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A listing of the best quality satellite imagery from the Geological Survey's collection of LANDSAT images has recently been released as Open File 386. This listing, comprising a short introductory text, an index map, and a 60-page catalogue, is available for sales at the various Geological Survey offices.

The Landsat program, was originated and funded by the National Aeronautics and Space Administration (NASA) of the United States of America. It was described by NASA officials as 'a research and development tool to demonstrate that remote sensing from space is a feasible and practical approach to efficient management of the earth's resources'.

From the start, the Canadian Government was interested in the project, and negotiated an agreement with NASA which permitted access to direct transmissions from the satellite while over Canada. The first images from the satellite were received in Canada on July 26th 1972 and have continued to be received to the present day. The Geological Survey of Canada is concerned with the potential applications of remotely-sensed data. To help Survey geologists become familiar with this new class of image and to provide geologists with easy access to good example of it, a collection of Canadian images was established in Ottawa. This reference collection of Multi-Spectral Scanner imagery includes all the material produced from the whole of Canada with less than 20 per cent cloud cover and of technically good quality. There are more than 15 000 black and white prints representing bands from about 6000 scenes. The scale of the prints is 1:1 000 000. The collection was begun soon after the first satellite was put into orbit in July, 1972. The latest additions were made in April, 1976. The collection also includes some 500 colour composite prints chosen from the collection of the National Air Photo Library in Ottawa for their quality and for their geological interest. Many of the images are snow scenes and many are affected by atmospheric haze which serves to reduce — sometimes drastically — image contrast. Cloud may also be present anywhere within the image. So far most of the interest shown by geologists has been in locating images with little or no snow, with little or no cloud and with a clear atmosphere.

In 1975 it was decided to establish a sub-collection of very high quality images. About 25 per cent of the full collection (1500 scenes) meets the "high quality" guidelines. The present listing (Open File 386) is the "high quality" imagery.

The criteria used to select imagery for this listing are as follows:

1. Absence or near-absence of perennial snow cover. In areas where there is a permanent snow or ice cover, the period of minimum snow is usually judged to be in August or early September — as close as possible to the first snowfall of the oncoming winter season. There are a few images with snow from a single storm occupying only a few per cent of the image area. Rather more images, usually ones from the Arctic, have snow lying on sheltered slopes and along river valleys. Where either of these conditions exist, mention is made in the 'notes' column of the image concerned.

2. Relatively free of haze. The presence of moisture and particulates in the atmosphere increases the amount of non-image forming light (haze) to reach the satellite-borne scanner. This results in a reduction in density contrasts within the image. Band 4 is always most strongly affected by haze, while band 5 is less so. Bands 6 and 7 are usually not affected except when there is smog or smoke present. The criteria for "haze free" imagery, is that band 4 should be reasonably contrasty when compared with bands 5, 6 and 7 of the same image.

3. Less than 10 per cent cloud within 1½ inches of the edge of the image. The location of cloud is mentioned in the listing. More than 10 per cent cloud is accepted where it lies over a lake or over ocean. Mention is made of this in the accompanying notes. There are a few images with one or more small clouds near the image. Again, mention of this is made in the notes. When calculating the amount of cloud present, one square inch is taken to represent 2 per cent of the image.

4. Good technical quality. This is indicated by an absence or near-absence of dropped lines or other imperfections derived from the original type. The negatives from which the prints are made are also expected to be of good photographic quality i.e. with no blemishes and with a reasonable range of grey tones.

The images are listed using the Fleming system of notation, which is based on the number of the orbit track and position of the image centre along the track.

More the 90 per cent of Canada is represented. There are still a few areas where coverage is poor, the most notable of which lie in Newfoundland, Labrador and eastern Quebec.



At 80°N, this image represents the northernmost limit for the reception of Landsat images. Eureka Sound, crossing the centre of the image, separates Axel Heiberg Island (left of image) from Ellesmere Island (right of image). The image is underlain almost entirely by sedimentary rocks of Carboniferous to Tertiary age. The prominent dark grey ridges crossing Axel Heiberg and Ellesmere islands represent unvegetated shales, mudstones and calcareous siltstones. The flatter light coloured areas with an irregular vegetation cover are underlain by less resistant shales, sandstones and mudstones. Several dome structures are clearly visible in these rocks near the centre of the image. At left, glaciers radiate from the Axel Heiberg snowfields. Ordovician limestones and dolomites form the mountain ridges seen at the right part of the image.

Figure 74.1. Landsat MSS Image of Axel Heiberg and Ellesmere islands Received 28th July 1974 — Image E-1735-19044.