1. Abstract

The Phanerozoic American Cordillera provides an excellent opportunity to study processes contributing to the creation of continental crust. In this study, we characterize and quantify the magmatic history of the Peruvian segment of this continental subduction system. The intensity of magmatism and therefore rate of magma emplacement into the subduction zone is not monotonically, being composed of a series of high magma additions, "flare-ups" against an intermittent and variable lower level of background magmatism. We add new U-Pb ages for igneous bedrock samples and detrital zircons from sedimentary rocks to existing geochronological data to give a picture of the magmatic history of the Peruvian arc. Detrital zircons from three sedimentary samples collected from locations in the west, center, and east of the arc show magmatism younging to the west. Flare-ups in magmatism from segments of the Peruvian Coastal Batholith (PCB) and Eastern Cordillera (EC) are analyzed to estimate the volume and rate of mantle magma addition (MMA) to the crust. Average flare-up duration is longer for the EC than for the PCB at ~40 My to 50 My. flare-ups are found to have variable durations from ~10 My to ~100 My with variable periods between them, thus being episodic in nature rather than cyclic. Magna volumes are calculated using areas of igneous map units, crustal thickness estimates based on element ratios, and a published calculation method based on tilted crustal sections. Total MMA volume added to the arc crust is estimated at 1070 km^3 and 1148 km^3 for the PCB (EC) are analyzed to estimate the volume and rate of mantle magma addition (MMA) to the crust. Average flare-up duration is longer for the EC than for the PCB at ~40 My to 50 My. 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