Crystal residence ages provide important constraints on the timescales of magma storage and evolution, and the interrelation of magmatic and eruptive processes. However there is also uncertainty in their interpretation, primarily because there are systematic differences in the timescales estimated from different approaches. U-series disequilibria typically suggest crystal residence in the $10^3$-$10^5$ year range, whereas diffusion models and crystal size distributions (CSD) yield shorter timescales, typically $<< 500$ years. The reasons for this disagreement remain unclear.

We review constraints on crystal ages in andesitic volcanoes and a present a systematic study of Mount Hood, Oregon, where recharge and mixing between mafic and felsic magmatic components control eruption and magma compositions. $^{230}$Th-$^{226}$Ra model ages for large plagioclase from two recent eruptions range from $\sim 5000$ to $> 10,000$ years. In contrast CSD and diffusion modeling suggest residence ages that are $< 200$ years.

Differences in crystal age estimates can potentially be understood by considering the thermal history of magma storage. Many andesitic magmas sample crystal-rich felsic magmas or mush zones, which likely experience intermittent intrusion by hotter mafic magmas. U-series age estimates record the absolute time since initial elemental fractionation associated with crystal formation, whereas CSD and diffusional times are sensitive to the thermal history, as diffusion and crystal growth are temperature dependent. Thus a variable thermal history prior to eruption can help reconcile the U-series, CSD and diffusional ages at Mount Hood and other andesitic volcanoes, and implies that felsic magma components may spend considerable times at near-solidus temperatures.