

Relationship between Kuroko Mineralization and Paleostress Inferred from Vein Deposits and Tertiary Granitic Rocks In and Around the Hokuroku District, Northeast Japan

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Abstract

In the inner zone of the northeastern Japan arc, kuroko-type massive sulfide deposits of copper, lead, and zinc are related to submarine dacitic volcanism. There are four horizons that host such deposits in and around the Hokuroku district, the main deposits occurring at 14.32 Ma and coinciding with the end of an extensional regime followed by a weakly compressive regime. The change in tectonic style is indicated by the fracturing patterns in the vein deposits and Tertiary granitic rocks that were emplaced at 13.9 to 6.0 Ma and show similar alignment. They are also associated with explosive dacitic volcanism that occurred after the main kuroko mineralization. During the middle of the extensional regime, which was characterized by intensive submarine bimodal volcanism, no kuroko mineralization took place. Therefore, the observed change in tectonic regime might have been the trigger for kuroko mineralization.

In addition to the main kuroko deposits, small-scale kuroko deposits can be found at different horizons. Two deposits are hosted within the first dacitic lava after the beginning of a marine transgression that coincided with the beginning of the extensional regime earlier than the main kuroko mineralization, and three deposits are hosted within dacitic rocks emplaced in the weakly compressive regime after the main kuroko mineralization. However, large-scale kuroko deposition appears to have been inhibited by explosive volcanism during this stage.

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