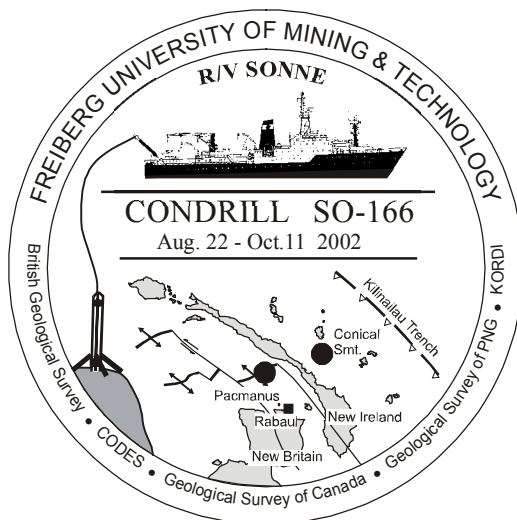


FREIBERG UNIVERSITY OF MINING AND TECHNOLOGY



Cruise Report

— SO-166 CONDRIILL —

Detailed Investigation of the Magmatic-Hydrothermal Gold Mineralization at Conical Seamount (New Ireland Basin) and of Massive Sulfides at PACMANUS (Eastern Manus Basin), Papua New Guinea by Shallow Drilling

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EXECUTIVE SUMMARY

By Peter Herzig

Cruise SO-166 of RV Sonne conducted seafloor drilling, sampling, and mapping south of Lihir Island in the New Ireland fore-arc and at the Manus back-arc spreading center west of New Ireland, Papua New Guinea, between September 15 and October 3, 2002. The objectives of the cruise were to establish the sub-surface nature and extent of alteration and gold mineralization at Conical Seamount, a submarine volcano 10 km south of Lihir Island, and to investigate active and inactive hydrothermal sites of the Pacmanus hydrothermal field in the Bismarck Sea.

Seafloor drilling was carried out with the Rockdrill of the British Geological Survey (BGS) which is capable of drilling to a maximum depth of 5 m below the seafloor. This was the first time that a portable drilling system has been used from R/V Sonne. The drilling operations with 39 holes drilled at the summit plateau of Conical Seamount with a total penetration of 91.1 m and an average recovery of 31% and 10 holes drilled in only two days at Pacmanus (Table 1), revealing almost 9 m of spectacular massive sulfides, were both a technical and scientific success and will undoubtedly lead the way to further projects of the German marine scientific community in which shallow-drilling is an important means to investigate the sub-seafloor.

The main focus of work was on Conical Seamount, one of several young volcanic cones discovered during cruise SO-94 in 1994. Indications of gold-rich epithermal-style vein mineralization at the summit plateau of Conical Seamount were confirmed during cruise SO-133 in 1998. Samples collected from the summit area include locally intense clay-silica alteration with a zonal distribution from a central clay-silica-pyrite stockwork to polymetallic vein mineralization at the margin. More than 1200 kg of mineralized rock was recovered in 1998, consisting of stockwork and disseminated sulfides similar to material currently being mined on the island of Lihir, showing gold concentrations of up to 230 g/t in surface samples. This discovery represents a new type of seafloor mineralization and has important implications for understanding the metallogenic history of the Lihir area.

Drilling at Conical Seamount has now confirmed the existence of alteration and gold mineralization to a depth of at least 4.5 m below the seafloor and further proven analogies to the giant Ladolam epithermal gold deposit on Lihir Island. Drill core samples of clay-silica alteration contain average gold grades up to 14.2 g/t over a core section of about 30 cm and appear to be part of a more extensive gold zone located below a carapace of relatively fresh ancaramitic and trachybasalt. These