

## CHAPTER VI

### GEOLOGIC HISTORY AND MINERALIZATION AT CHAE SORN AREA

Prior to the major shearing, sediments of Don Chai Group were regionally metamorphosed into phyllite of low grade greenschist facies by at least two episodes of tectonism as recognized by  $S_1$  foliation and  $S_2$  strain-slip-cleavage. Intrusions of Khuntan granite in Upper Triassic age (210-215 Ma, Charusiri 1989) and of diorite in the shear zone of unknown age also predated the shearing as suggested by the fact that both diorite and granite found in the shear zone have been superimposed by cataclastic deformation texture (i.e., sheared granite and sheared diorite). Limestone found in the shear zone might have been effected by thermal metamorphism probably from the intrusions of diorite and/or Khuntan granite as evidenced by extensive recrystallization of calcite prior to the shearing.

Before shearing, at least one episode of fracturing occurs in the study area. Those open fractures were infilled by unmineralized calcite-quartz or quartz veins and veinlets.

The major shearing in the Chae Sorn area might have taken place during Paleogene (40-50 Ma) coincided with the active-movement of Wiang Pa Pao - Khuntan fault (Charusiri, 1989). This movement has brought all the above mentioned rock types into the present configuration.

Subsequent to the shearing, probably related to a change in tectonic regime from compression to extension, the older Chae Sorn

shear zone was open up and provided an excellent channel way for various stages of later mineralization. Low temperature hydrothermal solutions of probably meteoric origin, which were heated by unknown heat source underneath, were responsible for the Chae Sorn mineralization. Multiple fracturing and brecciation and self sealing repeatedly occurred in the mineralized zone. Firstly, minor open-space-filling of galena-sphalerite-ferroan dolomite mineralization (stage I) following by minor fracturing and brecciation and arsenopyrite-pyrite-quartz mineralization (stage II) were the early two mineralizing stages took place in the old shear zone. Shortly after that, major hydrothermal fracturing and brecciation somewhat similar to phreatic explosion type occurred and following immediately by extensive silicification replacing wall rocks, infilling fractures and cementing breccia that are unmineralized and wide spread in Chae Sorn area. Later low temperature antimony-bearing hydrothermal solution ascended and precipitated early-stibnite-quartz (stage III) in newly-open fractures and minor breccias. Subsequently dissolution of phyllic-altered rock fragments took place. It was then following by a precipitation of late stibnite-quartz (stage IV) in newly-open fractures and dissolved vugs by a continuous influx of ascending low temperature solution antimony-free solution (comb quartz) and subsequently antimony-bearing solution.