

The role of arc migration in Cordilleran orogenic cyclicality

JAMES B. CHAPMAN¹; MIHAI N. DUCEA²

¹University of Wyoming, 1000 E. University Ave., Laramie, WY, 82071; jay.chapman@uwyo.edu

²University of Arizona, 1040 E. 4th St., Tucson, AZ 85721; ducea@email.arizona.edu

Continental arc rocks located farther away from the trench are characterized by more evolved radiogenic isotopic compositions. Episodic arc migration away from the trench will produce a temporal record distinguished by episodic shifts to more evolved compositions. In most Phanerozoic continental arcs, these temporal shifts to evolved isotopic compositions correlate with magmatic high-flux events, which are the basis for cyclicality models in Cordilleran orogenic systems. Landward arc migration into more melt fertile regions of the continental lithosphere can explain both episodic shifts in isotopic composition and high-flux events. Increased melt fertility is interpreted to primarily be related to hydration and metasomatism of the mantle lithosphere and lower crust. Metasomatic products may accumulate in the deep lithosphere during magmatic lulls and be expelled during high-flux events.