

Extinct mid-ocean ridges and insights on the influence of hotspots at divergent plate boundaries

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We review all global examples of confirmed or suspected extinct mid-ocean ridges that are preserved in present-day ocean basins. Data on their spreading rate prior to extinction, time of cessation, length of activity, bathymetric and gravity signature are analysed. This analysis identifies some differences between subgroups of extinct ridges, including microplate spreading ridges, back-arc basin ridges and large-scale mid-ocean ridges. Crustal structure of extinct ridges is evaluated using gravity inversion to seek to resolve a long-standing debate on whether the final stages of spreading leads to development of thinned or thickened crust. Most of the ridges we assess have thinner crust at their axes than their flanks, yet a small number are found to have a single segment that is overprinted by an anomalous feature such as a seamount or volcanic ridge. A more complex cessation mechanism is necessary in these cases. The location of spreading centres at their time of cessation relative to hotspots was also evaluated using a global plate reconstruction. This review provides strong evidence for the long-term interaction of spreading centres with hotspots and plate boundaries have been frequently modified within the radius of a hotspot zone of influence.