



The Jurassic-early Cretaceous Ilo batholith of southern coastal Peru: geology, geochronology and geochemistry

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The Ilo batholith (17°00 - 18°30 S) crops out in an area of about 20 by 100 km, along the coast of southern Peru. This batholith is emplaced into the 'Chocolate' Formation of late Permian to middle Jurassic age, which consists of more than 1000 m of basaltic and andesitic lavas, with interbedded volcanic agglomerates and breccias. The Ilo Batholith is considered to be a rarely exposed fragment of the Jurassic arc in Peru. Our aim is to reconstruct the magmatic evolution of this batholith, and place it within the context of long-lasting magma genesis along the active Andean margin since the Paleozoic.

Sampling for dating and geochemical analyses was carried out along several cross sections through the batholith that were exposed by post-intrusion eastward tilting of 20-30°. Sparse previous work postulates early to middle Jurassic and partially early Cretaceous emplacement, on the basis of conventional K/Ar and ⁴⁰Ar/³⁹Ar dating methods in the Ilo area. Twenty new U-Pb zircon ages (LA-ICP-MS and CA-ID-TIMS) accompanied by geochemical data suggests the Ilo batholith formed via the amalgamation of middle Jurassic and early Cretaceous, subduction-related plutons. Preliminary Hf isotope studies reveal a primitive mantle source for middle Jurassic intrusions. Additional Sr, Nd and Hf isotope analyses are planned to further resolve the source regions of different pulses of plutonic activity.

We strongly suggest that batholith emplacement was at least partly coeval with the emplacement of the late Permian to middle Jurassic Chocolate Formation, which was deposited in an extensional tectonic regime. Our age results and geochemical signature fit into the scheme of episodic emplacement of huge amounts of subduction related magmatism that is observed throughout the whole Andean event, particularly during the middle Jurassic onset of the first Andean cycle (southern Peru, northern Chile and southern Argentina). Although the exact geodynamic setting remains to be precisely defined, these events can be linked to extensional episodes during the breakup of Pangea, which commenced at 230-220 Ma along the western South American margin, with a period of rifting, and culminated in the Jurassic with arc and back-arc extension.