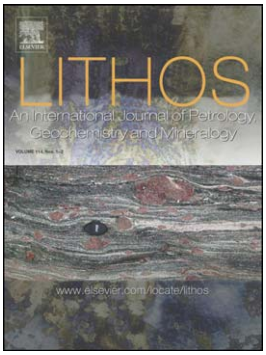

Granite provenance and intrusion in arcs: Evidence from diverse zircon types in Big Bear Lake Intrusive Suite, USA

A.P. Barth, J.L. Wooden, P.A. Mueller, R.C. Economos

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Granite provenance and intrusion in arcs: Evidence from diverse zircon types in Big Bear Lake Intrusive Suite, USA

Barth, A.P.[a*], Wooden, J.L.[b], Mueller, P.A.[c], and Economos, R.C.[d]

[a]*Department of Earth Sciences, Indiana University~Purdue University Indianapolis, 723 West Michigan Street, Indianapolis, IN 46234, USA*

**corresponding author, ibsz100@iupui.edu*

[b]*Department of Geological and Environmental Sciences, Stanford University*

[c]*Department of Geological Sciences, University of Florida*

[d]*Department of Earth Sciences, Southern Methodist University*

ABSTRACT

Textural, geochemical and hafnium isotopic data from diverse zircon domains allow discrimination between source and emplacement-level processes in the formation of a large-volume calc-alkalic intrusion. The Big Bear Lake Intrusive Suite is composed of satellite plutons and a main intrusive mass zoned from mafic granodiorites at its margins to central biotite ± muscovite granites, and is estimated to be 7 to 10 km thick and have a volume of 3500 to 5100 km^3. Zircons in the main intrusive mass and in the satellite plutons are composed of one or more of four domain types: (a) Archean to Proterozoic premagmatic domains and (b) Mesozoic premagmatic domains, both occurring as cores, which are overgrown by (c) luminescent early magmatic domains with low U+Th and relatively high estimated crystallization temperatures and (d) high U+Th main phase magmatic domains. U-Pb zircon geochronology indicates the main intrusive mass was emplaced 78 to 77 Ma, preceded by satellite plutons intruded 85 to 81 Ma. Zircon hafnium isotope ratios span 54 epsilon units, recording age and compositional diversity in