

GSA Data Repository Item 2017126

Shah, A.K., Bern, C.R., Van Gosen, B.S., Daniels, D.L., Benzel, W.M., Budahn, J.R., Ellefsen, K.J., Karst, A., and Davis, R., 2017, Rare earth mineral potential in the southeastern U.S. Coastal Plain from integrated geophysical, geochemical, and geological approaches: GSA Bulletin, doi:10.1130/B31481.1.

## **DATA REPOSITORY**

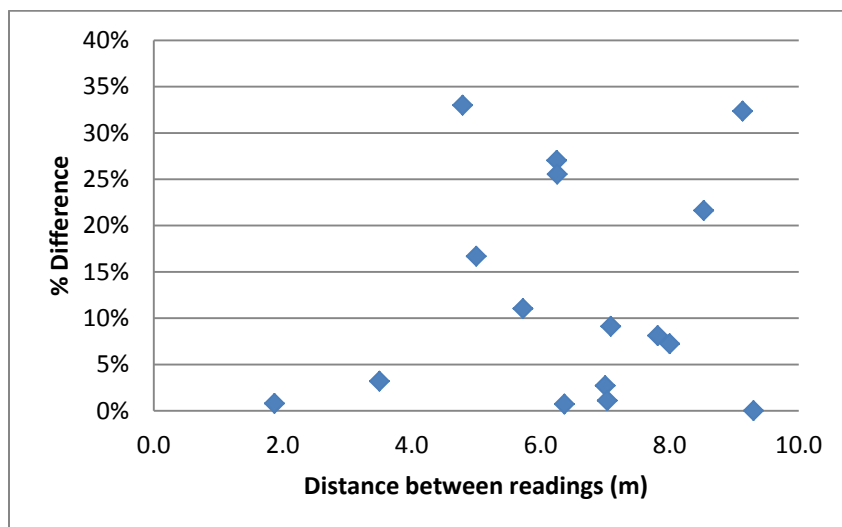
Repository Item 1. Comparison of the RS-125 to the Gamma Surveyor

Repository Item 2. Additional sample properties. Plots show titanium (Ti), iron (Fe), lanthanum (La), lutetium (Lu) and staurolite concentrations, as well as the europium (Eu) anomaly (europium divided by the square root of samarium (Sm) times gadolinium (Gd)). Elemental concentrations were measured using an ICP-AES-MS Sodium Peroxide Sinter; staurolite was estimated using X-ray diffraction. All measurements were conducted on heavy mineral separates.

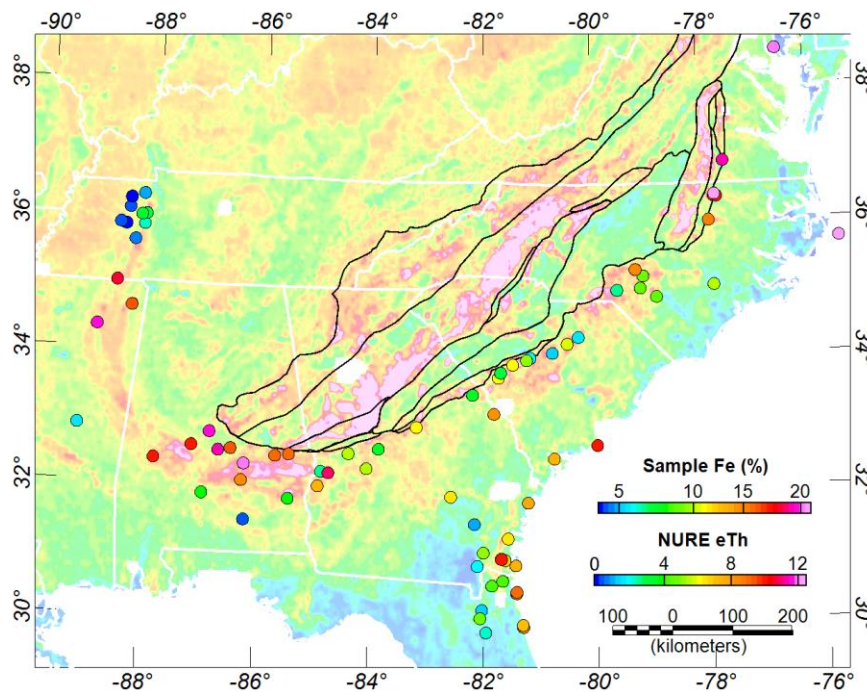
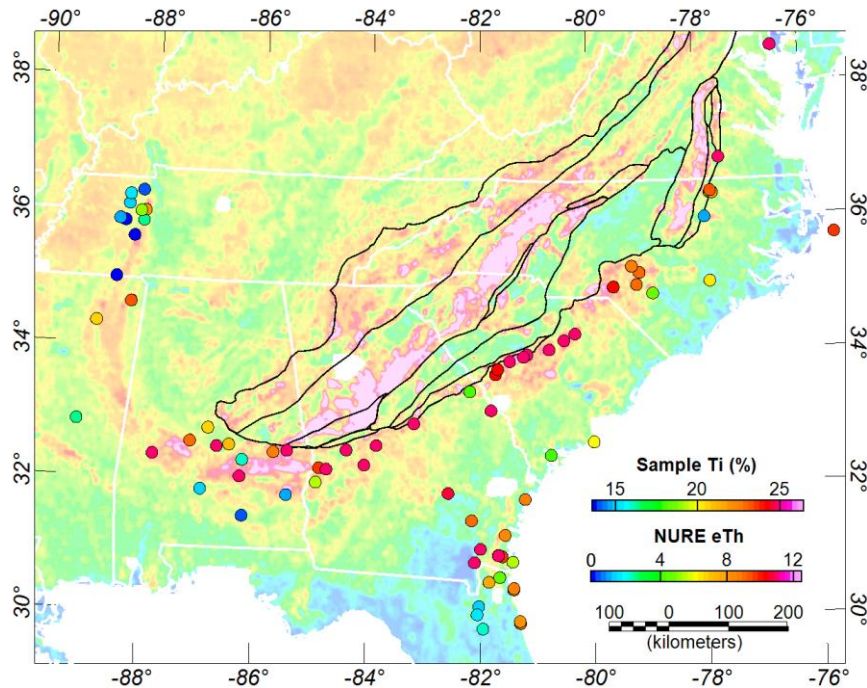
Repository item 3. Additional grid surveys for Aurelian Springs, NC and Cheraw, SC.

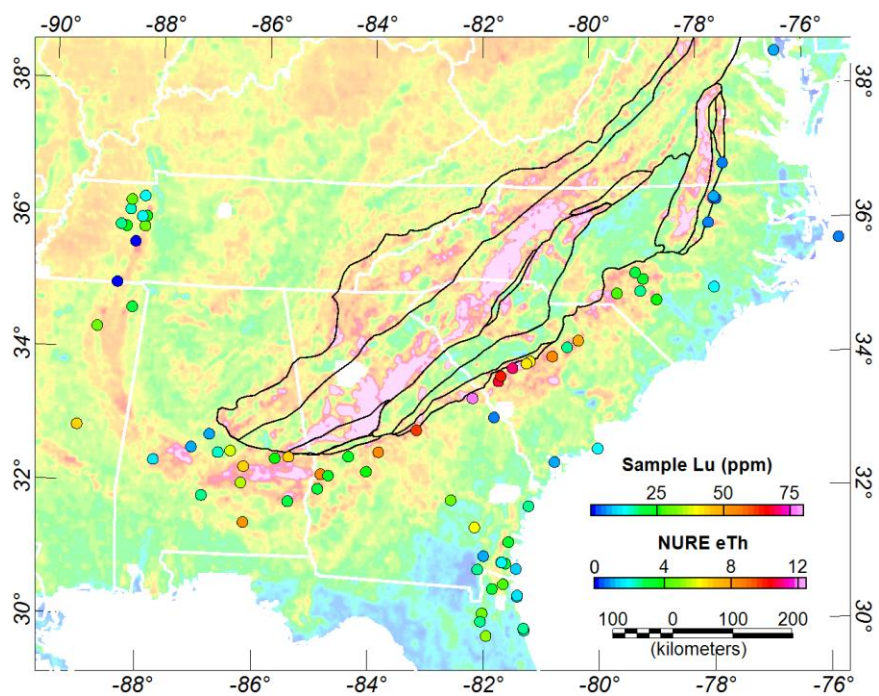
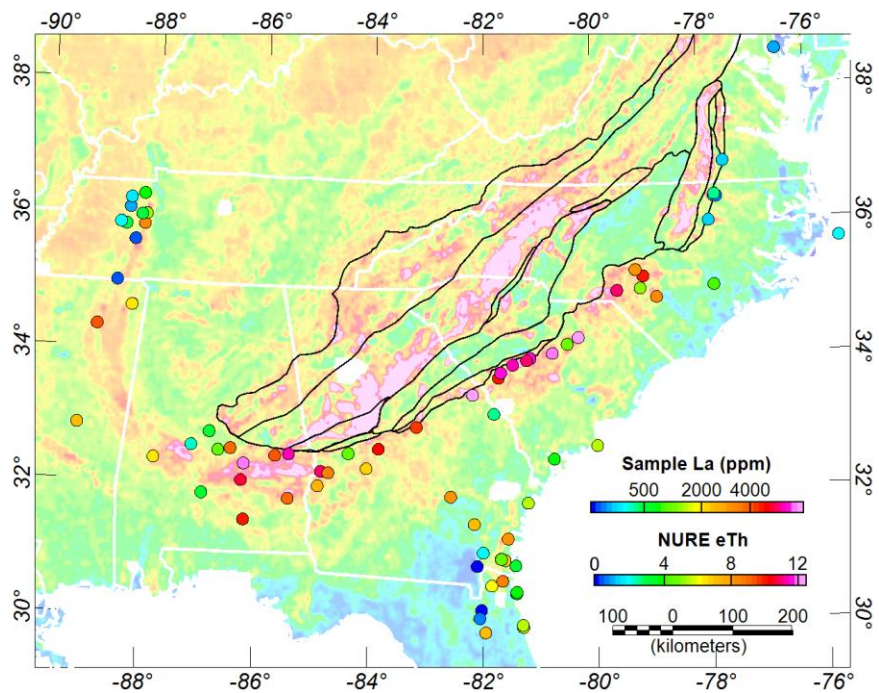
# Repository Item 1. Comparison of the RS-125 to the Gamma Surveyor

Longitude	Latitude	Gamma Surveyor eTh (eppm)	RS-125 eTh (eppm)	Distance between measurements (m)	% Difference
-79.930483	34.631393	10.06	10.9	8.0	8%
-79.930057	34.631320	11.62	14.6	5.0	26%
-79.929747	34.631205	17.86	17	7.0	5%
-79.929737	34.631695	31.87	22.8	9.3	28%
-79.482572	33.224317	10.77	14.3	9.1	33%
-79.482270	33.224193	10.91	10.8	1.9	1%
-79.482700	33.223895	13.96	15.5	5.7	11%
-79.482345	33.223707	12.34	13.8	7.1	12%
-79.482023	33.223502	16.01	16.2	7.0	1%
-79.481840	33.223642	17.25	16.7	3.5	3%
-79.481705	33.223860	11.46	17.9	4.8	56%
-79.481738	33.224075	19.52	15.3	8.5	22%
-79.481555	33.224150	14.07	18.6	6.2	32%
-79.481370	33.223828	16.76	15.4	7.8	8%
-79.481458	33.223902	15.29	15.4	6.4	1%
-79.481437	33.223537	11.55	8.6	6.3	26%

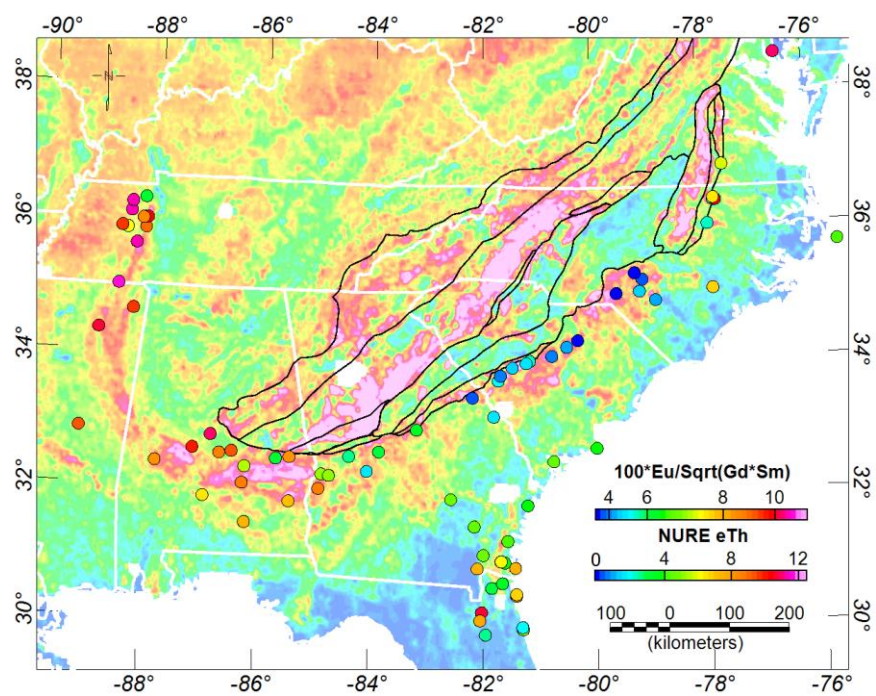
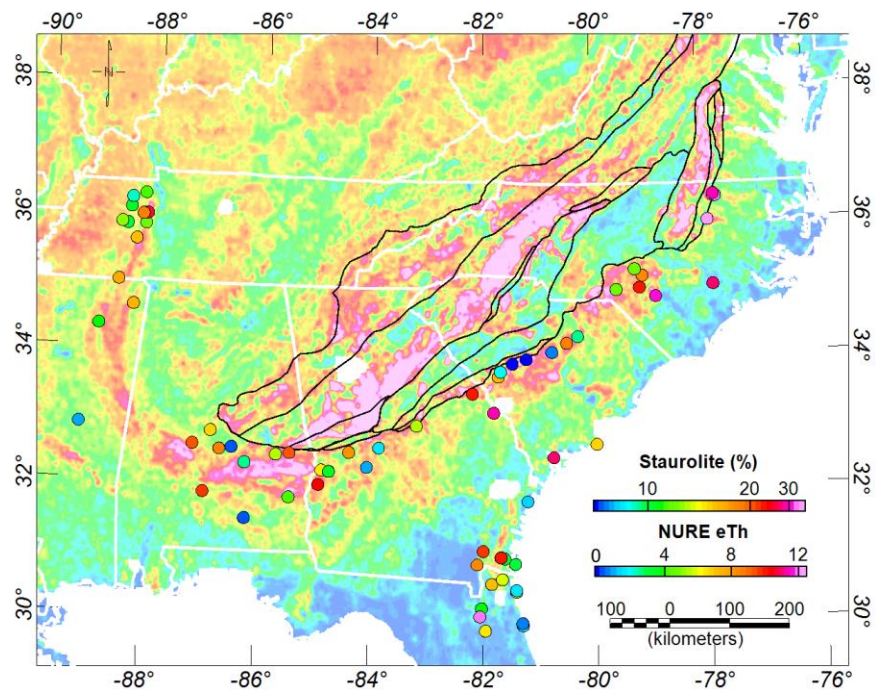


Repository Item 2: Additional sample properties. Plots show titanium (Ti), iron (Fe), lanthanum (La), lutetium (Lu) and staurolite concentrations, as well as the europium (Eu) anomaly (europium divided by the square root of samarium (Sm) times gadolinium (Gd)). Elemental concentrations were measured using an ICP-AES-MS Sodium Peroxide Sinter; staurolite was estimated using X-ray diffraction. All measurements were conducted on heavy mineral separates.









### Repository item 3: Additional grid surveys for Aurelian Springs, NC and Cheraw, SC

Radiometric and magnetic surveys were conducted in “mow-the-lawn” configurations in several additional areas.

#### Aurelian Springs, North Carolina

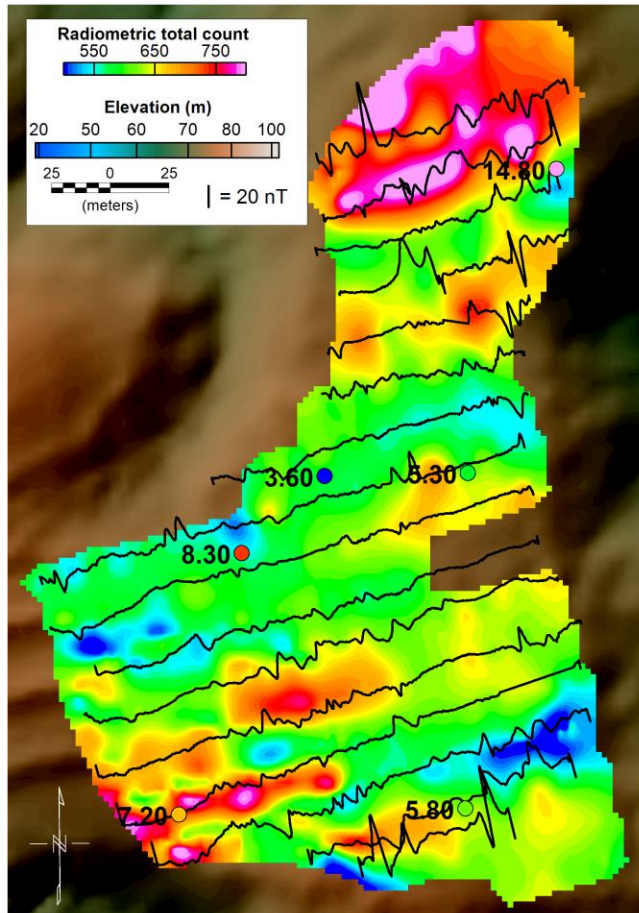


Figure R3-1. Radiometric total count data (color map) and magnetic data (line profiles) over a farm near Aurelian Springs, North Carolina. Circles represent drill holes, adjacent numbers represent the average heavy mineral % over the top 10 meters. The highest percentage of heavy minerals was observed at the northern tip of the survey (14.8% average). Radiometric total count estimates are high in this area, as well as in the southwestern part of the survey where drill data showed heavy mineral concentrations of ~7.2%. High concentrations near the center of the survey area were not imaged by the radiometric data. Gridded magnetic anomalies did not show much variation, but short-wavelength anomalies are visible in profile data in areas where radiometric highs and increased heavy minerals are present. Background image represents elevation. General location is shown in Figure 7.

## Cheraw State Park, South Carolina

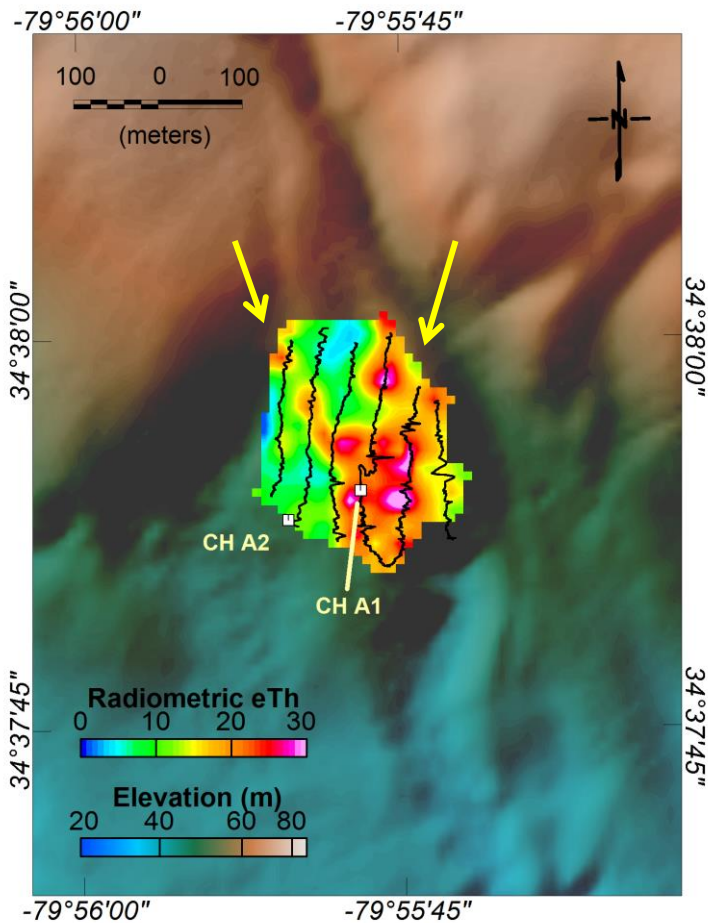


Figure R3-2. Cheraw State Park is located near the Fall Line in northern South Carolina. Elevation data (USGS NED) show indentations representing old riverbeds. Radiometric data show increased eTh corresponding to these riverbeds (yellow arrows), with strongest anomalies near the southward confluence of two riverbeds midway through the survey area. Magnetic data showed little correspondence to the radiometric data either when gridded or in profile. Profiles were high-pass filtered to emphasize shallowest sources; total magnetic field anomalies ranged several hundred nT, likely reflecting basement rock. Two auger holes were obtained within both high and low eTh areas (white squares). Materials from the high eTh area showed heavy mineral concentrations.