in brief

Operations Hub in action for Australian Tsunami Warning System

The Operations Hub for Geoscience Australia's new Australian Tsunami Warning Centre (AusTWC) was officially opened on Friday 1 December 2006 by the Minister for Industry, Tourism and Resources The Hon. Ian Macfarlane, MP.

The AusTWC is part of the Australian Government's response to the December 2004 Indian Ocean tsunami. 'This Operations Hub is a step towards increasing Australia's capability to respond effectively in the face of another natural disaster,' Mr Macfarlane said.

Fig 1. Minister Macfarlane and guests viewing monitors showing details of earthquake activity following the opening.

The Australian Tsunami Warning Centre is part of the Australian Tsunami Warning System, a collaborative project involving Geoscience Australia, the Bureau of Meteorology, Emergency Management Australia, and the Australian Agency for International Development (AusAID). The program is coordinated by the Department of Foreign Affairs and Trade.

The AusTWC's Operations Hub will detect earthquakes in the region and examine details such as magnitude, location, depth along with other seismic characteristics to determine whether or not they are likely to cause a tsunami. This data will be used in conjunction with the Bureau of Meteorology's tide gauge data, and Geoscience Australia and the Bureau of Meteorology will work together to determine whether a tsunami warning should be issued.

The Australian Tsunami Warning Centre will operate continuously 24 hours per day 7 days a week monitoring 39 Australian seismic stations and 71 overseas stations at any time and will share its information with other countries in the region.

For more information

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Related websites/articles

Australian Tsunami Warning System
www.bom.gov.au/oceanography/tsunami/atws_summary.shtml

in brief

Sentinel system closely watched

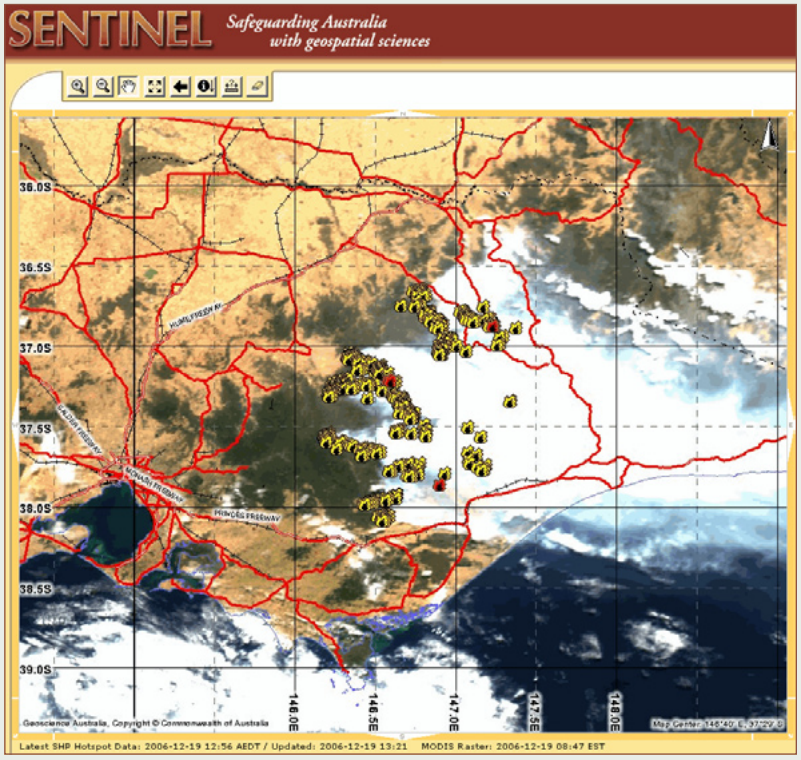

Fig 1. Sentinel download showing fire distribution at 19 December 2006.

There was unprecedented demand for information from Geoscience Australia's Sentinel bushfire hot-spot detection system during the December-January period as members of the public and emergency managers accessed the website seeking information about the location of fires.

The number of Sentinel users and volumes of data produced from the site increased rapidly in early December as forest fires raged in Victoria's Eastern Highlands and East Gippsland. During December 2006 Sentinel was used by over 40 000 unique visitors and provided over 180 Gigabytes of data, far exceeding any previous use. The usage levels for January were only slightly lower.

To manage this level of demand and possible slower access for users a 'Current Overview' page was put into service and a number of data layers were removed from the site. Emergency managers were able to access these layers using a password provided by Geoscience Australia.

Other improvements include the availability of some meteorological data following a new cooperative agreement between Geoscience Australia and the Bureau of Meteorology. Information such as wind speed and direction indicators, weather-watch radar, and isohyets are now available on Sentinel as trial layers.

Geoscience Australia is also testing hot-spot detection using the Advanced Very High Resolution Radiometer (AVHRR) satellites operated by the National Oceanic and Atmospheric Administration. If testing is successful, this would mean an increase in the daily hot-spot satellite cover from four 'overpasses' to six, thereby giving all users even more up-to-date information.

The Sentinel bushfire monitoring service is an internet based mapping tool which was developed by CSIRO Land and Water, Department of Defence and Geoscience Australia in 2003. The operational management and development of Sentinel was moved to Geoscience Australia in December 2005.

For more information

email sentinel@ga.gov.au

Related websites/articles

Sentinel
http://sentinel1.ga.gov.au/acres/sentinel/index.shtml

AusGeo News 80
Sentinel finds permanent home at Geoscience Australia
www.ga.gov.au/ausgeonews/ausgeonews200512/inbrief.jsp#inbrief1

in brief

New framework marks shift in disaster mitigation

Cyclone Larry in 2006 and the recent Victorian bushfires have again demonstrated the wide-reaching and profound impacts of natural hazards on communities and the environment. A National Risk Assessment Framework for sudden onset natural hazards is currently being implemented across the country. The framework aims to improve our knowledge about natural hazard risk in Australia and support emergency risk management and natural hazard mitigation. The natural hazards covered by the framework include bushfire, earthquake, flood, storm, cyclone, storm surge, landslide, tsunami, meteorite strike and tornado.

The framework has been implemented as part of the Council of Australian Governments (COAG) reforms for natural disaster arrangements in Australia. The COAG report Natural disasters in Australia (High Level Group 2004) advocated a 'fundamental shift in focus towards cost-effective, evidence-based disaster mitigation'. It also pointed out that there was a 'lack of independent and comprehensive systematic natural disaster risk assessments, natural disaster data and analysis.' Other drivers for the framework included:

- the potential impacts of climate change such as changes in the frequency or severity of weather-related natural hazards
- the increasing exposure of Australian communities to natural hazards because of demographic changes and increases in personal assets.

The National Risk Assessment Framework seeks to ensure that consistent and systematic information on risk is produced, and the rigour of risk assessment methods and information is improved where necessary. Consistency is important, as it allows the comparison of risks between different natural hazards and across geographic areas. Consistent information will also contribute to setting priorities for disaster mitigation at all levels from local to national. The framework covers the following risks arising from natural hazards: financial, socio-economic, casualty, political and environmental risk. Each of these risks contributes to the overall impacts of natural hazards on communities.

The framework was prepared through collaboration between government and non-government stakeholders in a series of workshops and meetings convened by Geoscience Australia. It was endorsed by

Figure 1. Damage to pre-1980s dwelling in Innisfail from Tropical Cyclone Larry.

Figure 2. Dwellings constructed after amendments to the *Queensland Building Act* in 1981 withstood Cyclone Larry better. A systematic approach to assessing cyclone risk in other tropical Australian cities will reveal the relative risk from cyclones in each city and areas of higher risk within each city.

the Australian Emergency Management Committee in September 2006. Geoscience Australia's role in the framework is in partnership with the Department of Transport and Regional Services (DOTARS) which manages the Disaster Mitigation Australia Package. The framework is designed for federal, state, territory and local government risk managers as well as risk assessment practitioners, researchers and information managers.

Two national committees have been established to implement the framework and report through the COAG process. The National Risk Assessment Advisory Group is a new Whole-of Governments working group established in September 2006. It includes representatives from each state and territory, the Australian Local Government Association, and Australian Government representatives from the Bureau of Meteorology, Emergency Management Australia, DOTARS, and Geoscience Australia.

The Technical Risk Assessment Advisory Committee is an independent panel of experts established in December 2004 to prepare the framework and to provide expert advice on natural hazard risk relevant to the COAG reforms. This group comprises experts on floods, bushfires, earthquakes and meteorological hazards, as well as experts on climate change, land use planning, insurance and building codes. This range of expertise provides knowledge of the key areas central to the mitigation of natural hazards as well the natural hazards themselves. Geoscience Australia provides the Secretariat for both of these committees.

Current priorities in the framework implementation plan include developing risk assessment guidelines, identifying gaps in our knowledge and setting priorities to increase our knowledge on risk.

References

High Level Group. 2004. Natural disasters in Australia: Reforming mitigation, relief and recovery arrangements, Report to the Council of Australian Governments. Department of Transport and Regional Services, Canberra.

For more information

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Related websites

The National Risk Assessment Framework
www.ga.gov.au/urban/

in brief

Geoscience Australia participates in National Collaborative Research Infrastructure Strategy (NCRIS)

Geoscience Australia will participate in AuScope, an exciting $42.8 million upgrade of the nation's infrastructure used to support geodetic and geological research. A number of Australian universities, and the geological surveys and spatial agencies in all states and territories were also part of the successful bid. The funding was announced by the Minister for Education, Science and Training, The Hon Julie Bishop MP on 27 November last year.

NCRIS is a $500 million package under the Australian Government's Backing Australia's Ability initiative which is providing $8.3 billion to Australian science over ten years to 2011.

AuScope will allow bridges to be built between the geodetic and geological research communities and practical applications of their science for all Australians. It has a number of elements:

1. $15.8 million has been earmarked by the Australian Government to upgrade the nation's geodetic infrastructure, matched by $50 million in funding and in-kind assistance from GA, the states, territories and participating universities. The upgrade is designed to improve the accuracy of position in Australia by an order of magnitude over the next 10 years. This will be done through upgrades to our Very Long Baseline Interferometry and Satellite Laser Ranging capabilities, highly accurate gravity surveys and almost an order of magnitude increase in the number of fixed global navigation satellite system (GNSS) receivers. There will also be a pool of portable GNSS receivers for campaign measurements in areas thought to be undergoing crustal deformation. The outcomes from this upgrade will be relevant to the Earth sciences, for example through the study of neotectonics and natural hazards, but are expected to have their biggest impacts in the farming, mining, transport, safety, defence and construction industries.
2. The remaining $27 million has been allocated for four main initiatives. It is matched by approximately $30 million in co-investment.
   - The National GeoTransect Program is a major data acquisition program and involves three key components: Earth Imaging and Structure (mostly for seismic and magnetotelluric sounding), Materials and Properties (Virtual Core Library), and Composition & Evolution (including geochemistry and geochronology).
   - AuScope Grid comprising distributed data / information storage hardware, high bandwidth network links, data management protocols, middleware and software. AuScope will also be establishing Grid-enabled access to a range of simulation, modelling, inversion and visualisation tools.
   - AuScope Simulator is a toolkit of simulation, modelling, inversion and data mining tools.
   - The AuScope Earth Model is the integrated knowledge infrastructure component of the AuScope Infrastructure System but is not funded by nor part of NCRIS. AuScope intends to work with the State and Commonwealth government geoscience agencies to plan and build the Earth Model.

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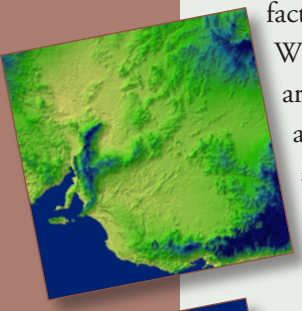
Fig 1. Vibroseis truck which is used to generate a source for seismic imaging of the Earth.

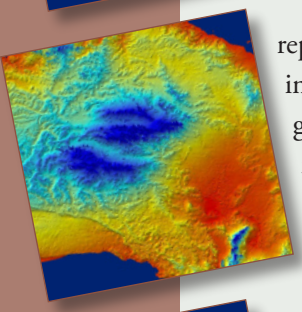
in brief

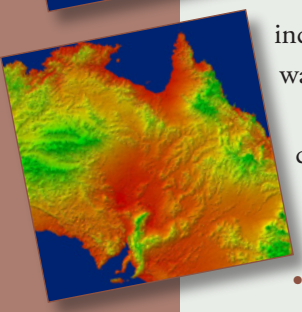
Towards a New National Elevation Database

Australian government agencies at all levels, the community and industry are driving significant increases in the demand for high quality spatial data. Issues such as climate change, coastal vulnerability, water and natural resource management, emergency management, health and safety issues all require fundamental spatial data at a range of scales to meet specific requirements. Fortunately in some instances a few key datasets, such as elevation data, can help meet a range of needs.

When examining coastal vulnerability, users need to know which areas could be inundated, and other factors such as rainfall in a catchment area which could be susceptible to tidal surge caused by a cyclone. With scientists predicting a sea-level rise during this century, regional planners require information on areas which may be susceptible to inundation. Water resource managers need to know the direction and distribution of water flows through catchments and floodplains for water accounting, agriculture and biodiversity management. Emergency managers need to be able to predict which roads may be cut by flooding, or model the potential spread of a fire. These and similar applications require information displaying the characteristics of the terrain in three dimensions.





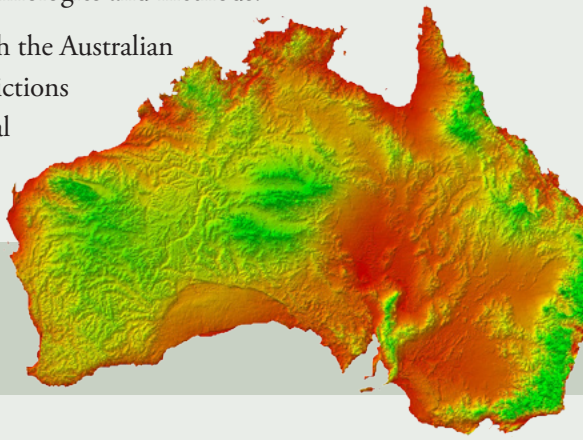


In this context elevation data are generally analysed using digital elevation models (DEM) which represent a simulated 'bare earth' dataset which can be displayed and analysed within a geographic information system (GIS). At present there are numerous DEMs held by local, state and federal governments ranging in vertical and horizontal accuracy from +/-25 centimetres and one metre respectively to state-wide DEMs with 10 metre vertical and 25 metre horizontal accuracy, whilst at the national level there is a DEM gridded at 250 metre resolution. Though the local and regional DEM needs are adequate for many significant areas there are also many gaps. Often data is captured using different standards, and duplication of effort also occurs. Licensing and data access are often inconsistent and a lack of coordination can mean that data costs significantly more than if the process was coordinated at the state or national level.

Geoscience Australia has recently initiated a New National Elevation Database Project in conjunction with the Intergovernmental Committee on Surveying and Mapping (ICSM). Though the project is in the early stages of development, recent consultation with a wide range of users has identified a number of requirements which will drive its development. These include the need for:

- very high resolution DEMs with vertical accuracies of approximately 25 centimetres in low-lying coastal areas and floodplains
- seamlessly integrated DEMs which include both topography (land) and bathymetry (water depth)
- a single point-of-truth framework with appropriate consistency in standards, license conditions and access
- a multi-resolution approach which recognises that different areas will have different data requirements
- the database to be dynamic and allow continual improvement rather than a 'snap-shot'.
- opportunities for private industry involvement using a range of technologies and methods.

Over the coming months Geoscience Australia will be working with the Australian and New Zealand Land Information Council (ANZLIC), state jurisdictions and Australian Government agencies to refine user needs and technical and administrative frameworks. A detailed implementation strategy will be developed over the next 12 months.



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