FAMOS Insights into the Magmatic Plumbing Systems that Control the Genesis of Porphyry Copper Deposits

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The FAMOS research project is a multi-million pound collaboration funded by the Natural Environment Research Council in the UK. Using a Mineral Systems approach, the project focuses on the operation of the magmatic plumbing system that permits the divergence of igneous evolution away from ‘normal’ arc magmatism and into a ‘fertile’ state from which porphyry deposits may form. Five key process ‘gates’ are interrogated to establish their importance in enabling or impeding the development of porphyry fertility: (i) mantle source constraints; (ii) the lower crustal ‘sulfide trap’; (iii) the importance of deep-to-mid-crustal volatile saturation; (iv) the mafic trigger; and (v) extraction and focussing of fluids. Key outcomes from these studies are presented and the proxies – in the form of rock and mineral composition records – that record essential steps and which can form the basis of new exploration tools are highlighted.