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A Mineral Systems Approach for Li Volcano-Sedimentary Deposits: Commonalities with Other Li Deposit Models

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The formation of lithium volcano-sedimentary (VS) deposits requires the juxtaposition of a series of critical processes to develop grade and to be preserved in the geological record. The mineral systems approach provides an ideal framework to examine the interplay of these processes and their relative weightings across the diversity of Li-VS deposits. Through the examination of key examples—Jadar (Serbia); the deposits of the McDermitt Caldera (USA); Rhyolite Ridge (USA); and Shavazsay (Uzbekistan)—we describe these critical and constituent processes. Key amongst these are favourable melt/magma types, regional and local structural settings, and environments favourable for formation of clay and other Li phases. This analysis allows us to establish the specificity and sensitivity of the various mappable criteria, which may be used by exploration teams seeking to discover new VS deposits. An emergent theme of this work is the commonalities in some of the critical processes between Li-VS and other Li deposit types such as rare metal granites and pegmatite systems.