Exploring time-dependent geomagnetic and atmospheric effects on cosmogenic nuclide production-rate scaling

NATHANIEL LIFTON[1]

[1]Department of Earth, Atmospheric, and Planetary Sciences and Department of Physics and Astronomy, Purdue University, West Lafayette, Indiana, 47907 USA, nlifton@purdue.edu

The scaling implications of two recent time-dependent spherical harmonic geomagnetic models spanning the Holocene are explored using a recently published cosmogenic nuclide (CN) production-rate scaling model [1] termed the LSD model. [2] and [3] updated earlier paleomagnetic models, now covering 0-10 ka. Time-integrated scaling predictions using the new models and LSD differ significantly from those using 1) the earlier models, and 2) another recent time-dependent spherical harmonic geomagnetic model from 0-14 ka [4].

In addition, the effects of a time-dependent atmospheric model (SynTraCE-21, e.g., [5]) on LSD scaling predictions are evaluated from 0-21 ka. Given the dominance of altitudinal over latitudinal (geomagnetic) scaling effects on CN production, incorporating such transient global simulations of atmospheric structure into scaling frameworks may contribute to improved understanding of long-term production rate variations and their implications for surficial process studies.

[1] Lifton et al., 2014 *EPSL* **386**, 149–160 [2] Korte and Constable (2011, *Phys. Earth. Planet. Int.* **188**, 247–259 [3] Korte et al. (2011, *EPSL* **312**, 497–505 [4] Pavón-Carrasco et al. (2014, *EPSL* **388**, 98–109 [5] Liu et al., 2009, *Science* **325**, 310–314