

## 150 years of continuous geomagnetic monitoring in Australia

Today, Flagstaff Gardens is a short walk from Melbourne's Central Business District. Surrounded by busy streets, it is a tiny green oasis in the midst of a big city – a far cry from its quieter scientific past. In May 1858, an observatory measuring changes to Earth's magnetic field began operation on Flagstaff Hill. A similar observatory had operated in Hobart from 1840 to 1854 until a lack of resources in the young colony forced its closure.

The Flagstaff Hill observatory was established by Georg von Neumayer, a young German scientist, who obtained the necessary funds and equipment from the Duke of Bavaria. His enthusiasm for geomagnetism also extended to arduous field campaigns by horse and cart throughout Victoria and into New South Wales and South Australia in the 1860s. During an expedition in 1862, von Neumayer was memorably recorded in the iconic painting of Mount Kosciusko by Eugene von Guérard.

Melbourne's rapid expansion, with the associated construction and increasing traffic, began to disturb the quiet conditions at Flagstaff Hill necessary to measure subtle magnetic-field changes. In September 1862, observatory operations moved to a new site at the Royal Botanic Gardens (figure 1). The magnetic environment remained suitably quiet there until the 1900s when the introduction of electric trams in Melbourne changed conditions dramatically and forced another move, this time to the country.

In 1919 a new observatory was established at Toolangi, about 50 kilometres northeast of Melbourne. Magnetic-field monitoring continued at this site until the transfer of operations to a new observatory near Canberra in 1979 except for a 12 month break after a devastating bushfire in January 1939. Toolangi's subsequent closure in the mid-1980s ended an impressive span of more than 60 years of operation at a single site. Operations continue at the Canberra observatory today.

This sequence of geomagnetic observatories, beginning in Hobart, provides a significant history of magnetic-field measurement in southeast Australia. Figure 2 shows how the direction of the magnetic field in southeast Australia has changed over that time.

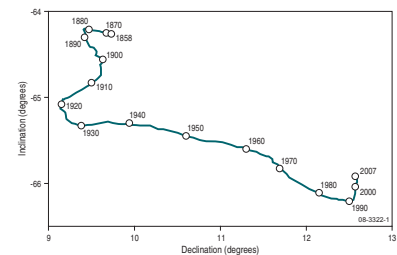
Geomagnetic observatories monitor the constant changes in Earth's geomagnetic field whether caused by solar activity, or the motion of molten fluids in Earth's outer core. Today Geoscience Australia operates six geomagnetic observatories in Australia and three in Antarctica. They provide a wealth of information for a variety of purposes, ranging from natural resource exploration to space weather forecasting.

### For more information

phone Adrian Hitchman on +61 2 6249 9800  
email [adrian.hitchman@ga.gov.au](mailto:adrian.hitchman@ga.gov.au).



**Figure 1.** The Old Melbourne Observatory 'Magnet Hut' (left), near the Shrine of Remembrance (background) and tramlines along St Kilda Road.



**Figure 2.** The magnetic field direction at Canberra, Australian Capital Territory, 1858 – 2007. Historic values have been adjusted to the Canberra site. 'Declination' is the angle in the horizontal plane between true north and magnetic north. In southeast Australia magnetic north is to the east of true north, represented by the positive declination values in the graph. 'Inclination' is the angle the magnetic field makes with the horizontal plane. In the southern hemisphere the magnetic field is directed out of the Earth, represented by the negative values of inclination in the graph.

### Related websites/articles

Real-time magnetic-field data from Geoscience Australia  
[www.ga.gov.au/geomag](http://www.ga.gov.au/geomag)

North-east view from the northern top of Mount Kosciusko by Eugene von Guérard  
(National Gallery of Australia)  
[artsearch.nga.gov.au](http://artsearch.nga.gov.au)

*AusGeo News 86:* Gnamagara geomagnetic observatory—50 years young  
[www.ga.gov.au/ausgeonews/ausgeonews200706/observatory.jsp](http://www.ga.gov.au/ausgeonews/ausgeonews200706/observatory.jsp)