# Using LREE Minerals to Reassess the Nd Isotopic Record of the Early Earth

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The decoupling of bulk-rock Sm-Nd isotopic data and the zircon Lu-Hf records has been documented in several Eoarchean terranes worldwide, such as the Acasta Gneiss complex, the West Greenland and the Kaapvaal cratons. Recent studies have suggested that post-crystallization high-grade tectonothermal events may have re-opened the Sm-Nd isotope system and resulted in complicated bulk-rock initial $\varepsilon_{Nd}$ values. In order to test how the Sm-Nd mobility potentially affects the current bulk-rock Nd isotopic record of the early Earth, here we present new *in-situ* LREE mineral Sm-Nd and zircon Lu-Hf isotopic data from a suite of TTGs in the Ancient Gneiss complex, eastern Kaapvaal craton. Zircons from these rocks give U-Pb ages between ~3.5 and ~3.3 Ga, with initial $\varepsilon_{Hf}$ values ranging from +2 to +1 at their respective crystallization ages. In contrast, these rocks yield apatite-allanite-titanite Sm-Nd isochron ages of ~3.3 – 3.2 Ga, which are generally younger than their crystallization ages as established by the zircons. This is likely a result of post-crystallization Sm-Nd re-distribution during cratonization ~3.2 Ga (Schoene et al., 2009). Magmatic titanite from one of these samples yields identical U-Pb and Sm-Nd isochron ages of ~3.3 Ga. However, the initial $\varepsilon_{Nd}$ values of these titanites are between -3 and -1 at ~3.3 Ga, contrasting with the zircon's positive initial Hf isotopic record.