Australian Government
Geoscience Australia

Amateur Seismology in Australia – a Review

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Summary

The cost of seismic equipment is steadily going down, and therefore becoming more within the reach of amateurs. Amateur seismology has the potential to make useful information quickly available over media such as the world wide web, and assist with the infill of seismic stations needed in Australia

There are two dominant styles of amateur equipment in use in Australia:

1. Long-period pendulum style sensors with low-cost data loggers (Figure 1).
2. Short-period recorders using recycled equipment, or low-cost amplifiers/ digitisers, and low-cost GPS receivers for timing (Figure 2).

Figure 1. Lehmann-type sensor with low-cost data logger (as built by Dave Dobeson).

Figure 2. Alby Judge (Martin Observatory) with short-period Public Seismic Network equipment.

Amateurs are experimenting with web-based technology and can provide information rapidly via this medium (Figure 3). Some of the useful websites that are currently available are shown in Table 1.

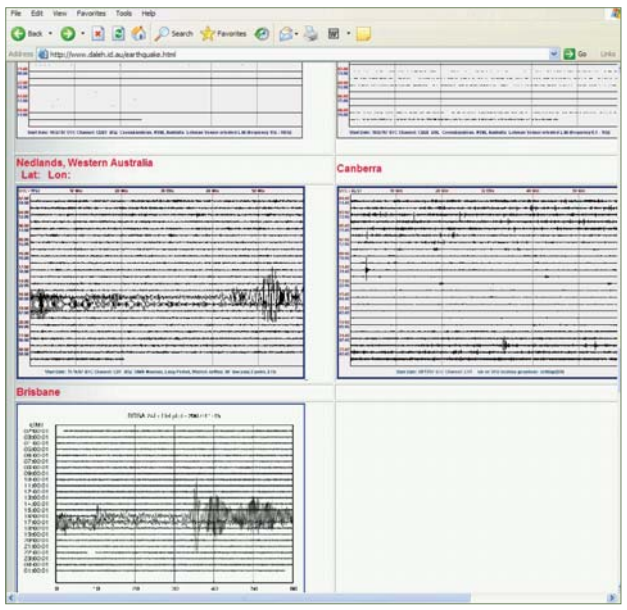

Figure 3. Screen-shot from Dale Hardy's web-site, showing Mag 7.7 Chile event of 14 Nov 2007, recorded at seismographs in Brisbane and Perth.

Table 1. Websites relating to amateur seismology

WEBSITE	COMMENTS
www.quaketrackers.org.nz/	New Zealand schools program
www.amateurseismologist.com/	Source of AS1 equipment for IRIS
www.turramurra-h.schools.nsw.edu.au/library/asp/quake/quake.asp	live feed from Turramurra High School
www.iris.washington.edu/edu/AS1.htm	IRIS seismographs in schools program
http://psn.quake.net/lehmntxt.html	reproduction of 1979 Scientific American Article – Lehmann seismograph
http://science.uniserve.edu.au/school/Seismograph/	Dave Dobeson's site describing Lehmann seismograph
http://cyllene.uwa.edu.au/~vdent/SEISMIC	"live" UWA and UQ seismograms
www.bgs.ac.uk/schoolseismology/	UK School seismology program run by British Geological Survey
www2.ifjf.uib.no/SEIS-SCHOOL/	Norwegian schools site
www.mgm.monschau.de/seismic/	German schools site
www.map.id.au/seismic/	Coonabarabran Seismic Station
www.daleh.id.au/	Dale Hardy, Mark's Pt., NSW
http://seismo.cqu.edu.au/	Mike Turnbull, Univeristy of Central Queensland

The low cost of digital technology these days means that amateur seismology could and should be promoted, particularly in the school environment. A school could be equipped with a working seismograph for approximately $500. A list of some of the current significant amateur operations in Australia is shown in Table 2, and their locations shown in Figure 4.

Seismographs are relatively sparsely distributed throughout Australia, and a good amateur network could provide information useful in improving the accuracy of epicentres, and lowering the magnitude detectability threshold in remote areas.

Table 2. Private seismic stations in Australia

STATE	LOCATION	DATE OPENED	OPERATOR	CODE	SENSOR	SOFTWARE
ACT	Aranda	1999	Kevin McCue	RNDA	Willmore Mk II	Kelunji
	Kambah	Dec 1985	Marion Leiba	KBH	L4C	MEQ
WA	Martin	1989	Alby Judge		Willmore Mk II	PSN
	Nedlands	1972	UWA		Spengnether LP	PSN
	Broome	July 2006	Broome SHS		Willmore Mk II	PSN
	York	April 2007	York DHS		4.5Hz geophone	AMASEIS
NSW	Mark's Pt	Jan 2006	Dale Hardy		Gundersen-S	PSN
	Swansea	Jan 2006	Colin Stuart		Lehmann	PSN
	Coonabarabran	Jan 2006	Andre Philips	CBB	4.5Hz geophone	PSN
	Gundaroo	July 2007	Primary School	GUND	Willmore Mk II	PSN
	Turramurra	2005	Dave Dobeson		Lehmann	AS1
SA	Modbury Hts	1988	Modbury SHS	THS	L4C	
VIC	Sandon	13 Feb 2006	Gary Gibson	S88B	S7000	Kelunji
QLD	Gin Gin	1 June 1995	Mike Turnbull	FS03	S6000	Kelunji

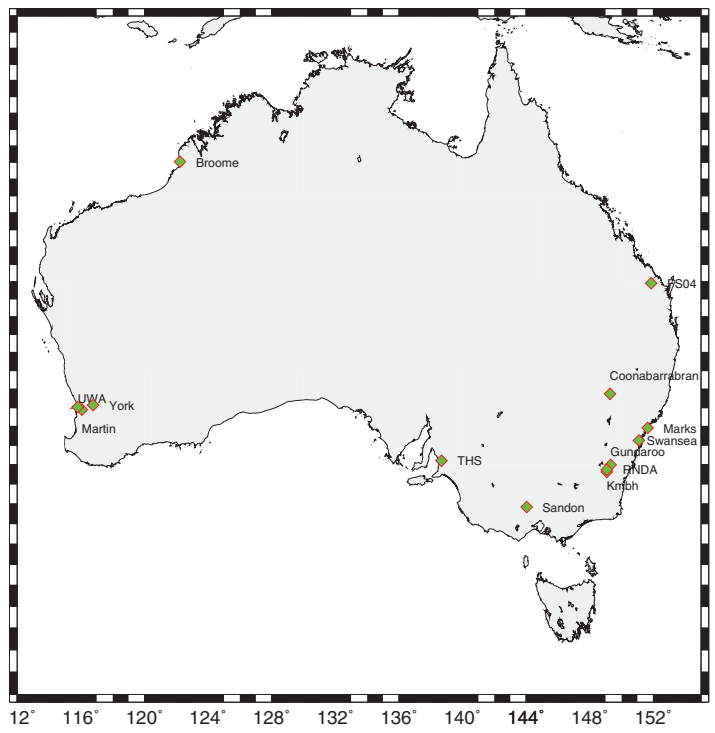

Figure 4. Amateur seismic stations in Australia.

References

Dent, V.F., Harris, P. and Heal, D., (2006) A new low-cost seismograph network in Western Australia. *Proceedings of the 2006 Conference, AEES*, Canberra ACT Nov 2006 p 185.

Dobeson, D., (2005) Build your own Seismograph. *Silicon Chip Magazine*, V18, No 9, Sep 2005.

Doyle, H and Underwood, R. (1965) Seismological Stations in Australia Aust J. Sci, Vol 28, No. 2

Gibson, G (2006) Seismological contributions to earthquake risk Mitigation *Proceedings of the 2006 Conference, AEES,* Canberra ACT November 2006, p 41.

Husbye, E., Beketove, E, Fedorenco, Y., (2003). School Yard Seismology. *Journal of Geoscience Education*, V 51, pp 329-335

Sagar, S & Leonard, M. (2007) Mapping the Magnitude of Completeness of the Australian Earthquake Catalogue. *Proc of AEES, Wollongong*, 2007.

Strong, C.L.,(1975).The Amateur Scientist- Electronic stratagems are the key to making a sensitive seismometer. *Scientific American,* V 233, #3 pp 182–188

Udias, A & Stauder, W. (2002) The Jesuit contribution to Seismology. The Intern'l Handbook of Earthquake and Eng. Seismology, Vol 81A, 2002 Int'l Assoc Seismol. & Phy. Earth's Int.

Walker, J. (1979). How to build a simple seismograph to record earthquake waves at home *Scientific American, V241, # 1 pp* 134–141

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