

# Mantle plumes, ocean spreading and the North Atlantic Igneous Province, Palaeogene extrusive igneous rocks, Northern Ireland

From Earthwise

[Jump to navigation](#) [Jump to search](#)

Mitchell, W I (ed.). 2004. [The geology of Northern Ireland-our natural foundation](#). Geological Survey of Northern Ireland, Belfast.

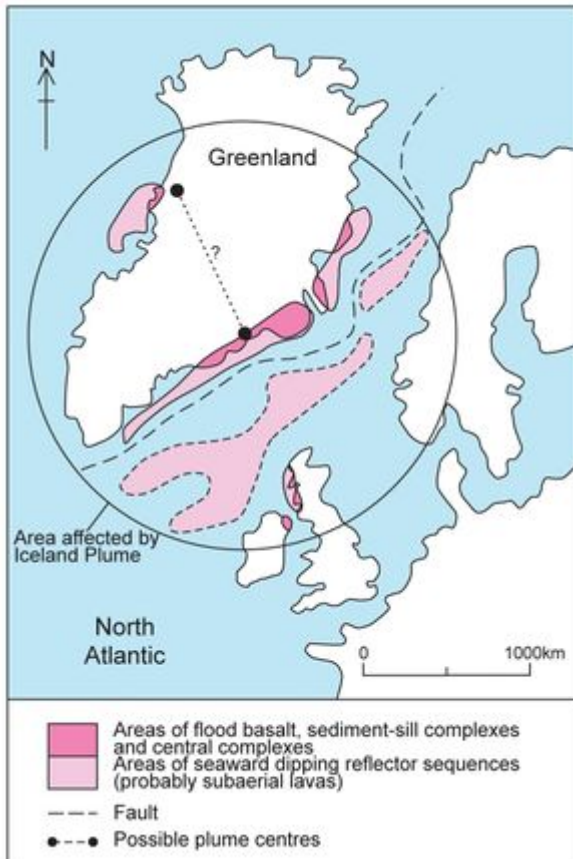
M R Cooper

## Mantle plumes, ocean spreading and the North Atlantic Igneous Province

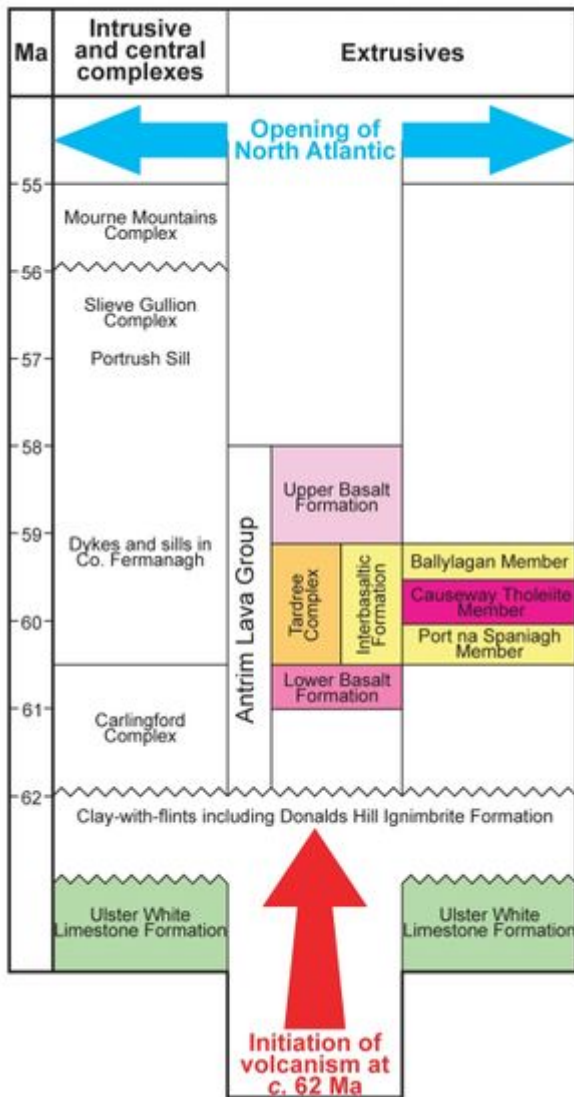


Continuing movement of the continents saw their distribution more closely resemble the geographical position that is recognisable to us today. In particular both the South Atlantic and North Atlantic Ocean continued to expand pushing Europe away from North America and Africa away from South America. Although still moving northwards, India did not collide with the southern margin of Asia, and thereby create the Himalayas, until about 25Ma ago. The northward movement of Africa towards southern Europe led to the onset of the Alpine Orogeny, but also created a water-filled depression between the two landmasses that later became the Mediterranean Sea. In the North Atlantic area the movement apart of North America and Europe stretched, thinned and ruptured the crust and allowed the migration to the surface of magma (the Iceland Plume) derived from the mantle. In Northern Ireland, basalt lavas of the Antrim Plateau represent a portion of a once more extensive lava plateau.

Position of the continents in Palaeocene times (c. 60Ma (1)). (P947859)



North Atlantic reconstruction during the Early Eocene (c. 50Ma (3)). (P947860)



Stratigraphy and chronology of Palaeocene extrusive and intrusive igneous rocks in Northern Ireland. (P948097)



During the Palaeocene, the continental crust of Ireland was influenced by a syn-magmatic extensional tectonic regime related to an early attempt to open the North Atlantic Ocean between Greenland and Europe <sup>[5]</sup>. Extension, dilation and uplift of the crust were linked to doming caused by the rise of hot magma fed by the Iceland Plume. This was ultimately responsible for the initial opening of the North Atlantic Ocean by seafloor spreading at the mid-Atlantic Ridge in the latest Palaeocene-early Eocene, about 55Ma ago ([P948097](#)).

Between c. 62 and 55Ma the Northern Ireland sector of the North Atlantic Igneous Province experienced plume-related igneous activity which led to the development of lava fields and intrusive or central complexes <sup>[6]</sup>. The largest remnant of that igneous province in Britain and Ireland forms the Antrim Plateau although lava fields and central complexes occur in western Scotland ([P947861](#)). Offshore Palaeogene volcanic centres occur in the Blackstones Bank, and extend the igneous province northwest to the Rockall Trough and south to Lundy Island in the Bristol Channel.

## References

- <sup>[1]</sup> Osborne, R, and Tarling, D H. 1995. *The Historical Atlas of the Earth (A Visual Exploration of the Earth's Physical Past)*. Viking. Penguin Books Ltd., London.
- <sup>[2]</sup> White, R S. 1989. Initiation of the Iceland Plume and opening of the North Atlantic Margins. *In: Tankard, A J, and Balkwill, H R. (eds.). Extensional Tectonics and Stratigraphy of the North Atlantic Margins*. American Association of Petroleum Geologists Memoir, 46, 149-54.
- <sup>[3]</sup> Ritchie, J D, Gatliff, R W, and Richards, P C. 1999. Early Tertiary magmatism in the offshore NW UK margin and surrounds. *In: Fleet, A J, and Boldy, S A R (eds.). Petroleum Geology of Northwest Europe: Proceedings of the 5th Conference*, 573-84. © Petroleum Geology '86 Ltd. Published by the Geological Society, London.
- <sup>[4]</sup> Dickin, A P. 1988. The North Atlantic Tertiary Province. *In: Macdougall, J D (ed.). Continental Flood Basalts*. Kinwer Academic Publishers, 111-49.
- <sup>[5]</sup> Geoffroy, L, Bergerat, F, and Angelier, J. 1996. Brittle tectonism in relation to the Palaeogene evolution of the Thulean/NE Atlantic domain: a study in Ulster. *Geological Journal*, 31, 259-69.
- <sup>[6]</sup> Bell, B R, and Jolley, D W. 1997. Application of palynological data to the chronology of the Palaeogene lava fields of the British Province: implications for magmatic stratigraphy. *Journal of the Geological Society, London*, 154, 701-708.

Retrieved from

'[http://earthwise.bgs.ac.uk/index.php?title=Mantle\\_plumes,\\_ocean\\_spreading\\_and\\_the\\_North\\_Atlantic\\_Igneous\\_Province,\\_Palaeogene\\_extrusive\\_igneous\\_rocks,\\_Northern\\_Ireland&oldid=32590](http://earthwise.bgs.ac.uk/index.php?title=Mantle_plumes,_ocean_spreading_and_the_North_Atlantic_Igneous_Province,_Palaeogene_extrusive_igneous_rocks,_Northern_Ireland&oldid=32590)'

Category:

- [The geology of Northern Ireland](#)

## Navigation menu

### Personal tools

- Not logged in
- [Talk](#)
- [Contributions](#)
- [Log in](#)

- [Request account](#)

## Namespaces

- [Page](#)
- [Discussion](#)

## Variants

## Views

- [Read](#)
- [Edit](#)
- [View history](#)
- [PDF Export](#)

## More

## Search

## Navigation

- [Main page](#)
- [Recent changes](#)
- [Random page](#)
- [Help about MediaWiki](#)

## Tools

- [What links here](#)
- [Related changes](#)
- [Special pages](#)
- [Permanent link](#)
- [Page information](#)
- [Cite this page](#)
- [Browse properties](#)

• This page was last modified on 25 September 2017, at 13:46.

- [Privacy policy](#)
- [About Earthwise](#)
- [Disclaimers](#)

