ID: W2131298162

TITLE: Biophysical patterns in benthic assemblage composition across contrasting continental margins off New Zealand

AUTHOR: ['Tanya J. Compton', 'David A. Bowden', 'C. Roland Pitcher', 'Judi E. Hewitt', 'Nick Ellis']

ABSTRACT:

Abstract Aim To examine whether benthic assemblages are more diverse in a region of high topographic and oceanographic complexity by comparing benthic invertebrate assemblages across continental margins with contrasting environments. Location Challenger Plateau and Chatham Rise, to the west and east of New Zealand, respectively. Methods Benthic faunal data were sourced from extensive seabed surveys in 2007, when both margins were sampled with an epibenthic sled and a towed video system. Three methods were used to investigate benthic assemblages in relation to environmental variables: one based on individual species distribution models (SDM s) using boosted regression trees analysis (BRT), and two community?based modelling methods using generalized dissimilarity modelling (GDM) and gradient forest analysis (GF), respectively. Each method was used to model and predict the turnover in assemblages with respect to environment ? the ?biophysical patterns? ? across the study region. Results Across Chatham Rise, a complex oceanographic environment arising from steep gradients in productivity and temperature at the Subtropical Front produced a high diversity of assemblages associated with the sub?Antarctic water mass, the Subtropical Front, steep?sloping regions and fast tidal currents. In contrast, Challenger Plateau lies entirely beneath a single (subtropical) water mass, and assemblage diversity was lower, with a distinctive assemblage on the plateau itself and a deep?water assemblage similar to the northern deep?water assemblage of Chatham Rise. Across both regions, assemblage turnover was fastest in cold waters, at shallow depths and in deep mixed layers. Main conclusions Benthic assemblages were more varied on Chatham Rise than on Challenger Plateau, supporting the hypothesis that environmentally heterogeneous margins have higher assemblage diversity. Differing assemblages on the northern and southern flanks of Chatham Rise suggest a biogeographical boundary for benthic taxa across the Subtropical Front. These results demonstrate that oceanographically and topographically complex margins have a diverse assemblage structure that should be considered in planning for the sustainable management of diversity.

SOURCE: Journal of biogeography

PDF URL: None

CITED BY COUNT: 44

PUBLICATION YEAR: 2012

TYPE: article

CONCEPTS: ['Benthic zone', 'Plateau (mathematics)', 'Oceanography', 'Assemblage (archaeology)', 'Geology', 'Subtropical front', 'Continental shelf', 'Subtropics', 'Water mass', 'Faunal assemblage', 'Ecology', 'Physical geography', 'Geography', 'Paleontology', 'Fauna', 'Biology', 'Mathematical analysis', 'Mathematics']