A most beautiful view of Antarctica for the IPY: the Landsat-7 mosaic

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Landsat imagery has long been sought-after for preparation of maps of fieldwork areas, particularly at proposed aircraft landing sites and surface traverse routes, to assess the safety of travel in these areas. Other sources of image data such as the RAMP, AVHRR, and MOA mosaics, while effective for some applications, are not well-suited for this purpose due to their much coarser resolution or microwave wavelengths. Landsat data are applicable to many of the diverse aspects of Antarctic research due to the unique and valuable combination of fine spatial resolution (as small as 15 meters), relatively large scene coverage (approximately 180km x 180km), and radiometric resolution (5 bands in the visible/near infrared, 2 thermal, 1 panchromatic). Applications include feature mapping, feature tracking, change detection, surface grain size studies, geologic mapping, and use in elevation mapping (shape from shading).

The launch of Landsat-7 in April 1999 was the most recent in a series of these spacecraft that began in 1972, and the ETM+ instrument on board includes improvements to its predecessor, the Thematic Mapper. So a campaign to collect new cloud-free images of the entire Antarctic continent was conducted beginning in September 1999, and nearly 20,000 scenes have been collected since then. Additional annual coverage of coastal and dynamically active regions continues.

With the IPY and its associated major field programs to begin in 2007, the utility of a high-quality, accurately geolocated, high resolution, multi-channel Landsat mosaic available for all researchers to obtain prior to starting fieldwork and other research is obvious. This has been proposed and accepted, and work has begun.

The mosaic comprises about 2000 scenes, chosen from the master collection of almost 20,000. Scene selection is taking place at NASA Goddard Space Flight Center. The digital mosaicking will be conducted at the EROS Data Center, and finally, distribution will occur via the National Snow and Ice Data Center. The poster presented here provides a progress report and we discuss the pertinent issues, problems encountered (both expected and unexpected), and their solutions.