An SCLM control on the metallogenic DNA of the continental lithosphere

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Ore deposits in the crust act as magnifying lenses into the processes of metal fluxing, fractionation and concentration through the continental lithosphere. We demonstrate that the unique geochemical signature of metasomatised mantle rocks and magmatic-hydrothermal mineral systems located at varying crustal depths in post-subduction settings illuminates the mechanisms involved in this fluxing of metals. We show a continuum of magmatic and magmatic-hydrothermal systems up through the lithosphere that have a consistent and anomalously gold (Au) and tellurium (Te) rich signature. Magmatic sulfides hosted by alkaline intrusions emplaced in the lower crust may be genetically related to ores with a similar metal signature associated with upper crustal post subduction porphyry and epithermal systems. These systems share a common Au-Te-rich "metallogenic DNA", and form a trans-lithospheric metallogenic continuum with the underlying metasomatised sub-continental lithospheric mantle, which is considered to have a critical control on the metal flavour of these alkaline magmas. In this framework, post subduction magmas that flux metal-rich sulfide cargos play a fundamental role in the crustal cycling of metals. Ore deposits through the lithosphere are part of a continuum of magmatism and hydrothermal evolution from mantle to upper crust, where a number of magmatic processes have continually built up to produce ore deposits in a sequential and predictable manner.