in brief

New satellite imagery for Australia

Geoscience Australia has been acquiring and archiving satellite imagery from the Indian Remote Sensing Satellite P6 (IRS-P6, or Resourcesat-1) since 14 February 2008. The IRS-P6 development is the key component in Geoscience Australia's contingency plan for the possible failure of Landsat-5. That possibility has increased with a major reduction in the performance of Landsat-5 batteries. During Australia's winter, Landsat-5 can only image in the far north of the country before the batteries are too low for safe operation.

In June 2008 engineers from the Indian Space Research Organisation (ISRO) installed software at Geoscience Australia to allow images to be produced from IRS-P6 raw image data. Imagery will be available through commercial distributors this calendar year. Although initially the P6 images will not be ortho-rectified, eventually Geoscience Australia expects to produce all P6 data as ortho-rectified imagery.

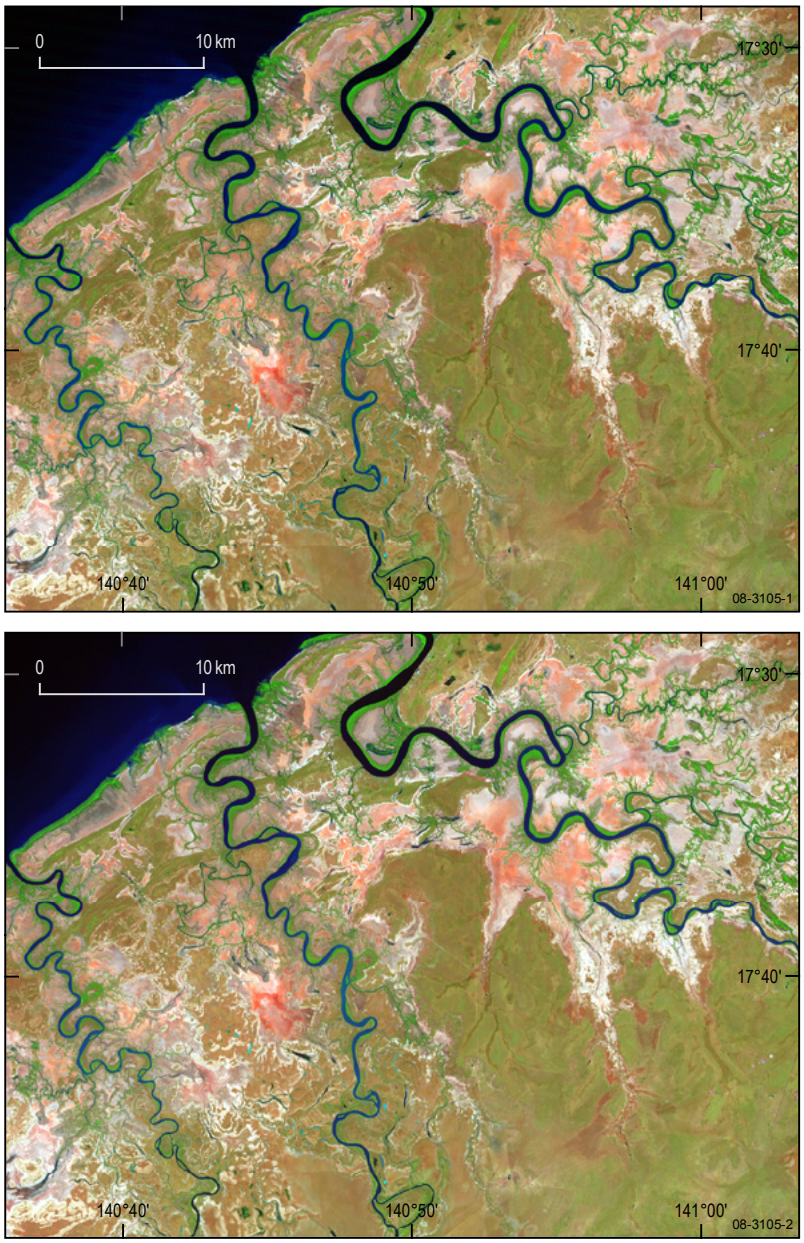

Figure 1. Comparative images from Landsat-5 and IRS-P6 with the Landsat image at the top and IRS-P6 below.

IRS-P6, launched in 2003, has several similarities to historical Landsat data and for many applications is a valid substitute for Landsat (Chander, Coan & Scaramuzza 2008). However, there are also significant differences including a 141 kilometre swath width (compared to 185 kilometres for Landsat), 24 days between overpasses (compared with 16 days) and fewer radiometric bands (see table 1). Geoscience Australia is receiving data from the Linear Imaging Self Scanner (LISS-III), which has a spatial resolution of 23.5 metres (compared to 30 metres for Landsat) but also from the Advanced Wide Field Sensor (AWiFS).

AWiFS creates new opportunities in land imaging for Australia. The instrument has a large (740 kilometre) swath width, allowing a 5-day revisit time, with a pixel size between 56 and 70 metres.

The Landsat program commenced in 1971 with the launch of Landsat-1. Geoscience Australia has a comprehensive archive of Landsat data from 1979 onwards. The latest satellite in the program, Landsat-7, developed an anomaly in its Enhanced Thematic Mapper (ETM+) sensor in 2003 causing the value of data to degrade. A replacement satellite, the Landsat Data Continuity Mission, is planned for launch in 2011.

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Table 1. Comparison of Landsat-5 TM, Landsat-7 ETM+ and IRS-P6 spectral bands.

	Spectral Range (µm)		
Band	**Landsat-5 TM**	**Landsat-7 ETM+**	**P6 AWiFS/LISS-III**
1	0.450 - 0.520	0.450 - 0.515	
2	0.520 - 0.600	0.525 - 0.605	0.520 - 0.590
3	0.630 - 0.690	0.630 - 0.690	0.620 - 0.680
4	0.760 - 0.900	0.775 - 0.900	0.770 - 0.860
5	1.550 - 1.750	1.550 - 1.750	1.550 - 1.700
6	10.40 - 12.50	10.40 - 12.50	
7	2.080 - 2.350	2.080 - 2.350	
Pan		0.520 - 0.900	

References

Chander G, Coan MJ & Scaramuzza PL. 2008. Evaluation and Comparison of the IRS-P6 and the Landsat Sensors. Institute of Electrical and Electronic Engineers. IEEE Trans on Geoscience and Remote Sensing. 46:209–221.

For more information

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Geothermal data collection heats up

An important part of Geoscience Australia's Onshore Energy Security Program is the Geothermal Energy Project. The Project aims to shed light on the type and location of geothermal resources on a national scale, and is designed to encourage exploration and investment in this renewable energy sector.

The Project will be integrating existing data and acquiring new data to map temperature in the continent's upper crust. Heat flow measurements are the primary data for quantifying the amount of thermal energy available at a geographic location. Currently there are less than 150 heat flow measurements publicly available across the entire continent resulting in a limited understanding of the distribution of heat in the Australian crust.

To produce a new heat flow measurement, both the temperature gradient and corresponding thermal conductivity of a rock sample need to be measured. The temperature gradient is measured in boreholes using borehole logging equipment. The Geothermal Energy Project has established a borehole logging capability through the purchase of a trailer mounted logging system which is currently undergoing testing and calibration, with the first measurements anticipated soon (figure 1). Thermal conductivity is measured in a laboratory using samples collected from drill cores and the Project is currently awaiting installation of a thermal conductivity meter at Geoscience Australia.

In collaboration with state and Northern Territory government agencies, Geoscience Australia will be measuring temperature gradient in selected drillholes across the continent and taking new thermal conductivity measurements of samples from state and territory core libraries.

Geoscience Australia is currently seeking available drillholes suitable for temperature logging as well as access to cores for sampling.

Figure 1. The new geothermal borehole logging equipment during a field test.

The Project welcomes enquiries from companies who might have holes available in the near future and are agreeable to allowing access to these holes for sampling.

For more information

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Related websites/articles

AusGeo News 87: In search of the next hotspot

www.ga.gov.au/ausgeonews/ausgeonews200709/geothermal.jsp