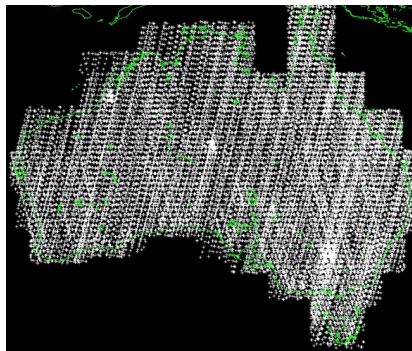
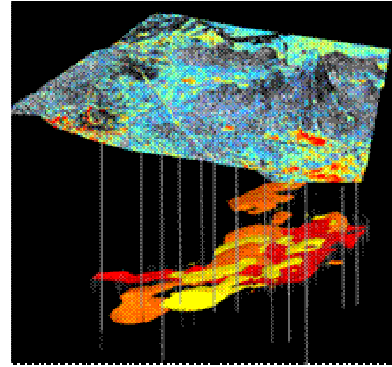


Expressions of interest

ASTER Geoscience Map of Australia

The Australian resources sector will benefit from public access to a 3D mineral map of the continent because of its value for better characterisation and understanding of the geology and regolith as well as possible discovery of resources. Large volumes of spectral data suitable for mineral mapping are being collected across Australia, including those from drill core (ANVCL – <http://nvcl.csiro.au>) and remote (airborne and spaceborne) technologies (<http://c3dmm.csiro.au>). The challenge is to produce seamless, accurate, web-accessible 3D geoscience information products from these different data/sensor types which is the goal of the WA Centre of Excellence for 3D Mineral Mapping (<http://c3dmm.csiro.au>).

However, establishing National geoscience product standards and their public delivery requires close collaboration between Federal, State and Territory government geoscience agencies, research organisations (e.g. CSIRO) and teams working in interoperability and information delivery (e.g. Auscope Grid - <http://www.auscope.org.au>).



ASTER Opportunity A significant step towards achieving a National 3D Mineral Map is processing the current satellite ASTER (www.gds.aster.ersdac.or.jp) archive (2000-2009) of Australia (~35,000 “cloud-free” scenes), which CSIRO recently secured (scene centres – left image) through ERSDAC (Japan), NASA-JPL, USGS and the ASTER Science Team. ASTER is a multi-spectral sensor with 14 “geoscience-tuned” spectral bands which provide geological information far superior to that available from Landsat TM but at lower accuracy and mineralogical detail compared with hyperspectral systems, such

as the 126 channel airborne HyMap sensor (www.hyvista.com). Suitable satellite hyperspectral imaging sensors will not be launched until 2014 (<http://www.isiswg.org>).

CSIRO has developed the software and computing capabilities required to process this large volume of ASTER imagery into GIS-compatible geoscience mapping products with successful demonstrations completed with Geoscience Australia and the respective State geosurveys for parts of Queensland and South Australia (<http://c3dmm.csiro.au>). Using this capability, Western Australia will be the first State to have completed an entire ASTER geoscience map which is scheduled for public release in the 1st half of 2011 (see next page for preliminary results). The ASTER products being generated include:

VNIR-SWIR products (definite) - indices

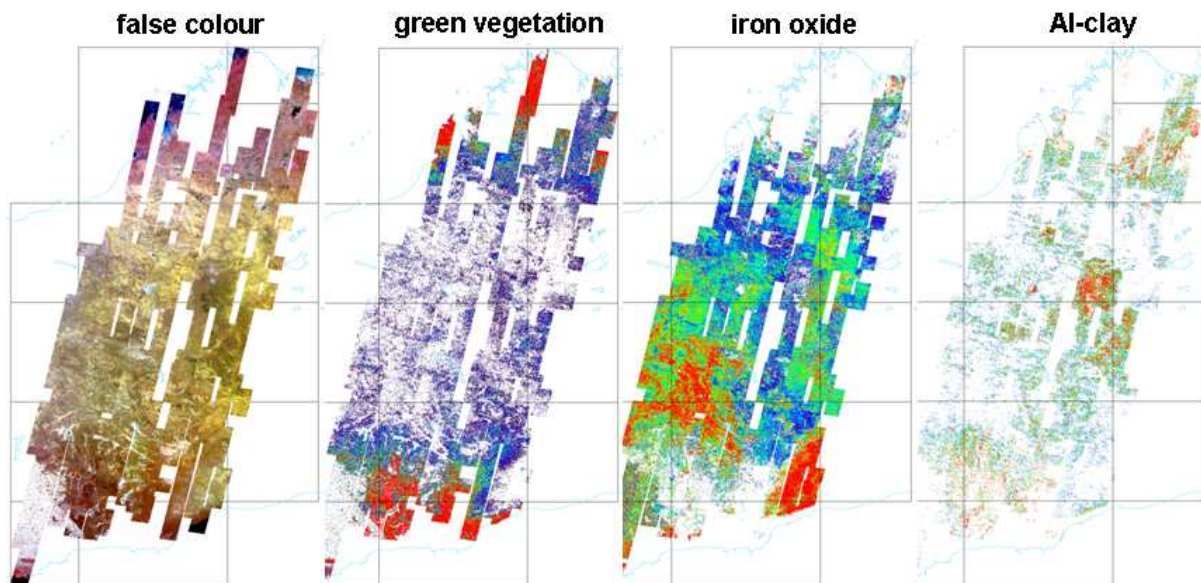
- False colour
- Green vegetation content
- CSIRO “regolith” ratios
- Ferric oxide content
- Ferrous iron content
- Opaques
- AIOH group (clay) content
- AIOH group (clay) composition
- Kaolin and “Advanced Argillic”
- Fe-OH group content
- MgOH/carbonate group content

- MgOH group composition
- Ferrous iron content in MgOH/carbonate group
- Ferric iron content in MgOH/carbonate group

TIR products (possible - still in testing and development phase) - indices

- silica (content)
- quartz (content)
- mafic (content)
- carbonate (content)

This suite of ASTER geoscience products provide basic information about the dominant rock and soil forming mineral components. For example, iron oxide, Al-clay, silica and carbonate are key regolith mineral groups. Primary mineralogy residual at the surface can be mapped using ASTER products like **ferrous iron in the MgOH/carbonate group**. Mapping different types of hydrothermal alteration include: argillic (**kaolin and advanced argillic**), propylitic (**MgOH group** and **FeOH group**), phyllic (AlOH group), silicic (**silica** and **quartz**) and skarn (**mafic**) styles. Finally, information regards REDOX conditions can be assessed from a product like **opaques**, which is sensitive to carbon black. Combined, these products can be used in a mineral systems exploration strategy (see reports available on <http://c3dmm.csiro.au>).



Project Proposal The opportunity now exists to roll out the suite of ASTER GIS-compatible (e.g. ecw, JPEG2000, geoTIF) geoscience maps, being generated for the State of Western Australia, across the entire country. These maps to then be publicly accessible via the web in standard GIS-compatible format (1:250,000 scale map sheets). The proposed project start date is 1st January 2011 with the VNIR-SWIR products to be completed and accessible by June 2012. The calibrated reflectance (and emissivity) mosaics and the higher level geoscience image files (BSQ, BIL format) will also available for internal use by the government agencies but will be not publicly available at this stage. The 3rd dimension (digital elevation and/or drill core) will not be added to this National ASTER geoscience map in this project. This opportunity is currently being demonstrated (zoom from continent to deposit scales) by other C3DMM public demonstration projects (<http://c3dmm.csiro.au>) and is expected to be tackled at a national-scale by later projects. Finally, the project will only generate one complete Australian ASTER mosaic (~3500 ASTER scenes) though future projects may generate additional continental mosaics for different periods (~3 complete mosaics possible) to help map temporal landscape change.

Contact Please contact Tom Cudahy to help secure this National opportunity.

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