

0107

## Interpretation

### Geochronology

Figure 3 is a standard Rb-Sr isotope isochron plot. Most of the data for the Hellyer district closely fit to a 387 Ma isochron whereas, as demonstrated below, these data also reflect alteration during the Cambrian (~500 Ma) volcanic event which led to the formation of VMS deposits in the district. Three of the thirteen data are not on the Devonian isochron and reflect a larger radiogenic Sr component. These show no unique relations with respect to rock type or proximity to ore. They are assumed here to represent incomplete isotopic reequilibration within this heterogenous altered rock suite.

### Alteration

Gemmell(1990) applied an alteration index to whole rock geochemical data as a means of quantifying the alteration intensity of each sample relative to exchange of alkali and alkali earth metals. The index applied,

$$\frac{K_2O + MgO}{K_2O + Na_2O + CaO + MgO}$$

increases with alteration from values of 36 in unaltered andesite to 91 in the core of the Hellyer deposit. This index operates effectively because of the general pattern of leaching of Na<sub>2</sub>O and CaO during VMS alteration and addition of K<sub>2</sub>O. Interelement correlation coefficients (Table 2) reflect these exchange processes.

The alteration index data for the strontium isotope sample suite are, with the exception of MAC15-106, low and indicative of weak alteration. MAC15-106 has the highest value but is distal relative to the Hellyer deposit.

Sr Isotopes and Geochemistry. As noted above the majority of the data fit to a single 387 Ma isochron indicating Devonian resetting. In order to retrieve the original Sr isotope profile from these data standard recalculation procedures have been applied based on an assumed formation date for the Hellyer deposit of 500 Ma. These recalculated data are shown as a function of distance from the Hellyer massive sulphide deposit in Figure 4a.

It is apparent from Figure 4a that an Sr isotope halo occurs around the Hellyer deposit similar in scale to that observed around the Fukazawa Kuroko-style VMS deposit in Japan(Farrell and Holland, 1983). However variability of the calculated initial Sr isotope ratio within samples from