

Mantle Plume Head Mafic Magmatic Events From >3.5 Ga to Present: a Preliminary Compilation

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We have compiled information on more than 200 short-duration large igneous province (LIP) events ranging from >3.5 Ga to present. They are represented by erosional remnants of mainly mafic magmatism, thought to have been emplaced over areas of 100,000-7,000,000 sq. km. Mafic magmatic components include flood basalts (and their erosional remnants), giant dyke swarms, sill provinces and layered intrusions which may be found in either a continental or oceanic setting. The duration of these events ranges from a few million years to 10s of millions of years. however, the longer durations probably represent multiple LIP events.

Short-duration LIP events are interpreted to mark the initial arrival of a mantle plume head (or, the arrival of a secondary plume head derived from the original plume). Globally, plume head events show episodicity, but no consistent periodicity, although this may reflect the poor dating of the majority of events. The locations of plume-head centres are known for only about 30 mafic magmatic events. Many are associated with cratonic margins, bolstering the link between plume head arrival and continental breakup. Until paleocontinental reconstructions are better constrained (mainly through coordinated paleomagnetism and high-precision geochronology), it will not be possible to distinguish between multiple plume events of the same age (superplume events?) and single plume events that have been dismembered by plate tectonics.