

DEVELOPING A METHODOLOGY FOR SEMI-AUTOMATED GEOLOGICAL INTERPRETATION OF TOPOGRAPHIC DATA IN THE CLARION-CLIPPERTON-ZONE, EASTERN PACIFIC

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The issue of the methodology for geological and/or geomorphological mapping has been discussed for a long time, since the 19th century, and it became highly relevant again in the end of the 20th century when computer-based techniques and GIS methods were developed. These techniques allow the automatization of the mapping to make it faster, more accurate and reproducible.

This study is focused on the comparison of the usability of four different GIS methods for mapping the geology of submarine landscapes, an area of research that is still in its infancy. These different methods are implemented as add-ons both in GRASS GIS and ArcGIS software products and are based on different mapping concepts and algorithms. Among them are: pixel-based methods (“Benthic Terrain Modeler” module in ArcGIS; “r.param.scale” module in GRASS GIS), an image analyses method (“Segmentation and classification” tools in ArcGIS Desktop) and a pattern recognition & computer vision method (“Geomorphon” module in GRASS GIS). These methods were applied to the eastern part of the German contract area for polymetallic nodules exploration within the Clarion-Clipperton-Zone (Eastern Pacific) to find a possible way for the semi-automated geological interpretation of bathymetric data.

As a result of the study, workflows were created and maps generated, which were then compared and discussed. Advantages and disadvantages for each method are described and the possibility of combining methods is discussed, also by using published literature. Recommendations to overcome some limitations are given in order to provide a framework for developing the methodology further and to find promising workflows for semi-automated mapping which should be tested in the future.