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Distribution of lithium in the Charlotte 1° x 2° quadrangle, North Carolina and South Carolina

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This map is a product of a geochemical survey of Charlotte 1° x 2° quadrangle, North Carolina and South Carolina, begun in 1978 that is part of a multidisciplinary study to determine the mineral potential of the area. Correlative studies are the completion of a geologic map of the quadrangle and aeromagnetic, aeroradiation, and gravity surveys (Wilson and Daniels, 1980).

The Charlotte quadrangle provides a nearly complete section across the Piedmont: its northwestern corner is in the Blue Ridge, its southwestern corner is over a basin of Triassic sedimentary rocks only a few miles from the Coastal Plain. All of the quadrangle except the southeastern corner is underlain by crystalline rocks of Precambrian and Paleozoic age metamorphosed to greenschist facies in the Slate Belt and to amphibolite facies farther west. Both premetamorphic and post metamorphic intrusive rocks are present. The rocks have been weathered to permeable saprolite to depths of 200 feet (60 meters) in the Inner Piedmont. Because of the thorough leaching, the prevalent soils are acidic.

Our heavy-mineral concentrates provided little information about the lithium contents of stream-sediment samples, so we rely upon the data presented by Ferguson (1979). The values represent the lithium contents of -100-mesh fractions of stream sediments and will be referred to here as silt.

Spodumene is by far the most prominent lithium mineral in the Charlotte quadrangle, being found in the tin-spodumene belt near Kings Mountain and in the gem and specimen mines at Hiddenite. Holmquistite--a lithian amphibole--is widely distributed in the metamorphic rocks of the tin-spodumene belt and other lithium minerals are trace constituents of the spodumene pegmatites. Of these, amblygonite may be the most common. Lithium is a minor component of some micas, which may be the most widespread host for the metal in the Charlotte quadrangle.

As would be expected, the tin-spodumene belt is the most prominent feature on the lithium map: it gave rise to most or all of the samples that contain 100 ppm or more of lithium, and many in the 20 to 99 ppm range, and none below 20 ppm lithium. The most unexpected feature is the moderately high lithium contents of samples taken as far as 10 miles north of the apparent terminus of the tin-spodumene belt east of Lincolnton. Confirmation that this northern area was mineralized is found in the high contents of Be, Sn, and Bi, common associates of Li, in nonmagnetic concentrates from the same areas. There is little geologic evidence that these metals in this area have come from pegmatites. The clusters of pegmatites of the sheet mica mining areas (Griffitts and Olson, 1953), which may be related to the Cherryville granite, are not consistently shown by high or moderate lithium contents in stream sediments.

Lithium-rich silt also parts company with the southern part of the tin-spodumene belt. Most samples collected over the southern half of the Cherryville pluton have moderately high lithium contents (20-99 ppm). There, as in the northern area, the lithium is accompanied by tin, beryllium, and bismuth. The source is probably quartz-white mica rock that forms veins and pods in that altered part of the pluton.

Stream sediments have moderate lithium contents for nearly 10 miles west of the southern part of the Cherryville pluton and are again accompanied by

tin-rich concentrates. Greisen float in that area suggests that it is the source of the metals. The rather diffuse mineralization in this area shows as separate rather large clusters of metalliferous sites scattered northward along the Inner Piedmont to the Catawba River. Passing northward along the Inner Piedmont, the lithium gradually leaves the tin behind but maintains an association with beryllium. This series of areas with lithian silt is generally west of the series of sheet mica pegmatites that once were mined for sheet mica.

The Cherryville pluton is the only one of the three stanniferous plutons in the Charlotte quadrangle that is accompanied by silts with moderate to high lithium contents. Neither the pluton at Brown Mountain nor the one near Salisbury are evident on the lithium map.

Moderately high (20-99 ppm) lithium values were reported for silt samples collected between the Salisbury pluton and the Triassic rocks at the southeastern corner of the quadrangle, where they are associated with moderate tin values in concentrates. The area is not known to have been mineralized, but small amounts of metals are rather widespread there. In addition to tin and lithium, there is a little copper, gold, and locally zinc all derived from unknown sources. Lithium contents of silts are commonly 20 to 99 ppm in the southern part of the Slate Belt, and 11 to 20 ppm farther north, values that are rather low but still are above those of much of the quadrangle.

References

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