

**Trace elements in apatite and titanite : a
new proxy to discriminate magma
evolution ?**

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The granitoid record has evolved through geological time from tonalite-trondhjemite-granodiorite (TTG) in the Archean toward typical granodiorite and granite with arc magma compositions in the present-day. However, many fundamental questions remain regarding the geodynamics of the early Earth and the timing of the transition to modern subduction-driven tectonics. The Archean rock record is often hampered by metamorphic overprinting and focusing on accessory minerals that may be impervious to metamorphism is a potential promising approach to gain insights into early Earth processes..

Here we present new geochemical data on two accessory phases (titanite, apatite) from a compilation of granitoids that cover a large span of the geological record from the Archean to the Phanerozoic. We demonstrate that trace element analysis and detailed petrographic work can give direct information about the petrogenesis of the host magmas even when these granitoids have been affected by metamorphism. Our results show that the chemical signature of accessory minerals allow discrimination of the different magma types generated during crustal evolution and give insights into their source characteristics. Since these accessory minerals often survive sedimentary processes, the Archean sedimentary record may offer an untapped archive of critical information.