_3\_D_0 = 4.497$ in natural log units normalized to s^{-1}

For ease of implementation, we also provide expressions equivalent to Equations (1) and (2), but explicitly solved for changes in E_a and $\ln(D_0/a^2)$ for a given set of time (i.e., duration of heating) and temperature constraints. These expressions are:

$$\Delta E_a = c_3\_E_a\{\exp(-\exp(c_1\_E_a) * \exp(c_2\_E_a/T) * t) - 1\} \quad (3)$$

and

$$\Delta \ln D_0/a^2 = c_3\_D_0\{\exp(-\exp(c_1\_D_0) * \exp(c_2\_D_0/T) * t) - 1\} \quad (4)$$

Note that $c_3\_E_a$ and $c_3\_D_0$ are constant values for the fitting exercise, but will vary as a function of Effective Damage Density (EDD) when implemented in the forward ADAM model. See manuscript for further details.

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