

## **Automated Extraction of Geologic Features from Bathymetric Data**

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### **ABSTRACT**

The analysis of bathymetry and geomorphological features provides necessary earth science information for multiple disciplines and applications. The development of an automated feature extraction method of seabed topography and geomorphological features is challenging due to their multi-scale nature. This paper will introduce two different methods to identify and extract geologic features from bathymetric data. The first method is principal component analysis, which involves finding linear combinations of a set of variables that have maximum variance. The Digital Elevation Model (DEM), slope, hill shade and intensity data are used to create principal components from high resolution (5 m) DEM data. Pattern recognition software is used to identify and extract distinct geologic features indicating that they are distributed in non-random clusters. The second method involves geographic information system (GIS) based spatial analysis and geomorphometric methods to extract undersea feature classes. This model extracts features from high resolution bathymetry, based on slope gradient and shape threshold. These empirically derived dimensions describe shape and distribution, and provide a new basis for comparison with other global data. A combination of both results will enable a hybrid quantitative comparison of geologic features including pockmarks as well as similar concave features, such as impact craters, dolines (sink holes), salt pools, etc. This approach can be employed to other specialized applications of potential undersea gas seep detection, safe shipping lane routing, and marine habitat mapping etc.