

DISCOL - Disturbance and Recolonization Experiment of a Manganese Nodule Area of the Southeastern Pacific

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ABSTRACT

After heavy disturbance of the deep ocean floor sediment in a manganese nodule field the recolonization of the fauna was monitored in the DISCOL Experimental Area (DEA). Three sets of data, all randomly sampled in the same way, were collected during RV SONNE-cruises SO 61 (DISCOL 1-2, immediately after disturbance), SO 64 (DISCOL 2, 6 months after disturbance) and SO 77 (DISCOL 3, 3 years after disturbance). The results are comparable with the data gained immediately before the disturbance (SO 61, DISCOL 1-1).

All faunal taxa were decreased significantly in numbers after the disturbance and, except bacteria, half a year later. Three years after the disturbance mega- and meiofauna numbers were significantly higher than at the baseline study. This can be a normal situation of recolonization processes.

The large scale DISCOL-experiment has presented first results on the recolonization process after anthropogenic disturbance. Nevertheless, during marine mining larger areas will be destroyed by towing the collector device track by track than during the DISCOL experiment.

KEY WORDS: deep sea, mining, benthos, disturbance, recolonization

INTRODUCTION

The actual and planned uses of the deep sea requires the necessity of the protection of the largest environment on earth (Thiel und Schriever, 1993, Thiel, 1995). One of the future uses is the mining of manganese nodules. Low metal prices and the International Law of the Sea are responsible that deep-sea mining will not commence before the second decade of the next century. But already now pre-

cautionary research is required to accumulate knowledge about the basic ecological situation in the deep sea to judge about the impact potential of mining (Thiel and Foell, 1993, Thiel, in press).

The research project DISCOL was developed on the results of the MESEDA- (Metalliferous Sediments Atlantis II Deep) and the DOMES (Deep Ocean Mining Environmental Study) projects (Thiel und Schriever, 1990, Thiel, 1992). To learn about the impact of industrial use of the deep ocean, scientific large scale experiments are necessary (Thiel, 1993) which allow extrapolation on the future dimension of the commercial activities in the deep sea.

The DISCOL project is based on this new research approach - an experimental large scale disturbance (Foell et al, 1990). An area of 11 km² of the deep sea floor was plowed with a plow harrow device in the southeastern Pacific close to a German manganese nodule claim in 4150m water depths. Both expected kinds of disturbance were created: disturbance of the deep-sea sediment by the direct plow harrow impact and resedimentation out of a sediment plume covering not only directly impacted areas. The experimental disturbance should not be viewed as a simulation of manganese nodule mining, but it created a comparable impact which will demonstrate the response of the benthic fauna on this kind of impact.

THE EXPERIMENT

Until now we have had three cruises into the DISCOL-Experimental-Area (DEA) (Fig. 1):

DISCOL 1, SONNE 61, February - March 1989
DISCOL 1-1, baseline study
DISCOL 1-2, disturbance and first post impact study

DISCOL 2, SONNE 64, September 1989
second post impact study

DISCOL 3, SONNE 77, February 1992
third post impact study