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UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Remote Sensing Data and Interpretations Applied to the
Mineral Appraisal of the Dillon, Montana and Idaho 1° by 2° quadrangle

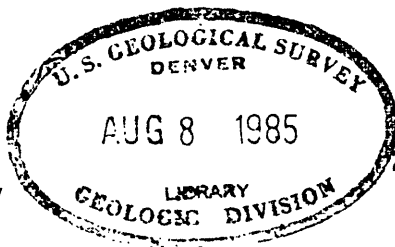
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Open-File Report 85-460

This report is preliminary and has not been reviewed for
conformity with U.S. Geological Survey editorial standards.

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1985

REFERENCE
not circulated

8 AUG 1985

Part A-- Description

This Open-File Report consists of eight 35-mm slides showing material that was presented as a poster paper at the Fourth Thematic Conference on Remote Sensing of the Environment held in San Francisco, California on April 1-4, 1985 (Purdy and Rowan, 1985). The work was carried out in conjunction with the U.S. Geological Survey's Conterminous U.S. Mineral Appraisal Program (CUSMAP) for the Dillon, Montana and Idaho 1° by 2° quadrangle (fig. 1). The data presented as slides were derived from Landsat Multispectral Scanner and side-looking airborne radar images and were applied to the mineral appraisal of the Dillon quadrangle. The data presented in this report and geologic, geophysical, and geochemical data will be published in a series of U.S.G.S. Miscellaneous Investigations Series Maps as a part of the Dillon CUSMAP Folio.

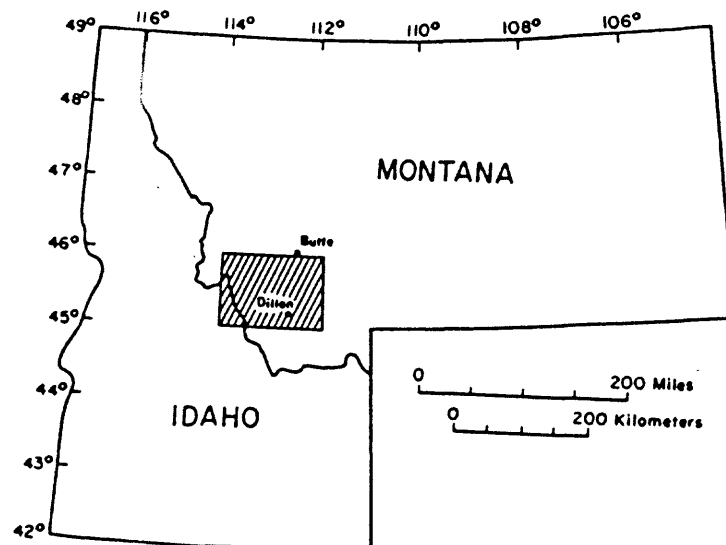


Figure 1-- Index map showing the location of the Dillon quadrangle.

The eight 35-mm slides in Part B of this Open-File Report are:

1. Landsat Multispectral Scanner color-infrared composite image (ID-2229-17394, acquired September 8, 1975) of the Dillon and Butte, Montana area.
2. Generalized geologic map of the Dillon quadrangle (modified from Ruppel and others, 1983).

3. Map showing the locations of hydrothermally altered rocks, unaltered limonitic rocks, and mining districts (Loen and Pearson, unpublished data) in the Dillon quadrangle. Altered rocks (A) are shown in red, unaltered rocks (U) are shown in yellow, and limonitic rocks which have not been evaluated with respect to alteration (L) are shown in blue. This map was produced through field evaluation of interpretations of Landsat Multispectral Scanner images that were digitally processed to enhance the diagnostic spectral characteristics of hydrous and anhydrous ferric-oxide minerals in a heavily vegetated terrain.
4. Map of linear features, lineaments, and arcuate features for the Dillon quadrangle derived from Landsat Multispectral Scanner and side-looking airborne radar images.
5. Length-weighted strike-frequency histogram of linear features mapped on Landsat Multispectral Scanner and side-looking airborne radar images for the Dillon quadrangle.
6. Contour map showing the areal density of N35°-58°E-trending linear features in the Dillon quadrangle.
7. Contour map showing the areal density of mines and prospects for the Dillon quadrangle gridded at a 5 km by 5 km spacing.
8. Composite map showing the areal density of hydrothermally altered rocks, lineaments, N35°-58°E-trending linear features, and arcuate features gridded at a 5 km by 5 km spacing. Values assigned to grid cells through an additive process are shown below.

Data Set	Values assigned to grid cells	
	Presence	Absence
Hydrothermally altered rocks	5	0
N35°-58°E-trending linear features		
\geq 10-level contour	4	0
$<$ 10-level contour and \geq 5-level contour	2	0
Lineament	2	0
Arcuate feature	2	0

References

- Purdy, T.L. and Rowan, L.C., 1985, A remote-sensing approach to the mineral appraisal of the Dillon 1° by 2° quadrangle, Montana and Idaho: International Symposium on Remote Sensing of the Environment, Fourth Thematic Conference, Summaries, Environmental Institute of Michigan, San Francisco, California, April 1-4, 1985, p. 66-67.
- Ruppel, E.T., O'Neil, J.M., and Lopez, D.A., 1983, Preliminary geologic map of the Dillon 1° by 2° quadrangle, Montana: U.S. Geological Survey Open-File Report 83-168, scale 1:250,000.