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# Non-plume generation of large-scale melting beneath supercontinents

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Supercontinents promote mantle warming and associated large-scale magmatism. Mechanisms for this feedback include the clustering of mantle plumes and lithospheric forcing of convective length scales. Modeling studies show that long-wavelength convection inherent to an internally heated mantle with no active plumes and a supercontinent produces mantle temperature anomalies of +100 °C. Such global mantle warming could have sourced the Central Atlantic Magmatic Province during the breakup of Pangea. Here we use 3D spherical mantle convection models with continents to investigate the temperature beneath continents, changing the total continental area and distribution. We show that in the presence of plumes, warming is enhanced leading to a temperature excess of 200 °C. We also find that significant broadly distributed heating occurs beneath diminutive supercontinents appropriate to the Archean, even in purely internally heated models. This result could help to explain the pulse in continental growth at 2.7 Ga.