

Zone deposits (Yeats, 1989, Taheri and Green, 1991). However the single negative value from MJ005A needs follow up sampling to verify this result. The lower $\delta^{34}\text{S}$ may indicate some magmatic sulphur is present in the system.

DISCUSSION

The similarities of the Henty-Mt Julia alteration system with the Comstock Deposit of the Mt Lyell Field, particularly the alteration facies, volcanic environment and stratigraphic relationships has long been recognised by Goldfields Geologists (eg. Halley and Roberts, 1997). It is becoming increasingly apparent that the copper gold deposits located to the southeast of the South Henty Fault may be related to a regional Cu-Au mineralising event. During the 1980's and early 1990,s VHMS models for Mt Lyell and Henty were favoured (eg. Walshe and Solomon, 1981, Halley and Roberts, 1997) although involvement of magmatic components was considered a possibility. Recent work suggests a stronger magmatic signature to the deposits as evidenced by alteration mineralogy, immobile element geochemistry, stable isotopes of carbon and oxygen, metal zonation and ore mineralogy (Huston and Kamprad, 1998, Callaghan 1998b).

A review of the stable isotopes from sulphides in the Mt Lyell field demonstrates a broad spectrum of results from deposits with possible magmatic sulphur signatures to those with reduced seawater sulphate signatures, to some very negative values (-10) (figures 4-8). Walshe and Solomon (1981) suggest the lower $\delta^{34}\text{S}$ values from some of the deposits could result from higher $\text{SO}_4/\text{H}_2\text{S}$ ratios. The presence of barite in the mineralisation assemblage supports their hypothesis. Alternatively, if a fluid mixing model for the deposits is hypothesised, the results could be interpreted to reflect different seawater/hydrothermal fluid ratios in the depositional environment of the deposits. The mineralogy of the different deposits supports either possibility. Davidson and Kitto, (1997) suggest some of the very negative $\delta^{34}\text{S}$ values found in Cambrian rocks result from partial leaching of igneous sulphur by low temperature, oxidised waters leaving a residuum of light sulphide. This process occurs near surface where Cambrian seawater permeates the volcanic pile. Mixing of magmatic volatiles and fluids with these ground waters could result in the range of $\delta^{34}\text{S}$ found in these deposits.

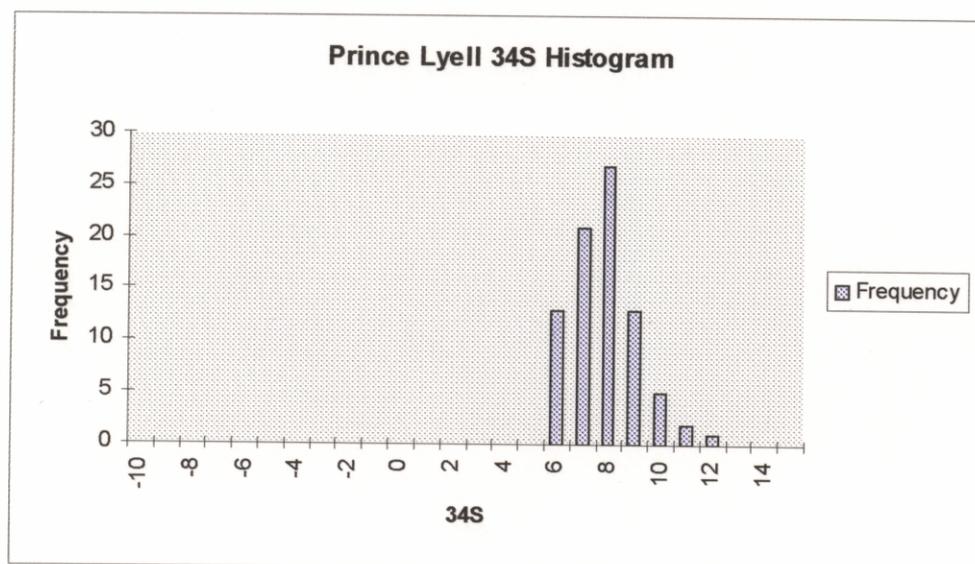


Figure 4. Histogram of pyrite $\delta^{34}\text{S}$ from Prince Lyell. Note similarities with Lake Newton Histogram (data from Walshe and Solomon, 1981).

← 5 cm →