TO: NASA Scientific and Technical Information Facility

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Attached is a statement of the results of our preliminary interpretation of some early ERTS imagery. We wish to present this material at the Eighth International Symposium on Remote Sensing of the Environment, October 2-6, 1972 at the University of Michigan, Ann Arbor, Michigan. We believe that these findings are most appropriately classified under Discipline 8, Interpretation Techniques Development; subdiscipline C, Classification and Pattern Recognition.

(E72-10053) DELINEATION OF PERMAFROST BOUNDARIES AND HYDROLOGIC RELATIONSHIPS
D.M. Anderson (Army Cold Regions Research and Engineering Lab.) 29 Sep. 1972 4 p
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" Dewayne M. Anderson "

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Delineation of Permafrost Boundaries and hydrologic Relationships
5 min Comment 3:50 - 4:50 pm 29 Sept GSFC

Project: MMC 298, DE 329: Arctic and Subarctic Environmental Analyses Utilizing ERTS-1 Imagery

Discipline: 8 Interpretation Techniques Development

Subdiscipline: C Classification and Pattern Recognition

We have analyzed ERTS-1 scene 1003-21355-457, a MSS color composite of the Koyukuk-Kobuk River area, Alaska and RBV imagery of an adjoining region, scenes 1003-21341-1; 1003-21341-2; 1003-21341-3; 1003-21350-1; 1003-21350-2; 1003-21350-3; 1003-21352-1; 1003-21352-2; 1003-21352-3. Tones textures and patterns evident in this imagery were compared with existing data on surficial geology, vegetation, topography and permafrost. Preliminary results are as follows:

1. The tonal differences in the MSS color composite appear to relate to vegetation density as well as species composition. Four density levels have been identified and mapped in this scene. They are:

a. High density tones (very dark red) occurring along the stream and resulting in a galaria forest type pattern.

b. Medium density tones (dark red) on the upland areas is believed to be associated with the well developed white spruce forest. Recently burned areas within this unit are shown by very high density black tones.

c. Low density tones (reddish grey) occur in the extensive lowland areas. These areas are essentially treeless bogs and

are punctuated by many thaw lakes typical of alluvial, poorly drained permafrost areas.

d. Very low density tones (grey with very little red) probably indicative of old burn scars. In these areas shrubs are the dominant vegetation.

2. Seven surficial geology units have been recognized and mapped. They are:

a. Bedrock and Colluvium deposits
b. Outwash deposits
c. Undifferentiated Alluvial, Glaciolfluvial deposits
d. Fluvial and Lacustrine deposits
e. Eolian deposits
f. Undifferentiated deposits
g. Fluvial deposits

3. Five categories of permafrost have been recognized and mapped. In this preliminary interpretation it was found most convenient to employ geologic terms as category descriptors. They are:

a. Bedrock-Colluvium
b. Dissected-Colluvium
c. Active floodplain
d. Abandoned floodplain
e. Alluvium-Colluvium

4. The increase in size of an active burn area (Pah River fire) during the period July 8 to July 26 was determined by color densitometer planimetry to be 20,000 acres.

5. The smallest circular lake visible on the MSS color composite is about 500 feet, and about 400 feet on band three of the RBV; however, distances between stream meanders of 250 feet are equally discernible on both types of imagery.