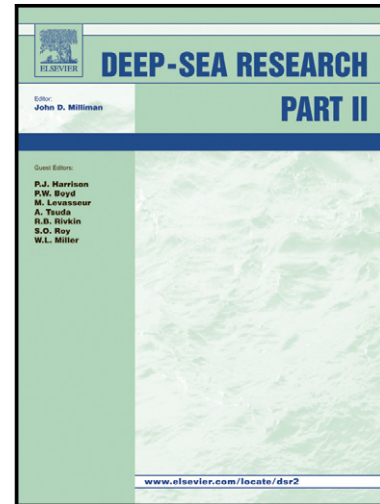


Author's Accepted Manuscript

Carlsberg Ridge and Mid-Atlantic Ridge: comparison of slow spreading centre analogues

Bramley J. Murton, Peter A. Rona



www.elsevier.com/locate/dsr2

PII: S0967-0645(15)00138-1
DOI: <http://dx.doi.org/10.1016/j.dsr2.2015.04.021>
Reference: DSR113870

To appear in: *Deep-Sea Research II*

Cite this article as: Bramley J. Murton, Peter A. Rona, Carlsberg Ridge and Mid-Atlantic Ridge: comparison of slow spreading centre analogues, *Deep-Sea Research II*, <http://dx.doi.org/10.1016/j.dsr2.2015.04.021>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Carlsberg Ridge and Mid-Atlantic Ridge: comparison of slow spreading centre analogues

Bramley J. Murton
National Oceanography Centre
European Way,
Southampton, SO14 3ZH, UK

Email: bjm@noc.ac.uk

Peter A. Rona
Institute of Marine and Coastal Sciences
Rutgers University
New Brunswick, New Jersey 08901-8521, USA

Email: rona@imcs.rutgers.edu

ABSTRACT

Eighty percent of all mid-ocean spreading centres are slow. Using a mixture of global bathymetry data and ship-board multibeam echosounder data, we explore the morphology of global mid-ocean ridges and compare two slow spreading analogues: the Carlsberg Ridge in the north-west Indian Ocean between 57°E and 60°E, and the Kane to Atlantis super-segment of the Mid-Atlantic Ridge between 21°N and 31°N. At a global scale, mid-ocean spreading centres show an inverse correlation between segment length and spreading rate with segmentation frequency. Within this context, both the Mid-Atlantic Ridge super-segment and Carlsberg Ridge are similar: spreading at 22 and 26 mm/yr full rates respectively, being devoid of major transform faults, and being segmented by dextral, non-transform, second-order discontinuities. For these and other slow spreading ridges, we show that segmentation frequency varies inversely with flank height and ridge axis depth. Segments on both the Mid-Atlantic Ridge super-segment and Carlsberg Ridge range in aspect ratio (ridge flank height/axis width), depth and symmetry. Segments with high aspect ratios deeper axial floors, often have asymmetric rift flanks, and are associated with indicators of lower degrees of melt flux. Segments with low aspect ratios have shallower axial floors, symmetric rift flanks, and evidence of robust melt supply. The relationship between segmentation, spreading rate, ridge depth and morphology, at both a global and local scale, is evidence that rates of melting of the underlying mantle and melt delivery to the crust play a significant role in determining the structure and morphology of slow spreading mid-ocean ridges.

1. Introduction

1.1 Background

Download English Version:

<https://daneshyari.com/en/article/6384021>

Download Persian Version:

<https://daneshyari.com/article/6384021>

[Daneshyari.com](https://daneshyari.com)