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Developing a predictive model for Mo mineralisation in a porphyry system through statistical and lab analyses of vein conduits.

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Abstract: The Mace Molybdenum-Copper Porphyry Deposit is hosted in the Galway Granite; a large and complex body of granitic rocks, outcropping along the northern shore of Galway Bay and extending inland for c.20km. The Galway Granite is a composite batholith; available geochronological data indicate that emplacement occurred between c.410Ma and c.385Ma, with most granites emplaced between c.410 and c.400Ma. Molybdenite from Mace Head has been directly dated using the Re-Os isotope system to 407 ± 1.5 Ma.

Molybdenum in the deposit occurs as molybdenite, and copper as chalcopyrite. The mineralization is hosted within fault-related quartz veins, with a south-southeast to Northnorthwest orientation. The mineralised veins can be seen on surface, particularly along the coast, where the rocks are well exposed in outcrop. It is believed that the deposit may contain further concentrations of economic mineralisation, but a greater understanding of its nature will be required.

A series of north-northwest to south-southeast faults have also been mapped. These faults appear to 'cut' the deposit and the associated mineralised faults, indicating that they are post-mineralisation. One of these faults, the Narrow Waters Fault, appears to offset the deposit dextrally, and there are indications that other faults have offset the deposit dextrally locally elsewhere. The offsets are not significant, being in the order of no more than tens of metres. A clear understanding of the paragenetic veining sequence is believed to be crucial in understanding the genetic nature of the deposit, and will inform the future exploration model. Since 2014, 42 diamond drill holes have been drilled on the Mace deposit, for a total of over 6000m of core. Seven distinctive categories of veins have been identified in drill core, with four types interpreted to be related to mineralisation, two are related to the development of the batholith, and one is interpreted as a late-stage alteration phase.