

# The origins and early trajectory of the mantle plume quasi-paradigm

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## **FOREWORD**

This essay is mainly concerned with the pre-1975 origins of the ideas that evolved into current mantle plume theory and how the theory was received. In particular: which precursory ideas underpinned incipient mantle plume theory; how the advent of young rock radiometry and its application in dating island chains promoted the theory; why Wilson's pioneering upper-mantle-fixed-lava-source hypothesis (hotspot idea)—later reformulated by Morgan as deep-mantle-plume theory—was published in 1963, notwithstanding its overt weaknesses; how the seafloor-spreading and plate tectonics zeitgeists warmed plume theory's reception, as did the magisterial stature<sup>2</sup> of the authors of the idea; how Wilson's hypothesis—given plate theory's success—enigmatically languished for 8 years before Morgan refined and expanded it; how the ascending plate tectonics paradigm infused plume theory with quasi-paradigmatic<sup>1</sup> status, endowing it for the majority—but not all—with the stature of a working hypothesis and guide to practice; how modeling assisted plume theory's ascent; how the Alvarez-group meteorite impact/extinction hypothesis and its alternative, the explosive-volcanist hypothesis—drawing wide attention by 1985--engendered research promoting plume theory; how the theory continues to draw both supporters and critics; and how theoretical adversaries—in keeping with behaviors evidenced in other conflicts—incommensurably assess the same evidence.

Among the important works with extensive bibliographies treating mantle plume studies are those by Hatton, C. J., ed., 1997; Mahoney, J. J. and Coffin, M. F., Eds. 1997; Jackson, I., 1998; Davies, G. F., 1999; Condie, K. C., 2001; Ernst, R. E. and Buchan, K.L., eds., 2001; and Pirajno, F., 2001, and articles in the present volume. This essay's cited bibliography—a small fraction of an expansive literature—mainly includes earlier publications and some historically and bibliographically rich recent ones. Anderson and Natland's history piece in this volume only partly overlaps this article and examines history and conflicted issues from different and complementary vantage points. The author has conducted all interviews cited in this essay.

Internet websites that present simple and lucid arguments for and against the mantle plume hypothesis are:

1) In defense of the plume hypothesis:

<http://www.geolsoc.org.uk/template.cfm?name=Saunders>

2) Overview of the plume hypothesis inviting commentary from all factions.

<http://www.mantleplumes.org/>