REMOBILIZATION AND SYN-TECTONIC EMPLACEMENT IN ORE GENESIS

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Metamorphosed deposits are characteristically remobilized by subsequent metamorphism and deformation. Metamorphogenic deposits form through scavenging by the metamorphic fluid within a metamorphosing source-volume, liquid-state transfer, and concentration at the sink-site. Some syn-tectonic deposits are metamorphogenic, but they may also be emplaced by externally derived non-metamorphic fluids. Distinguishing between remobilized and syn-tectonically emplaced deposits is affected by: overly simplistic notions of deposit-models and -geometry; evolving appreciation of the kinematic interpretation of structural observations; better understanding of the merits/limitations of many laboratory-based techniques; potential overlap between a high degree of liquid-state remobilization and syn-tectonic emplacement; inadequate acceptance of polymodal genesis; and inadequate scales of observation coupled with an insufficient range of investigatory techniques. The difficulty is intensified by the adversarial nature of research within the current research-funding climate. Discrimination between remobilized and syn-tectonic deposits requires integration and refinement of data from many lines of investigation. As a basis for practical discrimination, fifteen types of guideline are identified and evaluated. The more significant of these involve evidence from: solid-state remobilization; preserved primary textures; the gross relationships of ore and alteration to unaltered host rocks; and comparison of deformation-event sequences, silicate assemblages, and Pb-isotope systematics from ore, alteration and unaltered host rocks. Because discrete guidelines rarely provide definitive answers, they should not be used in isolation and interpretation should adopt a broadly based probabilistic approach. Application of the approach to some major Australian deposits suggests that they are pre-tectonic emplacements, substantially modified by regional deformation, metamorphism, and variously related hydrothermal events. Inevitably, further genetic resolution, including the possibility of polymodal genesis, is required.