128-8 - EVOLUTION OF THE IXL-JOB CANYON MAGMATIC SYSTEM IN THE STILLWATER RANGE, NV

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327 (3, David L Lawrence Convention Center)

Abstract

The Oligocene (~28.2-29.3 Ma) IXL-Job Canyon Magmatic System in the Stillwater Range of Nevada preserves a continuous, 10 km-thick cross section of an ancient magmatic system, from part of an upper-crustal pluton, through a sequence of overlying volcanic units. These field relationships provide a paired volcanic-plutonic record that can be used to explore the geochemical and temporal relationships between volcanic and plutonic units at the scale of an individual magmatic system. Existing Sensitive High-Resolution Ion Microprobe (SHRIMP) geochronology for the study area suggests that the IXL-Job Canyon magmatic system was constructed in about one and a half million years, with possible overlap between pluton construction and extensive eruptions of dacite and andesite. Our study uses high-precision Chemical Abrasion - Isotope Dilution - Thermal Ionization Mass Spectrometry (CA-ID-TIMS) U-Pb zircon geochronology from the IXL pluton and overlying volcanic units to determine the timing of pluton construction, and the temporal connections between the pluton and volcanic units. The higher precision provided by CA-ID-TIMS data affords the opportunity to assess the relationship between plutonic and volcanic rocks at timescales finer than 100 kyr.

Our data indicate that the IXL-Job Canyon Magmatic system transitioned from eruptions of dacitic and andesitic tuffs and lava flows, to a caldera forming eruption of a rhyolitic tuff, to more dacitic and andesitic lava flows over ~500 kyr. Zircon geochronology from the pluton indicates that it is largely younger than the volcanics and that it was built incrementally over ~400 kyr. We can constrain the transition from volcanic to intrusive activity to within ~300 kyr, with minimal temporal overlap between the earliest intrusive activity and waning volcanism. A ~3 Myr long volcanic hiatus occurred during and after pluton construction as evidenced by a ~25.5 Ma rhyolitic eruption that caps the studied volcanic sequence. Our study indicates that the construction of upper-crustal silicic plutons may be associated with volcanic quiescence. We discuss the significance of this result in relation to assessing volcanic hazards, particularly in volcanic systems that source high-SiO2 rhyolite, which is commonly thought to develop in large, upper-crustal, silicic magma reservoirs.

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