The Küre VMS (volcanogenic massive sulfide) deposit associated with the paleo-Tethys ophiolite, Turkey: allochthonous sulfide ore blocks in terrigenous sedimentary rocks

Ken Nakayama* and Nihat Kaya**

Received February 16, 1999

* Metal Mining Agency of Japan, ** ETI BAKIR A. S Mining

In the Pontides belt of northern Turkey, a number of ophiolites, which represent the paleo-Tethys oceanic crust-mantle of the Permian to Jurassic and active continental margin sequences of the Permian to early Jurassic are juxtaposed along the Tethyan suture (Sengör et al., 1980). Around the Küre mine dismembered ophiolite lacking sheeted dike complex is chaotically jumbled among terrigenous sedimentary rocks. In the Küre open pit, blocks of massive and stockwork sulfide ore associated with hyaloclastite ranging from a few tens of centimeters to few hundred meters in diameter are inlaid in scaly argillite with a prominent tectonic contact; so-called melange. The oceanic crust of paleo-Tethys overlain by a Cyprus type deposit is thought to be mingled with trench-fill terrigenous sediments and accreted to the continent. Although VMS deposits in sedimentary settings such as a back arc basin or marginal sea have been defined as Besshi type deposits (e.g., Slack, 1993), what would be the product if allochthonous VMS deposits, such as in this case, were introduced to a deeper level within the subduction zone and consequently undergone high P/T metamorphism ?

Fig. 1. Overview of the Küre mine open pit, looking north. Lithologic boundaries are tectonic contacts except for the dacite dike. PB : pillow basalt, HY : hyaloclastite, MS : massive sulfide ore body, SS : stockwork sulfide ore body, A : argillite, D : dacite dike. Arithmetic number corresponds to location of the figures.

Fig. 2. Geological map of the Küre district.

Fig. 3. Massive sulfide ore block was tectonically sandwiched between pillow basalt and sheared argillite. A : argillite, MS : massive sulfide ore, PB : pillow basalt.

Fig. 4. Lenticular block of stockwork sulfide ore block in scaly argillite. SS : stockwork sulfide ore, A : scaly argillite. (scale : day pack)

Fig. 5. Relationship of massive sulfide ore block and scaly argillite. Wedge of scaly argillite interposed into broken massive sulfide ore. MS : massive sulfide ore, A : scaly argillite.

Fig. 6. Pillow basalt with strong cataclasis.

Fig. 7. Stockwork sulfide ore in hyaloclastite with intense silicification and sericitic alteration.

Reference

- Sengör, A.M.C., Yilmaz, Y. and Ketin, I., 1980, Remnants of a pre-Late Jurassic ocean in northern Turkey : Fragments of Permian-Triassic paleo-Tethys ? *Bull. Geol. Soc. Amer.*, **91**, 599–609.
- Slack, J.F., 1993, Descriptive and grade-tonnage models for Besshi-type massive sulfide deposit. In Kirkham, R.V., et al., eds., *MINERAL DEPOSIT MODELING*, Geol. Assoc. Canada, Special Paper **40**, 343–371.