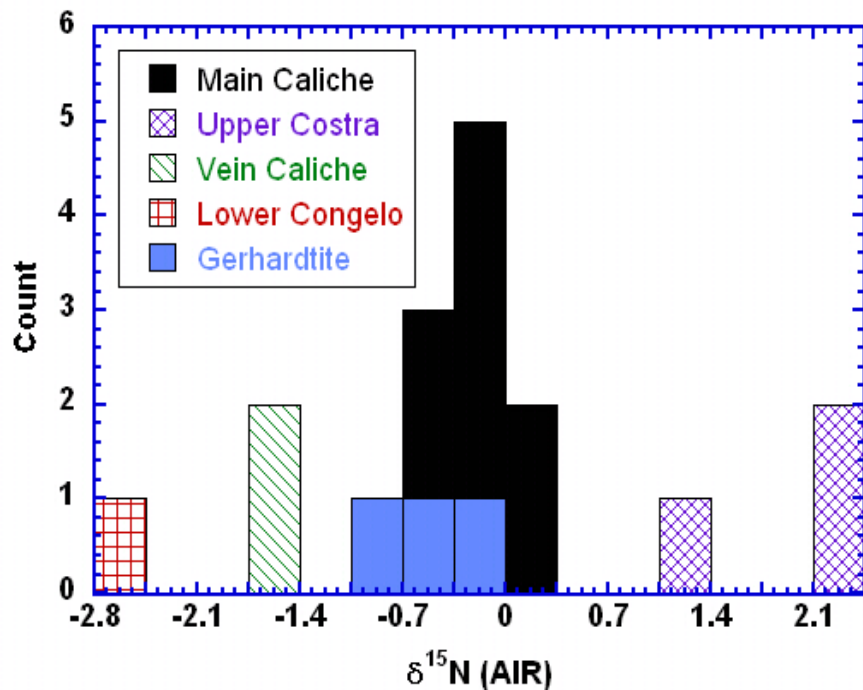


Nitrogen Isotope Stratigraphy of Caliche and Copper Nitrate of the Atacama Desert, Chile



The rare copper nitrate mineral Gerhardtite was discovered by our team at three new sites in the Atacama Desert of Chile. Nitrogen isotope analysis of this Gerhardtite suggests an atmospheric nitrogen source. Preliminary nitrogen stable isotope work has identified an isotope stratigraphy within caliche (nitrate) deposits. Together, these data suggest that copper nitrate mineralization occurred exclusively during the main stage caliche formation event (see figure).

The results of the above work on nitrate isotope systematics, the work recently published on lead carbonate isotope systematics, and the work recently published on fluid flow and acid mine drainage in coal mine waste piles will bear directly upon the diverse topics of ore deposit exploration (copper, lead, and nitrate deposits), fluid flow in porous media (petroleum and environmental geology), and acid mine drainage prevention (environmental geology).