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AN ERTS MULTISPECTRAL SCANNER EXPERIMENT FOR MAPPING IRON COMPOUNDS**

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SUMMARY

A visible-near infrared ratio technique, similar to the thermal infrared ratio technique applied to silicate rock-type discrimination, has been found useful for mapping iron oxide variations with aircraft multispectral scanner data. This same technique is being attempted with ERTS-A multispectral scanner imagery over the Wind River Range in Wyoming. Precambrian iron ore deposits near Atlantic City, Wyoming are the primary target, with metagabbro dikes in the Louis Lake batholith a secondary target. Both the iron ore and the metagabbro dikes have surface coatings of ferric oxide in varying thicknesses and concentrations. As wavelength increases from visible to near infrared, ferric oxide displays a rising reflectance, which produces a lower visible-to-near infrared ratio for ferric oxide than for almost any other mineral. Hence, ferric oxide should appear darker than most other geological targets, but not as dark as vegetation in such a ratio image produced from ERTS data. Ferrous iron compounds, such as siderite (iron carbonate), should display the opposite behavior if exposed in unoxidized form over areas large enough to be resolved by the ERTS scanner. Although no processed results are yet available, the approach of the experiment will be explained, including how atmospheric corrections will be attempted by both empirical and theoretical means. Slides of unprocessed ERTS imagery for the test area will be shown. If this technique works with satellite data, it should prove useful for the location of iron and nickel deposits and provide assistance in regional geologic mapping.

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