

The mid-Cretaceous Peninsular Ranges orogeny: a new slant on Cordilleran tectonics? II: northern United States and Canada

HILDEBRAND, Robert S.,* 1401 N. Camino de Juan, Tucson, AZ 85745 USA

WHALEN, Joseph B., Geological Survey of Canada, 601 Booth Street, Ottawa, ON K1A 0E8, Canada

Supplemental Figure 1

- Alasino, P.H., Ardill, K., Stanback, J., Paterson, S.R., Galindo, C., and Leopold, M. 2019. Magmatically folded and faulted schlieren zones formed by magma avalanching in the Sonora Pass Intrusive Suite, Sierra Nevada, California. *Geosphere*, **15**: 1677–1702, doi.org/10.1130/GES02070.1.
- Clemens-Knott, D. 1992. Geologic and Isotopic Investigations of the Early Cretaceous Sierra Nevada Batholith, Tulare County, California, and the Ivrea Zone, Northwest Italian Alps: Examples of Interaction Between Mantle-Derived Magma and Continental Crust. Ph.D. thesis, California Institute of Technology, Pasadena, California, 389 p.
- du Bray, E.A. 2007. Time, space, and composition relations among northern Nevada intrusive rocks and their metallogenic implications. *Geosphere*, **3**: 381–405. doi:10.1130/GES00109.1.
- Hirt, W.H. 2007. Petrology of the Mount Whitney Intrusive Suite, eastern Sierra Nevada, California: Implications for the emplacement and differentiation of composite felsic intrusions. *Geological Society of America Bulletin*, **119**: 1185–1200. doi.org/10.1130/B26054.1.
- Memeti, V. 2009. Growth of the Cretaceous Tuolumne Batholith and Synchronous Regional Tectonics, Sierra Nevada, CA: A Coupled System in a Continental Margin Arc Setting. Ph.D. thesis, University of Southern California, Los Angeles, California, 282 p.
- Sisson, T.W., Grove, T.L., and Coleman, D.S. 1996. Hornblende gabbro sill complex at Onion Valley, California, and a mixing origin for the Sierra Nevada batholith. *Contributions to Mineralogy and Petrology*, **126**: 81–108, doi:10.1007/s004100050237.
- Van Buer, N.J., and Miller, E.L. 2010. Sahwave batholith, NW Nevada: Cretaceous arc flare-up in a basinal terrane. *Lithosphere*, **2**: 423–446, doi:10.1130/L105.1.

Supplemental Figure 2

- Hildebrand, R.S., Whalen, J.B. 2017. The Tectonic Setting and Origin of Cretaceous Batholiths Within the North American Cordillera: The Case for Slab Failure Magmatism and Its Significance for Crustal Growth. *Geological Society of America Special Paper* **532**, 113 p.

Supplemental Figure 3

- Hildebrand, R.S., Whalen, J.B. 2017. The Tectonic Setting and Origin of Cretaceous Batholiths Within the North American Cordillera: The Case for Slab Failure Magmatism and Its Significance for Crustal Growth. *Geological Society of America Special Paper* **532**, 113 p.
- Manduca, C.A., Kuntz, M.A., and Silver, L.T. 1993. Emplacement and deformation history of the western margin of the Idaho batholith near McCall, Idaho: Influence of a major terrane boundary. *Geological Society of America Bulletin*, **105**: 749–765, doi:10.1130/0016-7606(1993)105<0749:EADHOT>2.3.CO;2

Supplemental Figure 4

- Wallace, C.A. 1987. Generalized geologic map of the Butte 1° x 2° quadrangle, Montana. United States Geological Survey, Miscellaneous Field Studies Map MF-1925, scale 1:250,000.
- Wallace, C.A., Lidke, D.J., and Schmidt, R.G. 1990. Faults of the central part of the Lewis and Clark line and fragmentation of the Late Cretaceous foreland basin in west-central Montana. *Geological Society of America Bulletin*, **102**: 1021–1037, doi:10.1130/0016-7606(1990)102<1021:FOTCPO>2.3.CO;2.

Supplemental Figure 5

- Miller, R.B., DeBari, S.M., and Paterson, S.R. 2018. Construction, emplacement, and geochemical evolution of deep-crustal intrusions: Tenpeak and Dirtyface plutons, North Cascades, western North America. *Geosphere*, **14**, 1298–1323, doi:10.1130/GES01490.1.
- Shea, E.K. 2014. Arc Magmatism at Different Crustal Levels, North Cascades, WA. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, 555p.

Supplemental Figure 6

- Crawford, M.L., Crawford, W.A., and Lindline, J. 2005. 105 million years of igneous activity, Wrangell, Alaska, to Prince Rupert, British Columbia. *Canadian Journal of Earth Sciences*, **42**: 1097–1116. doi: 10.1139/ e05-022.
- Girardi, J.D., Patchett, P.J., Ducea, M.N., Gehrels, G.E., Cecil, M.R., Rusmore, M.E., Woodsworth, G.J., Pearson, D.M., Manthei, C., and Wetmore, P. 2012. Elemental and isotopic evidence for granitoid genesis from deep-seated sources in the Coast Mountains batholith, British Columbia. *Journal of Petrology*, **53**: 1505–1536, doi:10.1093/petrology/egs024.
- Hildebrand, R.S., Whalen, J.B. 2017. The Tectonic Setting and Origin of Cretaceous Batholiths Within the North American Cordillera: The Case for Slab Failure Magmatism and Its Significance for Crustal Growth. *Geological Society of America Special Paper* **532**, 113 p.
- Lynch, G. 1995. Geochemical polarity of the Early Cretaceous Gambier Group, southern Coast Belt, British Columbia. *Canadian Journal of Earth Sciences*, **32**: 675-685.
- Mahoney, J.B., Gordeev, S.M., Haggart, J.W., Friedman, R.M., Diakow, L.J., and Woodsworth, G.J. 2009. Magmatic evolution of the eastern Coast plutonic complex, Bella Coola region, west-central British Columbia. *Geological Society of America Bulletin*, **121**: 1362–1380, doi:10.1130/ B26325.1.

Supplemental Figure 7

- Wheeler, J.O., and McFeely, P. 1991. Tectonic Assemblage Map of the Canadian Cordillera and Adjacent Parts of the United States of America. Geological Survey of Canada Map 1712A, 2 sheets, scale 1:2,000,000.

Supplemental Figure 8

- Cook, R.D., Crawford, M.L., Omar, G.I., and Crawford, W.A. 1991. Magmatism and deformation, southern Revillagigedo Island, southeastern Alaska. *Geological Society of America Bulletin*, **103**: 829-841
- Gehrels, G.E., and Berg, H.C. 1992. Geologic map of southeastern Alaska. U.S. Geological Survey Miscellaneous Investigations Map I-1867.
- Kapp, P.A., and Gehrels, G.E. 1998. Detrital zircon constraints on the tectonic evolution of the Gravina belt, southeastern Alaska. *Canadian Journal of Earth Sciences*, **35**: 253–268. doi:10.1139/e97-110.
- Redman, E., 1984. An unconformity associated with conglomeratic sediments in the Berners Bay area of southeastern Alaska. Alaska Division of Geological and Geophysical Surveys, Professional Report, **86**: 1–4.
- Yokelson, I., Gehrels, G.E., Pecha, M., Giesler, D., White, C., and McClelland, W.C. 2015. U-Pb and Hf isotope analysis of detrital zircons from Mesozoic strata of the Gravina belt, southeast Alaska. *Tectonics*, **34**: 2052–2066, doi.org/10.1002/2015TC003955.

Supplemental Figure 9

- Hults, C.P., Wilson, F.H., Donelick, R.A., and O’Sullivan, P.B. 2013. Two flysch belts having distinctly different provenance suggest no stratigraphic link between the Wrangellia composite terrane and the paleo-Alaskan margin. *Lithosphere*, **5**: 575–594. doi:10.1130/L310.1.
- Olson, N.H., III. 2015. The Geology, Geochronology, and Geochemistry of the Kaskanak Batholith, and other Late Cretaceous to Eocene Magmatism at the Pebble Porphyry Cu-Au-Mo Deposit, SW Alaska. M.S. thesis, Oregon State University, Corvallis, Oregon, 248p.

Supplemental Figure 10

Cloos, M., Sapiie, B., van Ufford, A.Q., Weiland, R.J., Warren, P.Q., and McMahon, T.P. 2005. Collisional Delamination in New Guinea: The Geotectonics of Subducting Slab Breakoff. Geological Society of America Special Paper 400, 51 p.