

**MULTIVARIATE MEASURES OF COMMUNITY STRESS AND  
THEIR APPLICATION TO MARINE POLLUTION STUDIES  
IN THE EAST ASIAN REGION**

By **R.M. Warwick and K.R. Clarke**

*Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, UK*

**ABSTRACT**

Three recently developed measures of stress on marine communities, which utilise species-dependent multivariate methods, are described. The first is a "meta-analysis" of benthic macrofaunal community data from NE Atlantic shelf stations with known community responses to pollution or disturbance at the phyletic level. These can be used as a training data set against which new data can be evaluated. The method has the advantages that it overcomes taxonomic difficulties (requiring phylum-level identification only) and offers the possibility of evaluating the severity of disturbance on a more globally comparative scale. Two other methods measure the increase in variability of multivariate community structure and the breakdown of zonation (or seriation) patterns as a result of disturbance. These latter methodologies are valuable because they can be used to assess environmental impacts on those types of communities which are of primary conservation value in the East Asian region (notably coral communities and their associated biota) and which are therefore a major focus for environmental concern.