

Thermal infrared spectroscopy on volcanic rocks of Paraná Basin (Brazil)

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Numerous studies have demonstrated the usefulness of remotely sensed data for geological mapping. The reflectance and emissivity spectra of minerals provide diagnostic features in advance to the traditional exploration techniques for geological mapping. There is a particular interest associated with Si-O bonding, commonly referred to as the reststrahlen feature. It occurs at relatively short wavelengths (8.5 μm) for framework silicates (quartz, feldspar) and at progressively longer wavelengths for silicates having sheet, chain and isolated SiO_4 tetrahedral. On this context, a digital library of thermal infrared spectra of Parana Basin volcanic rocks (tholeiitic basalts and minor rhyolites and rhyodacites in the upper portion) has been prepared for comparison to spectra obtained from planetary and Earth-orbiting spacecraft, airborne instruments, and laboratory measurements, improving the geological mapping of these rocks. Fourier Transform Infrared (FTIR) Model-102 portable field spectrometer has been used to obtain emissivity data. The spectral signature of the samples have been analyzing with litogeochemistry and petrography. Each rock spectrum is accompanied by descriptive information in database form including compositional information, sample quality, and description of specific information. Despite the problems associated with the measurement of spectral emissivity in the field, quality data could be obtained. If the researcher is aware of the collection and environmental conditions that affect the measurements and compensates for them, accurate spectral data could be available. Among other advantages, this technique can reveal specific differences within mineral groups and between mineral assemblage in rocks, giving a fast answer and decreasing the average research budget.