



# **1 Thermobarometric modelling of zircon and monazite growth in melt-bearing systems**

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Data collected from zircon and monazite is used to make inferences about a wide range of fundamental Earth processes including mountain building, the conditions of the early Earth, mantle processes and plate tectonics. Despite the emphasis placed on zircon and monazite ages, we still do not have a clear understanding of how to relate the timing of growth of zircon and monazite to an evolving rock system. Here we present for the first time the integration of experimental data for zircon and monazite saturation in melt-bearing rocks with metamorphic forward models of crustal rock compositions. Our calculations constrain the relative timing of zircon and monazite growth for a range of crustal rock types with respect to evolving pressure, temperature and silicate mineral assemblages, and are able to account for many of the age patterns observed in zircon and monazite in crustal rocks.