THE VOLCANO-TECTONIC SETTING OF THE EUNSAN GOLD DEPOSIT, SOUTH-WEST CHOLLA PROVINCE, KOREA

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ABSTRACT

The Eunsan gold mine, together with similar nearby prospects, is situated near the centre of the 'Wusuyeong' 1:50000 Scale Geological Quadrangle , an area largely underlain by a thick sequence of non-marine Cretaceous strata. The sequence, several kilometres thick, comprises basaltic and andesitic lavas and tuffs, intercalated with fluvial and lacustrine sediments, passing upwards into a further thick volcanic sequence of predominantly dacitic and rhyolitic composition. No significant unconformities have been recognised within this sequence and age determinations indicate that the sedimentary and volcanic episode lasted for at least thirty million years during late Cretaceous times.

The general sequence has been known since the 1920's when it was mapped by Japanese geologists, but though certain aspects of the geology of the area have been the subject of considerable research in recent years, there has been no systematic re-survey and several adjacent quadrangles still await detailed study.

Hydrothermal alteration of parts on the volcano-sedimentary sequence has locally resulted in the formation of clay deposits that have been mined for kaolin, pyrophyllite and alunite. The Eunsan gold deposit lies close to one of these latter areas. Several researchers have proposed models for the volcanic evolution of the area that involves the development of an extensive caldera with the intense hydrothermal alteration being associated with the intrusion and extrusion of rhyolite domes close to the caldera margin. The caldera was envisaged as a sub-circular structure over twenty kilometers in diameter Recent mapping, however, has failed to find compelling evidence of the existence of a cauldron structure of the classic 'Valles' type. For example no subcircular system of marginal faults or ring intrusions that might indicate the structural margins of a caldera have been identified and no abrupt lateral thickening of an ignimbrite sequence, such as that indicating a transition from intra-caldera to outflow tuffs, has yet been recognised. Furthermore, rhyolite domes close to some of the zones of intense alteration post-date the alteration minerals by several million year

Current mapping results indicate that the late Cretaceous volcanic sequence accumulated in a substantial and continuously subsiding volcano-tectonic depression, probably with the form of an elongated rift rather than that of a subcircular caldera. Subsidence more or less kept pace with the accumulation of fluvial and lacustrine sediments and thick pyroclastic flows. Extensive and intense hydrothermal alteration was caused by hydrothermal circulation driven by larger and somewhat deeper magma chambers (as suggested by I J Kim) than those represented by the relatively small intrusive/extrusive rhyolite domes that postdated the formation of the clay deposits. Although the sequence and progressive evolution of the late Cretaceous volcanic and sedimentary events and their depositional environments is reasonably well known, both lateral and vertical lithological variations need to be elucidated by further mapping in order to facilitate a more accurate reconstruction of the regional volcano-tectonic setting.