Session T04

Links between ophiolites and the lost large igneous provinces record

Conveners:

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The purpose of this session is to examine the LIP and ophiolite records through time to identify ancient oceanic crust and oceanic plateaus, to develop criteria for their recognition in the older rock record, and to better understand the significance of their multi-varied evolution patterns in plate tectonic cycles. Longer description: Oceanic crust generated at divergent plate boundaries commonly gets recycled into the mantle via subduction, although oceanic crust formed in subduction zone environments may become incorporated into continental margins through collisional and/or accretionary orogenic events as ophiolites. Times of enhanced ophiolite genesis and emplacement in Earth history appear to coincide with the timing of major collisional events during the assembly of supercontinents (basin collapse and closure), dismantling of these supercontinents via continental rifting, and widespread development of Large Igneous Provinces (LIPs) of oceanic affinity (oceanic plateaus, ocean basin flood basalts, and seamount chains), suggesting spatial and temporal reactions between these events at global scales. Since 200 Ma, oceanic LIPs have been emplaced with an average rate of approximately 1 per 20 Ma. However, oceanic LIPs (even those of Ontong Java-scale, 44 Mkm3) have poor preservation potential during ocean closure. Some Phanerozoic and Precambrian ophiolites and greenstone belts may be accreted scraps of oceanic plateaus and/or volcanic sections of plateau-like thick oceanic crust (particularly in the Archean). The purpose of this session is to examine the LIP and ophiolite records through time to identify ancient oceanic crust and oceanic plateaus, to develop criteria for their recognition in the older rock record, and to better understand the significance of their multi-varied evolution patterns in plate tectonic cycles. Characterizing the origin of "ophiolites" in the older record may be predictive regarding ore deposit potential. For instance, ophiolites of suprasubduction zone setting (such as Troodos) are associated with massive sulphide (mainly Cu)deposits, whereas LIPs, and presumably ophiolites of LIP affinity, have potential to form Ni-Cu-PGE deposits. A careful review of the Precambrian and Phanerozoic ophiolite record should aid in recovering the missing pre-Mesozoic record of oceanic LIPs.