The Shavazsay Deposit (Uzbekistan) – a Large Caldera-Hosted Volcano-Sedimentary Lithium Deposit

Alla Dolgopolova[1], Reimar Seltmann[1], Rustam Mirkamalov[3], Farid Divaev[3], Rustam Khalmatov[2]
1. Natural History Museum London, Centre for Russian and Central EurAsian Mineral Studies (CERCAMS), London, United Kingdom, 2. University of Geological Sciences / Centre for Advanced Technologies, Tashkent, Uzbekistan, 3. Institute of Mineral Resources / Centre for Advanced Technologies, Tashkent, Uzbekistan

Compared to the lithium deposits of volcano-sedimentary origin of Miocene age such as Thacker Pass (McDermitt caldera, Nevada) and Jadar (Serbia), little is known about similar formations in the Central Asian Orogenic Belt.

The Shavazsay deposit is located in the Western Tienshan (Uzbekistan), as part of the Chatkal ridge, Middle Tienshan continental arc, with subduction completed in the late Carboniferous. Extensive Permian post-subduction collisional magmatism includes volcano-plutonic complexes of leucogranite, gabbro syenite-syenite-granosyenite, leucogranite and sub-/volcanic equivalents of early rhyolite-trachyrhyolite, trachybasalt-trachyandesite-trachyte and late rhyolite-trachyrhyolite, respectively. These complexes extend over 100 km, exhibiting several calderas and volcano-tectonic depressions reflecting extensional tectonics.

The Chilten caldera hosts several lithium-bearing exploration objects: the Shavazsay rare metal deposit (Li, B, Rb, Cs, REE +/- Au, Ag, As, Mo, Sr, U) and the North Shavaz and Kamyshly occurrences. Upon Devonian and Carboniferous volcanics and intrusives forming the caldera basement, the intra-caldera volcano-sedimentary suite comprises the followig from bottom to top: Oyasay complex with basal conglomerate and gravellites; rhyolite lavas, tuffs and tuffobreccias; volcanomictic aleurolites and argillites (Li mineralization is confined to a productive zone of up to 350 m with up to 4% carbonaceous to bituminous matter as trap). It is overlain by basalt seal. Both complexes are crosscut by dikes of topaz rhyolites (“ongonite,” Li-F microgranite) and trachyrholites.

Stratiform Li mineralization is hosted mainly by mica (polylithionite, tainiolite, phengite) and clays (montmorillonite). Grade varies 0.3-0.8 wt % Li_2O (average 0.57 wt % Li_2O), exceeding 2-3 wt % Li_2O in mica metasomatites. Confirmed combined indicated and measured resources ($B+C_1+C_2$) are reported as 21.1 Mt of ore and 123.4 Kt of Li_2O (State Geoinform Centre of Uzbekistan).

Whole-rock K-Ar geochronology of polylithionite metasomatites gave an age of 286+10 Ma. With its Permian age of mineralised host lithologies, Shavazsay can be considered the oldest known volcano-sedimentary lithium deposit.