

SEG 2022 Conference: Minerals For Our Future

Low-density Mapping of Lithium Concentration in Stream Sediments and Definition of Geochemical Background in Minas Gerais State, Brazil

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Lithium is among the chemical elements that represent an emerging world demand, due to its use in high-tech products as lithium-ion batteries. The Investment Partnership Program Council of Brazil – CPPI, in June 2020, listed the characteristics of mineral goods that can qualify a mining investment project with government priority, among them there is lithium. One of the most used investigation methods in mineral prospecting is based on the study of stream sediments, whose prediction and reliability in detecting anomalous concentrations help to map elements availability. Stream sediments, due to their genetic complexity, can be considered representative of the geology upstream the sampling point in hydrographic basins, ideal for low-cost regional mineral exploration. This study aims to: apply different statistical techniques (TIF, MAD) to define geochemical background values of lithium concentration in these stream sediments; in a GIS environment, acquire the distribution and concentrations of lithium in seven different geotectonic units (GU) and identify potential mineral deposits. In partnership with CPRM (Geological Survey of Brazil), 3962 stream sediments were collected at a low-density scale between 2009 and 2012 throughout the state of Minas Gerais. They were treated by the laboratory SGS-GEOSOL® where the samples were dried at 60°C, quartered and sieved in meshes with an opening <80 mesh. The sieved pulps were subjected to spraying and 0.5g of each was mixed with 3ml of aqua regia (HCl + H₂NO₃ + water, in the proportion 3:1:2). The resulting extract was diluted to 1ml of water and subjected in ICP-OES and ICP-MS for 53 elements. Based on uni-varied stats (box plots) and relations to GU, the higher values are in Iron Quadrilateral (Craton part), Araçuaí Belt and São Francisco Basin (Craton). According to bi-varied stats, Li has an increasing chemical relation with Al < K < Rb < Be < Cs.