
**Analogue experiments of crustal melting
and contamination**

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A series of analogue laboratory experiments were carried out to model the melting and mixing occurring in an underplating event, where hot, dense mantle-derived magmas are emplaced at the Moho. The crust was modelled by ice or a cold, low-melting point wax, arranged in an upside-down “U” with the two walls and roof dyed different colours. The mantle magma was modelled by a hot, dense aqueous solution which was injected into the cavity between the walls. The experiments revealed the potentially important role that side wall processes can have in partial melting and contamination in this environment. The walls melted back much faster than the roof and the melts from the opposite walls ponded next to each other under the roof. They mixed with each other only in the central region, suggesting a mechanism by which separate granite plutons in a batholith might retain distinctive source-derived chemical signatures even if they are generated by a single underplating event. The input solution crystallized vigorously in the side-wall boundary layers, leading to mixing between melt and model magma, suggesting that this may be a suitable environment for the generation of hybrid magmas, and for crustal contamination of the mantle-derived magma.
