

The German Environmental Impact Research for Manganese Nodule Mining in the SE Pacific Ocean

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ABSTRACT

Since 1988 a research association of oceanographers exists in Germany, the so-called TUSCH-group (TUSCH = Tiefsee-Umweltschutz = deep-sea environment protection), investigating natural and experimentally disturbed conditions in the S.E. Pacific Peru Basin. The area is claimed for manganese nodule mining by Germany. The TUSCH-group aims at concentrations to an environmental impact statement. This multidisciplinary research association will be introduced and first results of their investigations will be presented.

KEY WORDS: Deep-sea mining, multidisciplinary oceanographic research, environmental impact statement, S.E. Pacific Ocean.

MINING AND ENVIRONMENTAL RESEARCH IN GERMANY

The development of mining for polymetallic nodules and of other deep-sea ores has a 25 years history in Germany, and this may be subdivided into three overlapping lines. The exploratory line began in 1971 with cruises of RV "Valdivia" to search for economically valueable manganese nodules in the Pacific Ocean (Kollwentz, 1975), and in 1978 RV "Valdivia" was replaced by RV "Sonne". The companies Preußag AG, Hannover, and Metallgesellschaft, Frankfurt were the main actors, and in 1972, together with Rheinische Braunkohlenwerke AG and Salzgitter AG, they founded the "Association for marine-technologically extractable resources" (AMR: Arbeitsgemeinschaft meeresstechnisch gewinnbarer Rohstoffe). These activities resulted in the application of a mining claim in the SE Pacific Ocean, of another one in the NE Pacific Ocean, and the AMR is partner in the US Ocean Mining Inc. consortium (OMI) since 1975. AMR participated with OMI in the first successful pre-pilot mining test in 1978 (Fellerer, 1980). Right from their early exploration, AMR cooperated with governmental institutions and academia, and in the later years, these gained more and more influence in determining the directions in geoscience deep-sea research and cruise planning (e.g. Rad and Kudrass, 1984, Halbach, 1986, Stackelberg et al, 1991).

Between 1968 and 1981 Preußag AG explored the deep Red Sea for metalliferous muds in cooperation with and for the Saudi-Sudanese Red Sea Joint Commission. In 1979 a successful pre-pilot mining test was conducted, demonstrating the feasibility of mining from the deep-sea (Bäcker, 1980, Bäcker et al, 1991).

The second line of development is the technological one which was followed up for 20 years from 1973 to 1994, first by industrial and later by governmental funds. This task ended with the engineering designs of collector systems for manganese nodules. A mechanical system was successfully tested in 1978 under pilot mining conditions in the Pacific Ocean. Later, a hybrid mechanical/hydraulic miner was developed but this system was not tested under in-situ conditions (Amann et al, 1991).

The third line is that of the environmental concern of deep-sea uses, whether it pertains to deep-sea mining or deep-sea waste storage. Already in 1972 the first "Valdivia" cruise covered a small environmental component, and comments on impact problems were published since the mid seventies (Schneider, 1975, Thiel, 1975, for further citations see Thiel et al, 1991). During the years 1977 to 1981 a broad environmental study was conducted in the Red Sea, accompanying the exploratory work and the test mining mentioned above (Thiel et al, 1986).

Except for general oceanographic information on this specific enclosed and warm sea, the most important result has been the insight, that large-scale environmental impacts, as they are to be expected from industrial activities in the deep-sea, should be investigated on larger scales than normally applied in oceanography (Thiel, 1992). This conclusion became decisive, when the new phase of environmentally directed deep-sea research began in the late eighties.

GENERAL CONSIDERATIONS

Environmental impact studies aim at the evaluation of anthropogenic disturbances, and they should be based on conditions as similar to the expected actions as ever possible. However, mining techniques are not finally developed and only vague assumptions can be made on the abilities of a miner to be employed when mining starts probably after another 20 years.

In 1985 discussions were initiated between the Minister of Science, Education, Research and Technology and oceanographers to develop a comprehensive environmental research programme for the evaluation of impacts from polymetallic nodule mining. Several institutions were occupied with the development of a mining vehicle and a collector (see above), and it was assumed that the oceanographic