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36. *DATA REPORT:* GOLD CONTENT IN UPPER CRUSTAL ROCKS FROM HOLE 504B[1]

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ABSTRACT

Gold contents were determined in 13 samples representing the interval from 2000 to 2111 mbsf in Hole 504B drilled during ODP Leg 148. The values range from 1.6 to 4.4 ppb, with a mean of 3.0 ppb that is similar to that for the basalts and diabases from the upper parts of the hole. A moderate level of correlation between Zn and Au concentrations observed from the upper parts of subsediment rocks is also valid for the samples from Leg 148. However, the lack of notable correlation between the intensity of alteration and Au contents observed in samples from Legs 69 and 140 is not as obvious for the deepest 300 m of the hole where the inverse correlation between Zn contents and percent alteration is strong. The problem is complicated by the discordance between the samples studied for gold concentration and materials used for shipboard geochemical investigations and determinations of intensity of alteration.

INTRODUCTION

New samples recovered from Hole 504B Ocean Drilling Program (ODP) during Leg 148 provided an opportunity to continue our previous investigation of Au distribution in basalts and sheeted dikes in Hole 504B (Korobeynikov and Pertsev, 1995). Gold concentrations were determined from 13 samples representing the interval drilled in Hole 504B during Leg 148. The objective of this study is to obtain information about patterns of gold distribution and its dependence upon geochemical and geological factors.

METHOD

Determination of Au concentrations, as in our previous study, was performed on 1- to 2-g charges by the method of film polarography with build-up on the graphite electrode. The sensitivity of the method is 0.001 ppb; reproducibility is 90%. Analytical results were checked by inner and outer controls. Extraction of Au was conducted twice by ethyl- or diethyl-ether from water solutions of HBr.

RESULTS AND DISCUSSION

Results of the analyses are illustrated in Table 1 and Figure 1, along with corresponding depths, percent alteration (or vol% of secondary minerals) and Zn contents (Alt, Kinoshita, Stokking, et al., 1993). Figure 1 includes data from Legs 140 and 148 beginning at 1800 mbsf. The data on Zn contents and intensity of alteration were taken from Volumes 140 and 148 of the *Initial Reports* (Dick, Erzinger, Stokking, et al., 1992; Alt, Kinoshita, Stokking, et al., 1993). Gold concentrations for the interval from 1800 to 2000 mbsf constitute our previous investigation (Korobeynikov and Pertsev, 1995). The inclusion of the Leg 140 data (Fig. 1) was prompted by the observation of an apparent decrease in Zn and Au content between 1900 and 2000 mbsf, whereas the Zn and Au content in the newly drilled part of Hole 504B (Leg 148) exhibited unexpected increases.

One of the results of our previous study was the lack of correlation between Au content and the type or intensity of alteration both in basalts and in sheeted dikes (Korobeynikov and Pertsev, 1995). However, comparison of the Zn content with the percent alteration (Alt, Kinoshita, Stokking, et al., 1993) reveals a strong reverse correlation (Fig. 1). This correlation made us consider the absence of the relationship between Au content and the intensity of alteration, at least in the lower part of Layer 2, where the chlorite-amphibole type of alteration predominates. Figure 1 shows that the tendency for a positive correlation between Zn and Au content noted earlier (Korobeynikov and Pertsev, 1995) is present in the Leg 148 samples. This correlation, however, is not as strong as that between Zn and percent alteration.

The correlation between Au and percent alteration is less obvious. The problem of the relationship is complicated by the fact that different samples were used for shipboard X-ray fluorescence (XRF) analyses and determination of percent alteration. Irregular intensity of alteration and the limited number of analyzed samples introduce an important uncertainty that might have been reduced if we had been able to use the same samples for the determination of all the values (Au, Zn, and percent alteration).

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Table 1. Depths, alteration, and Zn-Au contents in samples from Hole 504B, Leg 148.

Depth (mbsf)	Core, section, interval (cm)	Alteration (%)	Zn (ppm)	Au (ppb)
2000.50	239R-1, 0–4			4.2
2000.66		22	50	
2000.85		45	40	
2007.23		31	52	
2007.42		26	31	
2007.72	240R-1, 83–87	49	30	4.4
2016.50		23	48	
2017.55		48	30	
2017.60	241R-1, 115–117			2.4
2026.02		34	43	
2026.10	242R-1, 2–4			2.8
2038.23		29	62	
2042.90	245R-1, 13–15			1.6
2043.01		43	36	
2043.19		61	27	
2052.41		56	29	
2052.90	246R-1, 70–73			1.7
2053.31		44	33	
2057.30	247R-1, 60–62			2.3
2057.34		31	37	
2057.42		12	60	
2062.20	248R-1, 40–42			3.4
2062.23		34	48	
2072.05	249R-1, 81–84			3.6
2072.12		44	29	
2072.87		20	51	
2081.40	250R-1, 105–109			3.2
2081.52		23	69	
2090.10	251R-1, 80–85			3.8
2090.39		44	42	
2099.70	252R-1, 33–37			2.3
2103.50	253R-1, 1–3	26	61	3.0

Note: Data for the depth, alteration percent, and Zn contents are taken from Alt, Kinoshita, Stokking, et al. (1993).

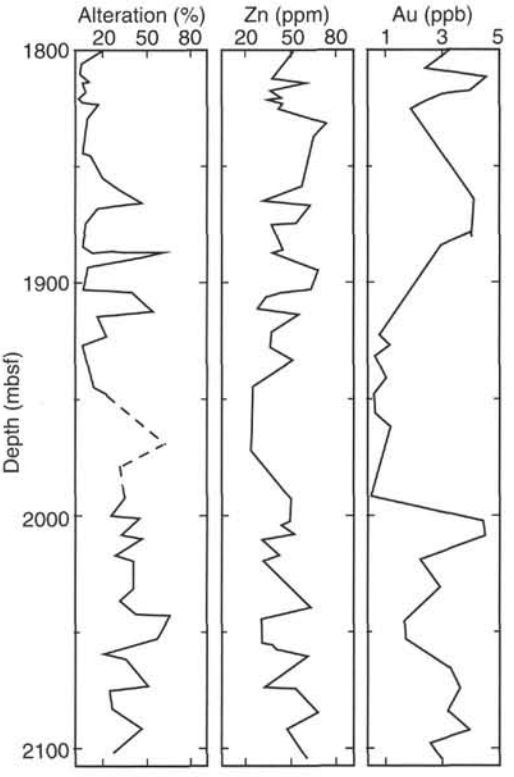

Figure 1. Plot of percent alteration and contents of Zn and Au in the lower part of Hole 504B (Legs 140 and 148).