

LIP record through time and implications for secular environmental changes and GTS boundaries

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An emerging consensus suggests that Large Igneous Provinces (LIPs) are a significant driver of dramatic global environmental and biological changes, including several Phanerozoic mass extinctions, leading to plausible links with Geological Time Scale (GTS) boundaries. LIP-induced environmental changes are now being identified in the Precambrian record, suggesting potential for the use of LIPs to define natural pre-Phanerozoic GTS boundaries. There is now an opportunity for more systematic integration of the sedimentary and LIP records.

As a contribution to assessing the role of LIPs in secular environmental/biological changes and their correlations with the GTS, we provide an updated summary of the LIP record through time in a series of time-slice diagrams and in a data compilation. We also summarize links between LIPs, GTS boundaries and selected environmental impacts.

Continued integration of the LIP and sedimentary records will help to: 1) identify those LIPs that induced major environmental changes and thus can help define chronostratigraphic GTS boundaries, as well as those that had minor, or no observable impact on surface environments; 2) lead to better characterization of the specific components of LIPs that caused secular environmental changes; and 3) allow proper integration of LIP events with other drivers of secular environmental changes such as bolide impacts.