The International Space Station Supports International Polar Year (IPY)

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The International Space Station (ISS) provides an excellent venue for observing Earth systems. Starting in March 2007 and coinciding with the beginning of IPY, NASA's Crew Earth Observations (CEO) payload invites IPY investigators to submit requests for relevant imagery be collected from the ISS.

Every day, ISS astronauts photograph designated sites and dynamic events on the Earth's surface using digital cameras equipped with a variety of lenses. Depending on observation parameters, astronauts can collect high resolution (4-6 m pixel size, see Robinson and Evans, 2002) or synoptic views (lower resolution but covering very large areas) digital data in 3 (red-green-blue) color bands.

ISS crews have daily opportunities to document a variety of high-latitude phenomena. Although lighting conditions, ground track and other viewing parameters change with orbital precessions and season, the 51.6^{o} orbital inclination and 400 km altitude of the ISS provide the crew an unique vantage point for collecting image-based data of polar phenomena, including surface observations to roughly 65^{o} latitude, and upper atmospheric observations that reach nearly to the poles.

During the 2007-2009 timeframe of the IPY, polar observations will become a scientific focus for the CEO experiment; the experiment is designated ISS-IPY. We solicit requests from scientists for observations from the ISS that are coordinated with or complement ground-based polar studies. The CEO imagery website for ISS-IPY (http://eol.jsc.nasa.gov/ipy) provides an on-line form that allows IPY investigators to interact with CEO scientists and define their imagery requests. This information is integrated into daily communications with the ISS astronauts about their Earth Observations targets. All data collected are cataloged and posted on the website for downloading and assimilation into IPY projects. Examples of imagery and detailed information about scientific observations from the ISS can also be downloaded from the ISS-IPY web site.

To date, the database of imagery acquired by the Crew Earth Observations experiment aboard the ISS (http://eol.jsc.nasa.gov) contains more than 54,000 images of high latitude events such as aurora, polar mesospheric clouds, sea-ice, high-latitude plankton blooms, volcanic eruptions, and snow cover. Previous scientific collaborations using these data include coordinating observations of aurora with ground-based investigators, observations of plankton blooms with ship-based experiments, imagery of volcanic activity in the Aleutians, and tracking large icebergs over time in the southern oceans.

References

Robinson, J. and C. Evans, Space Station Allows Remote Sensing of Earth to Within Six Meters, Eos, Trans. AGU, 83, 185, 188, 2002.

Figure 1: Examples of polar observations of the upper atmosphere from the International Space Station. (a) Polar Mesospheric Clouds over Alaska, and NW Canada. NASA image number ISS013-E-37301 [http://eol.jsc.nasa.gov/scripts/sseop/photo.pl?mission=ISS006&roll=E&frame=28961] was taken on June 15, 2006 at 08:04:20 UT, with 180 mm lens. Spacecraft position was 42.8^{o} N, 140.8 ^{o} W and at an altitude of 335 km. (b) Aurora over the southern polar region at sunset. NASA image ISS006-E-28961 [http://eol.jsc.nasa.gov/scripts/sseop/photo.pl?mission=ISS013&roll=E&frame=37301] was taken February 16, 2003 at 19:41:00 UT using a 58 mm lens. Spacecraft position was 51.6 ^{o} S, 79.7 ^{o} E and 391 km altitude.

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