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## Establishing the ACT: From the ground up

Geoscience Australia and its predecessor organisations played a significant role in the establishment of the Australian Capital Territory (ACT).

Geoscience Australia's history dates back almost to Federation when in 1901 it was decided to set aside land for the national capital. This decision led to the establishment of the Australian Survey Office in 1910, when surveying began for the Australian Capital Territory led by New South Wales surveyor Charles Scrivener.

To commemorate the ACT Centenary, Geoscience Australia is currently hosting a display of maps, satellite images and aerial photography illustrating how the nation's capital has taken shape over the past 100 years. The display—Establishing the ACT: From the ground up—provides an accurate history and record of the land and how it has changed and developed over time. From this central theme, other themes have generated:

- *ACT Geology*—A geological overview of the nation's capital, identifying the various rock types found in the region and the geological maps of the region.
- *Then and Now*—A pictorial history of how the nation's capital has changed over the years. This display shows images collected during the construction of Canberra's infrastructure with a distinct geological flavour.
- *A Bird's Eye View*—Aerial photography and satellite images of the development of the ACT. This display also includes a selection of equipment used to gather these images.
- *Mapping and Surveying*—A story of how mapping and surveying techniques have progressed over the last 100 years. This display showcases a variety of reference and topographic maps of the ACT and the Canberra City region.
- *Scorched Pages*—This display, located within the Geoscience Australia library, showcases a selection of the books that were damaged and salvaged from a fire that occurred in 1953 at the Bureau of Mineral Resources. The collection is of great significance as it contains rare, early Australian publications and international works covering Papua New Guinea, Japan and Korea.

The Geoscience Australia foyer display also acknowledges the role of Charles Scrivener, the New South Wales surveyor who was given the task of mapping a new federal territory.

**Figure 1:** This pair of photos show the Molonglo Parkway (the west end of Parkes Way). The 1977 photo shows the cutting at ANU before it was covered to form the tunnel. At that time the then Bureau of Mineral Resources (now Geoscience Australia) carried out geotechnical studies for the alignment of the Molonglo Parkway from Acacia Inlet to Sullivans Creek.

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In addition to these displays, old mapping and surveying films have been digitalised and made accessible via touch screens, with special film showing events planned throughout 2013. These films explore Geoscience Australia's role in studying Earth processes, our role as key Australian Government advisor on all aspects of geoscience and as custodian of the nation's geoscientific and spatial information.

The display is open to the public Monday to Friday during business hours until the end of the year. Geoscience Australia is located at the corner of Jerrabomberra Avenue and Hindmarsh Drive, Symonston.

### Related articles and websites

Geoscience Australia's history
www.ga.gov.au/about-us/our-history.html

### For more information

**email** ausgeomail@ga.gov.au

## Education activities off and running for 2013

### National Youth Science Forum

Sixty of Australia's top Year 11 science students visited Geoscience Australia in January as part of the 2013 National Youth Science Forum. During their visit the students participated in a half-day workshop interacting with geoscientists to learn about techniques used to identify possible groundwater resources which are essential to Australia's sustainability in a changing climate. More than 30 of Geoscience Australia's scientists and technical staff volunteered their time to spend with the students.

**Figure 1:** Students analysing sediment samples during their visit to Geoscience Australia.

The students participated in activities to find a paleochannel which would be a suitable source of potable groundwater. Their investigations involved a range of geoscience techniques and included undertaking a scaled seismic and magnetic survey, and analysing sediment and water samples. The students not only had the opportunity to conduct experiments themselves, but to do so in a professional environment using specialised field and laboratory equipment that they would not normally have access to in a classroom.

The highlight of the day came when the students combined data and interpretations from the experiments and, after a series of presentations and discussions, the students successfully revealed the existence of a suitable paleochannel.

Geoscience Australia's Chief of Energy, Dr James Johnson met with the students and commented that this workshop provided students with a hands-on experience to engage with some of our leading scientists and learn about the major challenges facing Australia—in this instance helping to identify alternative water sources in arid Australia. Dr Johnson hoped that these talented students would be inspired by the experience to consider pursuing a career in the geosciences, and even consider

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applying for a place with Geoscience Australia's work experience and graduate programs in the future.

The National Youth Science Forum is a two-week program held in Canberra in January each year, and hosted by the Australian National University. The program is designed for students moving into Year 12 who wish to follow careers in science, engineering and technology. It offers students an introduction to research and researchers in government and industry organisations. Geoscience Australia is one of the many science education experiences offered to the students as part of the program.

### 2013 National Science Teachers Summer School (NSTSS)

As part of the 2013 National Science Teachers Summer School program, forty-five science teachers from around the country spent an afternoon in January at Geoscience Australia. The teachers visited the Sensitive High-Resolution Ion Microprobe (SHRIMP), the Australian Tsunami Warning Centre and the Geoscience Australia Education Centre's 3D theatre.

The NSTSS program is designed to provide science teachers a unique experience in Earth science education to stimulate their passion and, in turn, enhance the teaching of Earth science to their students. The teachers left with a more rounded understanding of Geoscience Australia's capabilities—and a showbag brimming full of educational material.

The Geoscience Australia Education Centre is staffed by trained educators, science communicators and geologists and offers structured hands-on activities with science and geography curriculum focus for visiting school groups.

### Related articles and websites

Geoscience Australia Education Centre
www.ga.gov.au/education.html

National Youth Science Forum
http://www.nysf.edu.au/

National Science Teachers Summer School
http://asta.edu.au/programs/nstss

### For more information

**email** ausgeomail@ga.gov.au

## Series of seismic events in Solomon Islands triggers large earthquake and tsunami

The Santa Cruz earthquake sequence began on 30 January 2013, resulting in a local tsunami and over 120 separate earthquakes in southern parts of the Solomon Islands chain known as the Santa Cruz Islands. A tsunami was produced from a magnitude 7.9 (M7.9) undersea earthquake on 6 February 2013 at 12:12 AEST (01:12:30 UTC), with an epicentre located approximately 80 kilometres west of Nendo Island (figure 1). The undersea earthquake occurred at a depth of 32 kilometres below the seabed, which immediately prompted a tsunami warning for surrounding Pacific nations. The Joint Australian Tsunami Warning Centre (JATWC) advised that there was no tsunami threat to Australia.

The earthquake caused severe shaking on Nendo Island, and generated a tsunami that impacted local islands, with 10 people confirmed dead and 13 people injured in Temotu Province. Over 3300 people were affected as their houses were swept away by the tsunami. In total, almost 600 houses were destroyed and Lata wharf, the key supply point to Nendo Island was damaged. Assessment of tsunami affected areas suggests that the tsunami runup was 3.5 metres above the coastline in Temotu Province (OCHA, 2013). Overall, the impacts of this tsunami were not as severe as damage produced by a M8.1 earthquake and tsunami in the Solomon Islands in 2007, which is reported to have killed 52 people.

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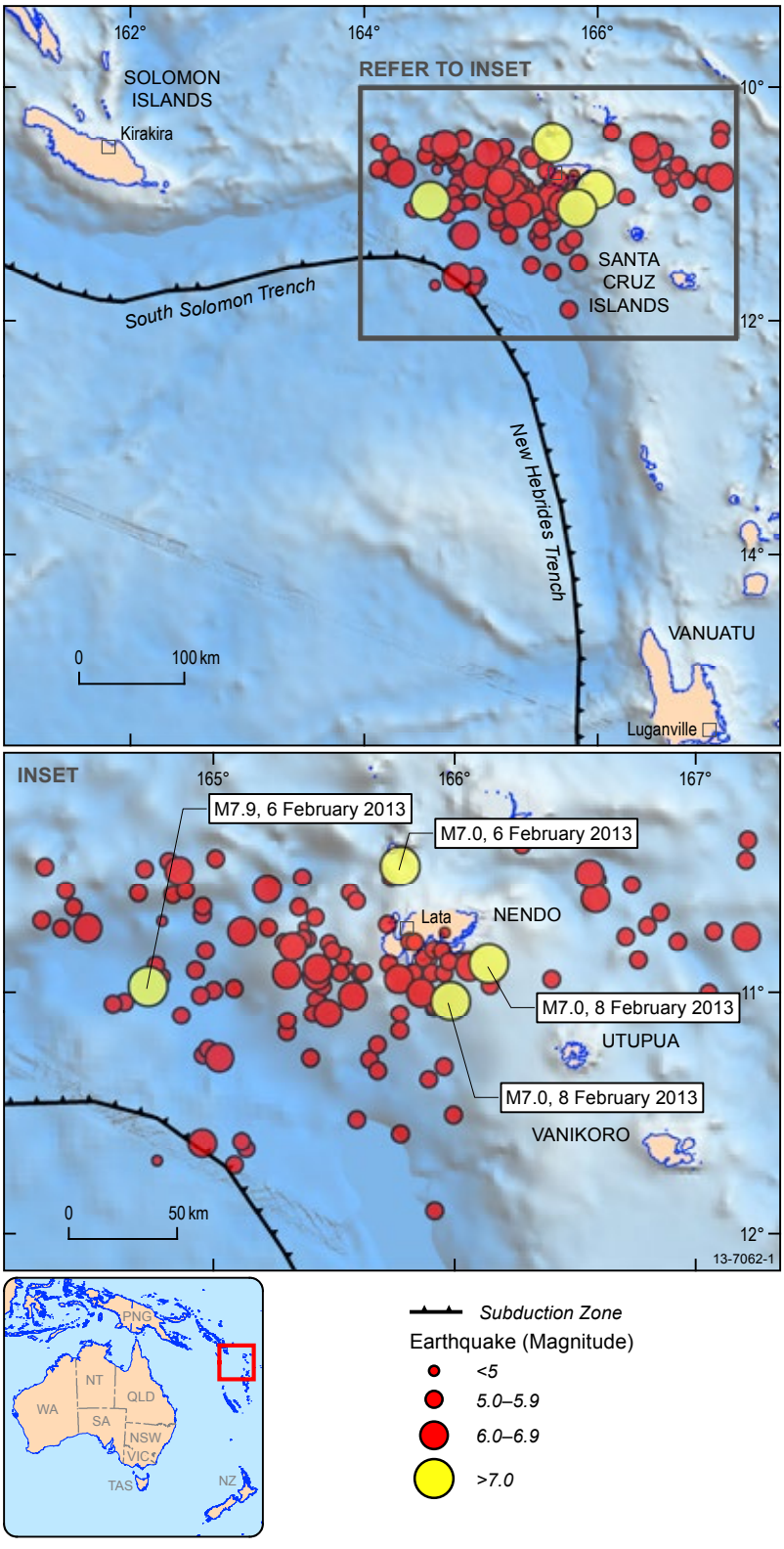


**Figure 1:** Map showing the magnitude 7.9 earthquake that occurred in February 2013 in southern parts of the Solomon Islands, and all earthquakes above magnitude 4.7 that were recorded around the Santa Cruz Islands from late January 2013, until late February 2013. Earthquakes of magnitude 7.0 and above are highlighted in yellow. The map also shows the tectonic plate boundaries.

There had been a notable increase in earthquake activity in the Santa Cruz Islands in the week prior to the M7.9 earthquake and tsunami. From 30 January onwards, Geoscience Australia recorded eight earthquakes above magnitude 6. This included a magnitude 6.4 earthquake that occurred at 11:07 AEST on the same day as the M7.9 earthquake.

More than 90 aftershocks were recorded in the Santa Cruz Islands region in the week following the M7.9 event; three of these were M7.0 (figure 1). The earthquakes are located on the Australian-Pacific Plate boundary, where the Australian Plate is being subducted beneath the Pacific Plate. The tectonic plate boundary is complex at this location, changing from East-West along the Solomon Trench, to North-South along the New Hebrides Trench. The M7.9 earthquake occurred at the northern end of the New Hebrides section.

Subduction zone tectonic settings around the world are typically very seismically active, and often generate large magnitude earthquakes (for example, March 2011, Tohoku Japan M9.0; December 2004, Sumatra-Andaman M9.1-9.3). The Solomon Islands lie in an active tectonic region, where many significant earthquakes have occurred in the past. This includes a M8.1 earthquake in the Solomon Islands on April 1, 2007. The epicentre from this event was located approximately 850 kilometres north west of the recent M7.9 event. In addition, later the same year on September 2, a magnitude 7.2

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earthquake struck the Santa Cruz Islands. This earthquake was located only 130 kilometres away from the epicentre of the 6 February M7.9. This earthquake activity is a result of a build-up of stress at the plate boundary as the Australian Plate moves towards the north-northeast at a rate of approximately 7 centimetres per year (Blewett, 2012).

Earthquakes and tsunamis are monitored via the JATWC operated by the Australian Bureau of Meteorology in Melbourne and Geoscience Australia in Canberra. The JATWC monitors, analyses and alerts for earthquakes occurring in our region as part of the Indian Ocean Tsunami Warning and Mitigation System, and warns the Australian community of potential tsunami impacts to Australia's coastline and external territories. In the case of the Santa Cruz earthquake, the Duty Seismologist responded with an earthquake solution within 12 minutes of the earthquake origin time.

## References

Blewett R. 2012. Shaping a nation: a geology of Australia. Canberra: Geoscience Australia and ANU E-Press.

United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2013, Solomon Islands: Earthquake and Tsunami Situation Report No. 5 (as of 15 February 2013), OCHA Regional Office for the Pacific.

## Related articles and websites

Earthquake Monitoring
www.ga.gov.au/earthquakes/staticPageController.do?page=earthquake-monitoring

Solomon Islands 2007 tsunami: GA Earth Observation and Satellite Imagery
www.ga.gov.au/earth-observation/basics/gallery/international-locations/solomon-islands-2007-tsunami.html

The Joint Australian Tsunami Warning Centre
www.bom.gov.au/tsunami/about/jatwc.shtml

Earthquakes @ Geoscience Australia
www.ga.gov.au/earthquakes

***If you have felt an earthquake, you can find earthquake information and fill in an online felt report at Earthquakes @ Geoscience Australia or you can contact the Earthquake Hotline on 1800 655 739.***

## For more information

**email** ausgeomail@ga.gov.au