



Global warming of the mantle at the origin of flood basalts over supercontinents

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At the surface of the Earth, continents cluster together episodically as a supercontinent, ultimately breaking up with intense magmatic activity supposedly caused by mantle plumes. The break-up of Pangea, the last supercontinent, was accompanied by the emplacement of the largest known continental flood basalt, the Central Atlantic Magmatic Province, causing massive extinctions at the Triassic/Jurassic boundary. Although, there is little support for a plume origin for this catastrophic event. This paper presents a convection modelling study showing that large-scale melting in an internally heated mantle would naturally occur following continental aggregation, without involving plumes. With internal heat sources, the formation of a supercontinent causes the enlargement of the wavelength of the flow and the global temperature increase in the mantle can be as large as 100°C. We suggest the existence of two distinct types of continental flood basalts, caused by plume or mantle global warming.