300 M.yr of felsic magmatism in the Archean Yalgoo Dome

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Archean cratons have arguably evolved through cycles of juvenile magmatism followed by reworking of pre-existing crust. This ciclicity is observed in igneous suites of the Murchison Domain, Yilgarn Craton, Australia [1]. Here, we present geochemical and age data for this secular change in crustal chemistry in the well preserved, but poorly exposed Yalgoo Dome. Within the Yilgarn craton, it has previously been established that 2.95 Ga old rocks of the tonalite-trondhjemite-granodiorite series (TTG) and greenstones are succeeded by two distinct cycles of juvenile magmatism and accompanied crustal recycling between 2.82 and 2.60 Ga [1, 2]. In most of the Murchison Domain, the older of these cycles (2.82-2.73 Ga) was strongly overprinted by the younger one, ca. 100 M.yr later at 2.73 Ga, during the onset of the Neoarchean orogeny. Our new data reveals that a prime example of this succession, covering all rock-units associated with this change, is preserved in the Yalgoo Dome.

In the dome and its surroundings, we identified five igneous suites, ranging with decreasing age from (1) Archean-style TTGs over (2) transitional TTGs and (3) high-Mg sanukitoids, followed by final emplacement of post-tectonic (4) Fe-rich and (5) high-K granites. The change in major and trace element chemistry from suites 1-5 is interpreted to record a gradual shift in the geodynamic parameters associated with melt generation. The chemical evolution of igneous suites in the Yalgoo dome reflect the secular progression from TTGs to potassic granitoids proposed for the Murchison Domain [3]. In light of similar changes in the chemistry of igneous suites worldwide [4], the crustal evolution of the Yalgoo Dome in particular, appear to reflect the stabilization of modern-style continental crust notably before the onset of the Neoarchean orogeny (<2.73 Ga). Following the timescales of chemical evolution within the dome, this change operated on protracted (> 300 M.yr), but pulsed episodes of crustal reworking, which may also apply to other cratons.

[1] Ivanic et al., (2012) *Lithos* **148**, 112-127. [2] Mole et al., (2013) *Geological Society London Sp. Pub.* **393**, SP393-8. [3] Champion & Sheraton (1997) *Precambrian Research* **83**, 109-132. [4] Laurent et al., (2014) *Lithos* **205**, 208-235