How can publicly available national geoscience and geochemical geographic data sets be used to predict the probable presence of the rare blue tourmaline Paraiba in the United States?

Laura Budrow

GEL 4970 UR Geology

Dr. Kackstaetter

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Predicting the presence of Paraiba in the US
Laura Budrow
GEL 4970 UR Geology

Tourmalines are boron aluminosilicates that occur in crystalline igneous rocks, particularly pegmatites. Paraiba is a species of tourmaline, also known as elbaite tourmalines, that get their vivid blue color from traces of copper. Paraiba tourmalines are uncommon because the "crystal zones where they form are distinguished by not only high copper content, but also higher values of lithium and fluorine, iron values near zero, and lower concentrations of manganese" (Beurlen et al., 2011).

Geographic data will be used to generate maps utilizing ArcGIS Pro to predict the presence of this rare gem in the United States. First, maps of concentrations of boron, copper, lithium, fluorine, iron, and manganese across the United States will be produced. From there, focusing on one region or state that possesses qualities that could sustain the existence of this precious stone will create a more focused investigation and the ability to find finer data supporting igneous activity. Research will also be conducted on the active tourmaline mines in this chosen region and predictions will be made on where to explore next.

Citations

Beurlen, H., Moura, O.J.M.de, Soares, D.R., Silva, M.R.R.D., and Rhede, D., 2011, Geochemical and geological controls on the genesis of gem-quality "Paraíba tourmaline" in granitic pegmatites from Northeastern Brazil, accessed February 3, 2023, at The Canadian Mineralogist at https://pubs.geoscienceworld.org/canmin/article/49/1/277/127322/Geochemical-and-geological-controls-on-the-genesis?casa_token=ScnDmi46L1IAAAAA%3A4YI6W8p7CFYdQijRtF29i-hSl3kAQ7PkDRac-Nj-xhA0ga0HiZjUyers5yVNj2CrHMTGXXadtQ.