

# The Status of the Global Large Igneous Province (LIP) Record

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Over the past decade, there has been a dramatic expansion of the global LIP record and progress in understanding the key role that LIPs have in a range of major geodynamic processes, including formation and evolution of the lithosphere and mantle, supercontinent breakup, dramatic climate and environment changes including mass extinctions, major regional topographic changes, formation of major ore deposits and a role in oil/gas exploration, and as a planetary analogue. Thus, it is timely to provide an overview of the current status of the global LIP record.

The dramatic expansion of the global LIP record has been facilitated by U-Pb dating campaigns, funded in part through an ongoing Industry Consortium. This has resulted in the discovery of numerous new LIP events, not only of Precambrian age, but also surprisingly even some new Phanerozoic LIPs. As a result, most of the continental blocks on Earth are at least partially LIP-“barcoded”, which allows the LIP record to be efficiently used along with paleomagnetism and geochemical data in global reconstructions.

Continued U-Pb dating efforts will facilitate the next step of determining the full extent of LIPs within crustal blocks (and between crustal blocks through reconstructions), and locating mantle plume centres (typically as the focus of giant radiating and/or circumferential mafic dyke swarms).

It has been shown that LIPs are a major driver of climate change including mass extinction events and frequently correlate with Phanerozoic time-scale boundaries. LIPs have also become a leading proxy for natural boundaries in the Proterozoic and Archean. The expanding pace of high precision CA-IDTIMS zircon dating applied to LIPs through time will allow further precise matching with climatic /environmental changes recorded in the sedimentary record, and result in further integration of the igneous and sedimentary records.