

Evolution of Pleistocene to Holocene eruptions in the Lesser Caucasus Mts: Insights from geology, petrology, geochemistry and geochronology

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Both effusive and highly explosive ($VEI > 5$) and often voluminous caldera volcanism has developed atop the collision zone between the Arabian and the Eurasian plates. Currently what is exposed on the Anatolian-Armenian-Iranian active orogenic plateau is post-Mesozoic felsic to intermediate collision-related plutons, and mostly collision or post-collision related Quaternary volcanic structures. We have studied in detail the volcanism, tectonics and geophysics on the territory of E. Turkey and Armenia, where several large stratovolcanoes (Ararat, Lesser Ararat, Aragats, Tsghuk, Ishkhanasar) are surrounded by distinct monogenetic volcanic fields (distributed volcanism). These large in volume stratovolcanoes and the associated low volume monogenetic cones range from normal calc-alkaline to high-K shoshonitic in affinity, with their products ranging from basanites to high K trachytes and rhyolites. Several volcanic provinces, namely Kechut/Javakheti, Aragats, Gegham, Vardenis and Syunik are recognized in Armenia and each of them has > 100 mapped volcanoes. These have distinct geochemical (mineral chemistry, trace element and Sr-Nd-B isotope systematics) and petrological (melt eruption temperatures and volatile contents) fingerprints that may or may not vary over time. Age determinations and volcano-stratigraphy sections for each of the case studies we aim to present shows that the volcanism includes a continuous record from Pleistocene to Holocene, or even historical eruptions. The excellent volcano exposures and the now complete high resolution database (GIS), geological mapping, and new and improved K-Ar and Ar-Ar geochronology, uniquely allows us to evaluate the driving forces behind the volcanism in this continent-continent collision setting that is uniquely associated with long lasting eruption episodes. We shall compare the now well studied historical/Holocene eruptions with those pre-dating them, with the aim to identify possible geochemical or petrological precursors, on both local and regional scales. Our presentation will include several case studies, new ages, high resolution maps of many volcanoes and their association with young active faulting and often large earthquakes. We will present one particular high resolution case study (on Aragats volcanic complex) where we attempted to quantify the volcanic hazards. This is important as this region hosts the active Metsamor nuclear power plant and the capital city of Yerevan (population > 1.4 million), where people live in area with very low (10^6), yet existing risk for a renewed volcanic activity.