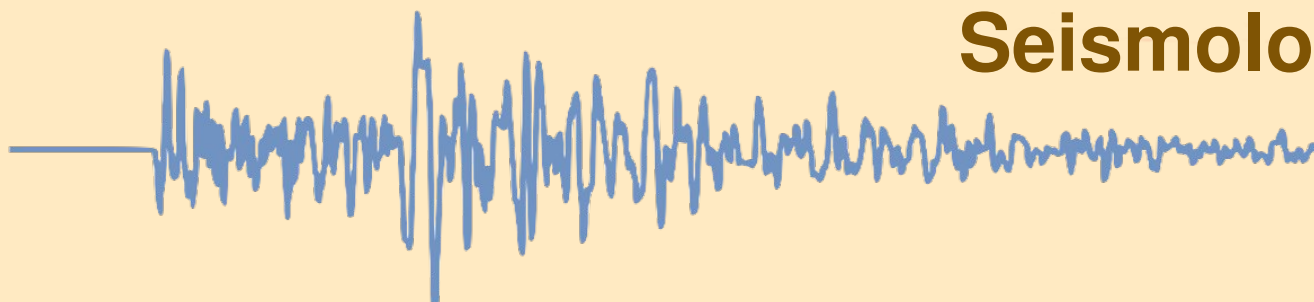




**Newsletter of the Seismological Association
of Australia Inc. Jul-Aug 2018**



Seismological Association of Australia Inc.

Newsletter of the
Seismological Association of Australia Inc.
PO Box 682, Mylor SA 5153

Your Committee

Chairperson - Blair Lade

m: 0407 189 061 e: blairl@bettanet.net.au

Chief Seismologist - David Love

p: 08 8336 8003 e: david@earthquake.net.au

Public Officer - Paul Hutchinson

m: 0419 829 216 e: windfarmer@bigpond.com

Treasurer - Joe Grida

m: 0407 558 036 e: joe.grida@internode.on.net

Editor - Peter Gray

m: 0418 829 632 e: weaksignals@iinet.net.au

The SAA can be contacted by post to the
address above, or by email to any member of
Committee, as listed above

Membership of the SAA is open to all, with the
only prerequisite being an interest in seismology.
Membership applies for the calendar year
(January through to December)

Membership fees are:
Full member \$50

A Membership application form can be obtained
from the Treasurer.

Member Submissions

Submissions for inclusion in the Newsletter are
welcome from all members; please note that
submissions may be held over for later editions.
Wherever possible, text submissions should be
sent via email in almost any word processing
format. Your name may be withheld only if
requested at the time of submitting. Images
should be high resolution and uncompressed,
although high resolution JPEGs are acceptable.

All enquiries and submissions should be
addressed to the Editor and preferably sent by
email to weaksignals@iinet.net.au

A word from the Editor

My apologies for the delay in getting this issue
out, I have lots of excuses but won't bore you
with them here, send me an email. The first
person to complain gets the job next year.

Included are some images and an example of
some "learning material" from Science Alive,
held in Adelaide recently. This event was the
SAA's first public outing so there was much to be
done to make it successful. I hope you can
appreciate the effort that went into the three days
of the display, along with the preparation, setup
& breakdown of the stand by SAA members.

I have started a list of links that you might find of
interest. Please send me any other links that
you think might help your fellow members.
On the subject of sending me stuff, I look
forward to receiving some submissions for SAA
Newsletter #8 over the next few weeks.
Submissions for this current edition were pretty
lean and so I was very close to pulling out that
book I mentioned some time ago. You have
been warned!!

Enjoy.

Peter Gray



Recent Seismic Events

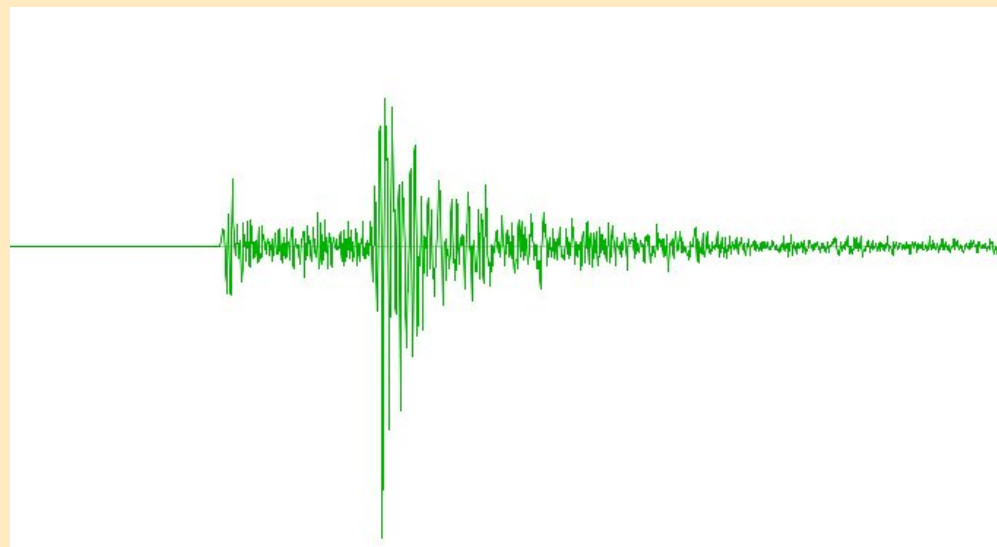
2018-07-01 CLEVE M3.7

Prepared by David Love, Chief Seismologist, SAA.

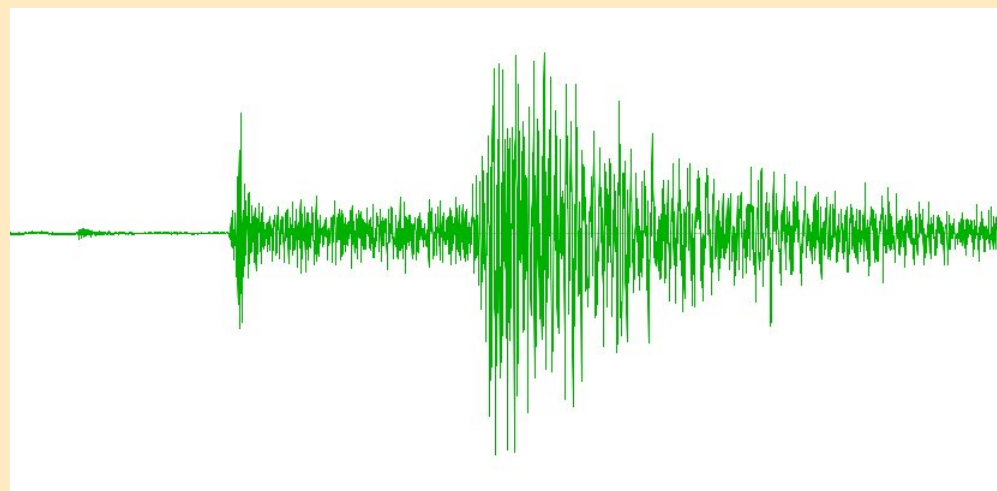
An earthquake occurred near Cleve on 1st July at 02:28 UTC (11:58am local time). The Seismological Association of Australia calculated that it was centred 18km north-east of Cleve, at a depth of about 26km. It had a magnitude of 3.7, which would normally be felt up to about 45km away, however being at a depth of 26km would mean that people nearby were unlikely to get strong shaking.

Many seismographs operated by the SAA, Geoscience Australia, schools and local citizen scientists have recorded the event. The nearest seismograph, operated by the SAA, was located on the outskirts of Cleve.

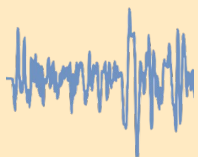
The hilly area to the north-east of Cleve has occasional activity. In 2010 an earthquake of about magnitude 5.0 occurred further to the north-east. It had a depth of about 20km. The following year, a magnitude 4.0 earthquake occurred only slightly north of Cleve.



Earthquake recording from Cleve seismograph



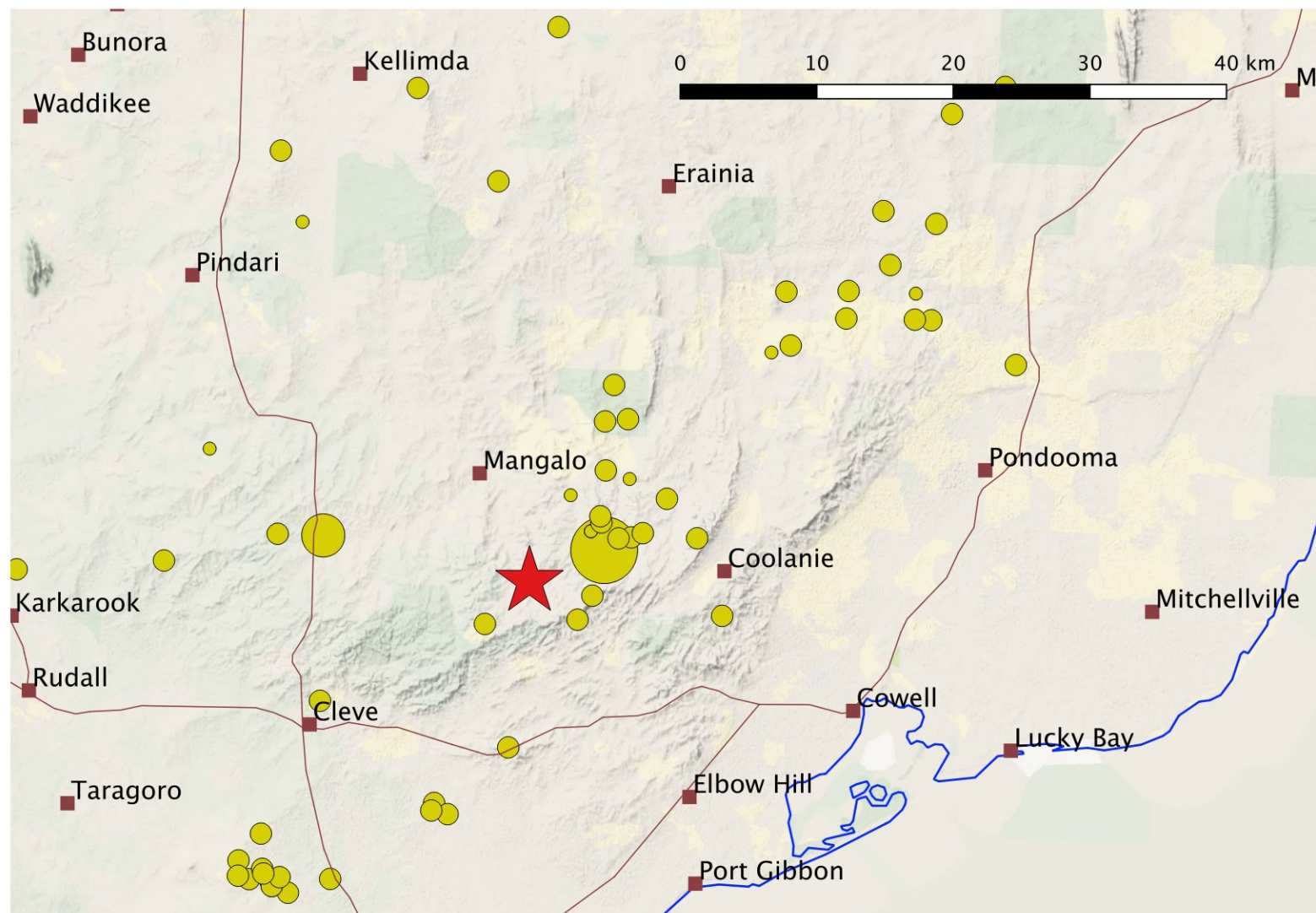
Earthquake recording from Cummins Area School seismograph

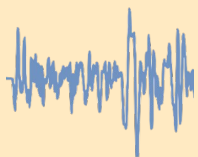


Recent Seismic Events

2018-07-01 CLEVE M3.7

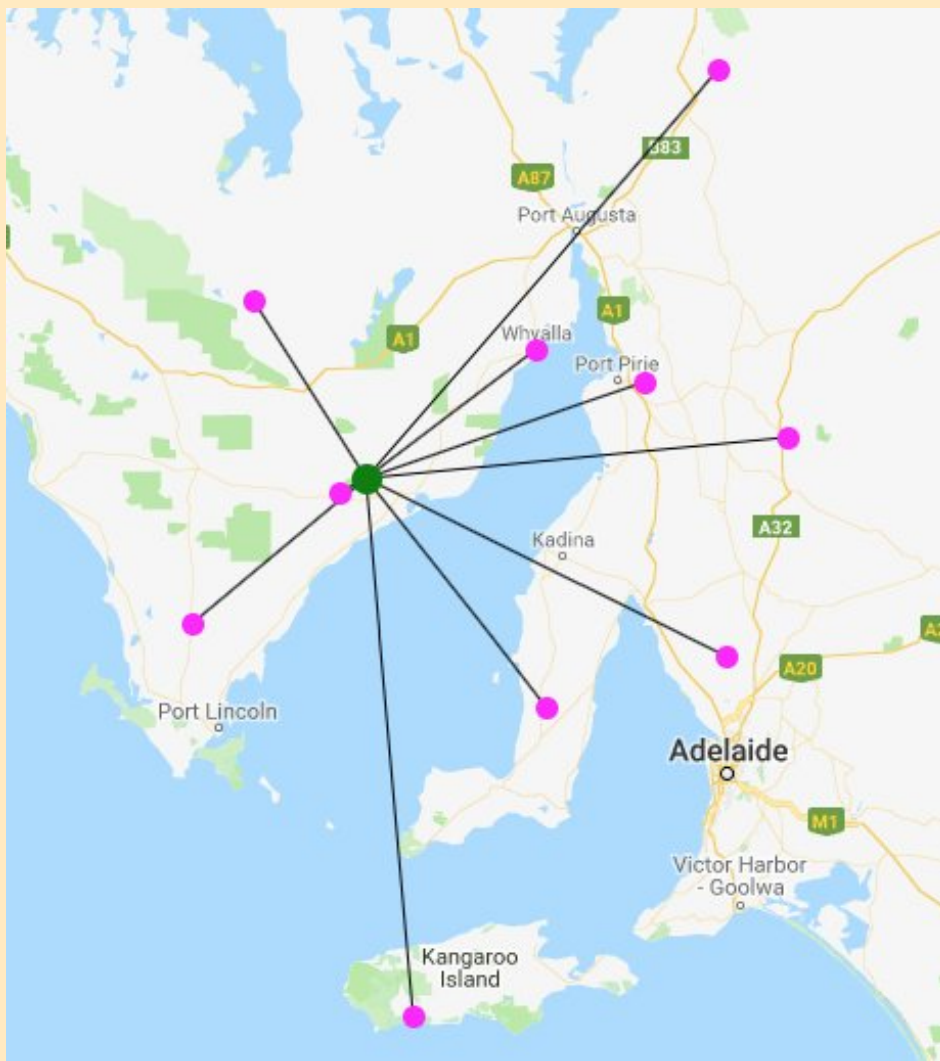
Map of the area
showing
earthquakes over
magnitude 2, from
2008 to 2018





Recent Seismic Events

2018-07-01 CLEVE M3.7



Seismographs used to calculate the epicentre

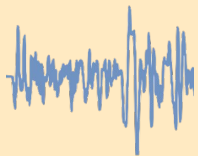
2018-08-08 PALMER M2.8

Prepared by David Love, Chief Seismologist, SAA

An earthquake occurred near Palmer on 8th August at 11:01 UTC (8.31 pm local time).

The Seismological Association of Australia calculated that it was centered 7km south west of Palmer, at a depth of about 17.8km with a magnitude of 2.8.

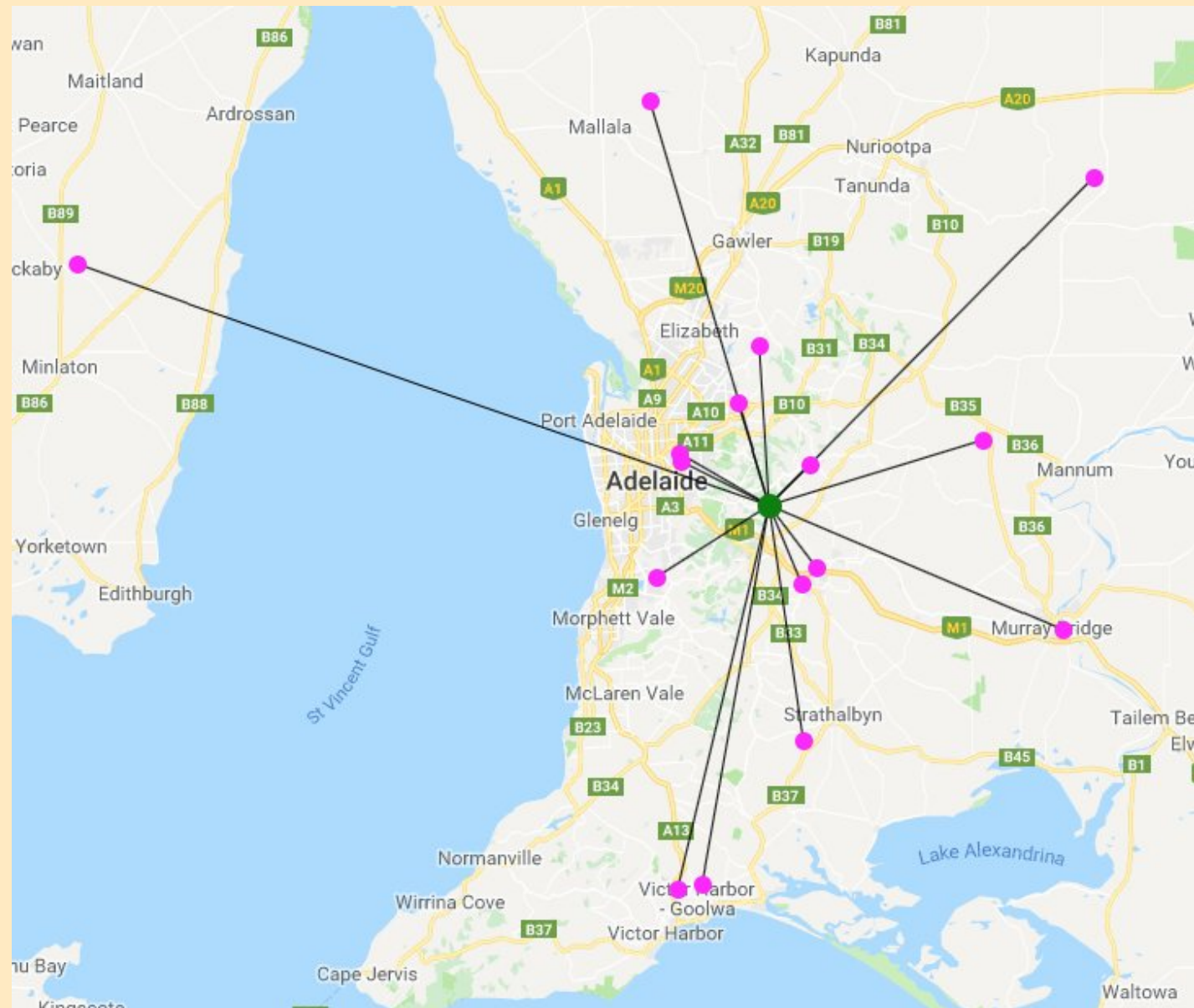
Many seismographs operated by the SAA, Geoscience Australia, schools and local citizen scientists have recorded the event. The nearest seismograph was at Palmer, Upper Tea Tree Gully and Murray Bridge, all owned and operated by members of the SAA.

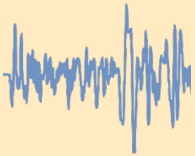


Recent Seismic Events

2018-08-08 PALMER M2.8

Seismographs
used to calculate
the epicentre

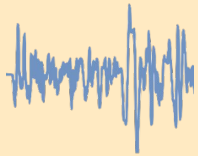




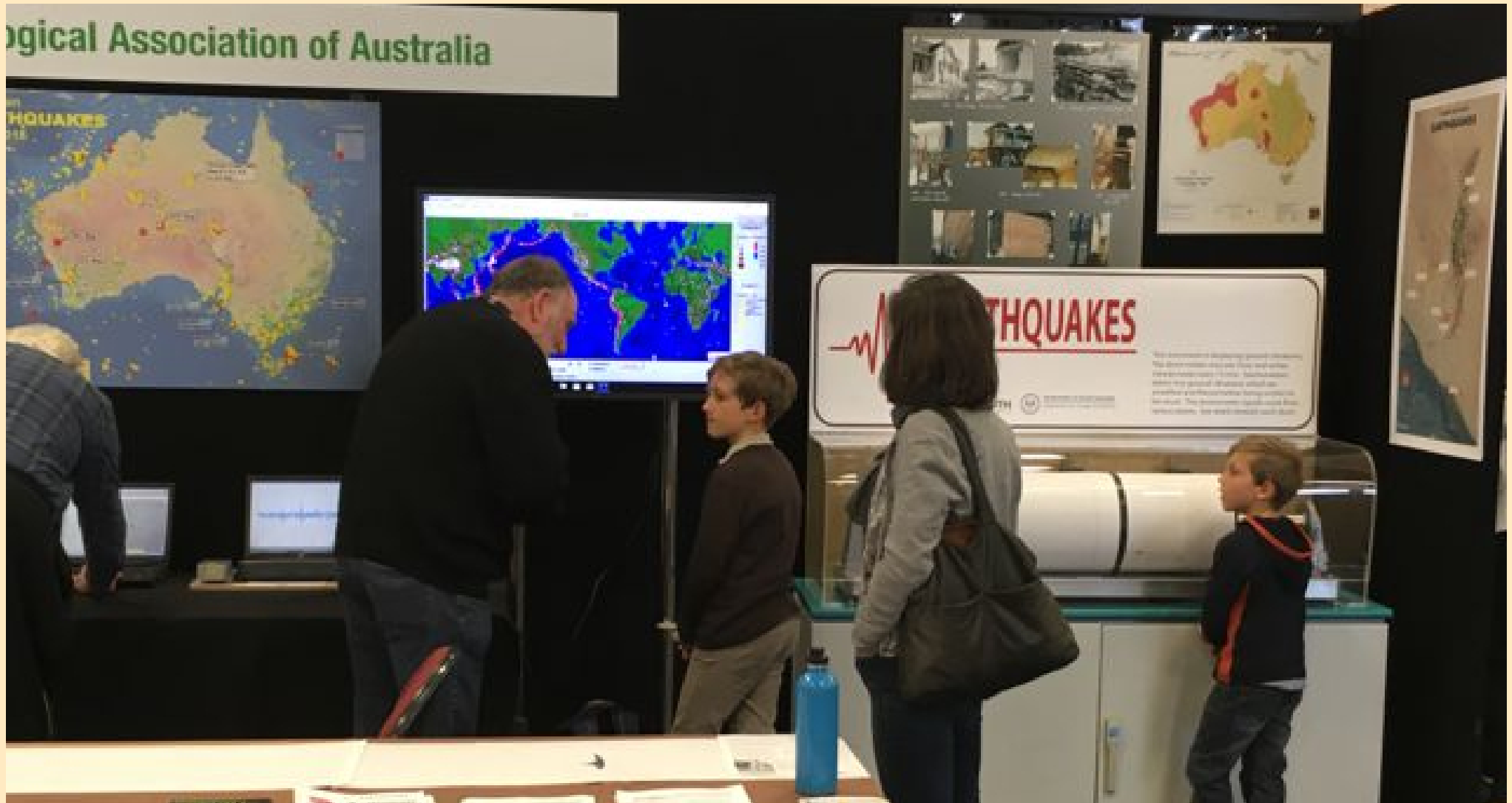
SAA at Science Alive - Adelaide 2018



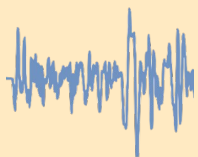
Paul Hutchinson (right) discusses the drum recorders with visitors, whilst David Love (middle) demonstrates the Seismic Eruptions program by Alan Jones. John Duffield (left) watches on.



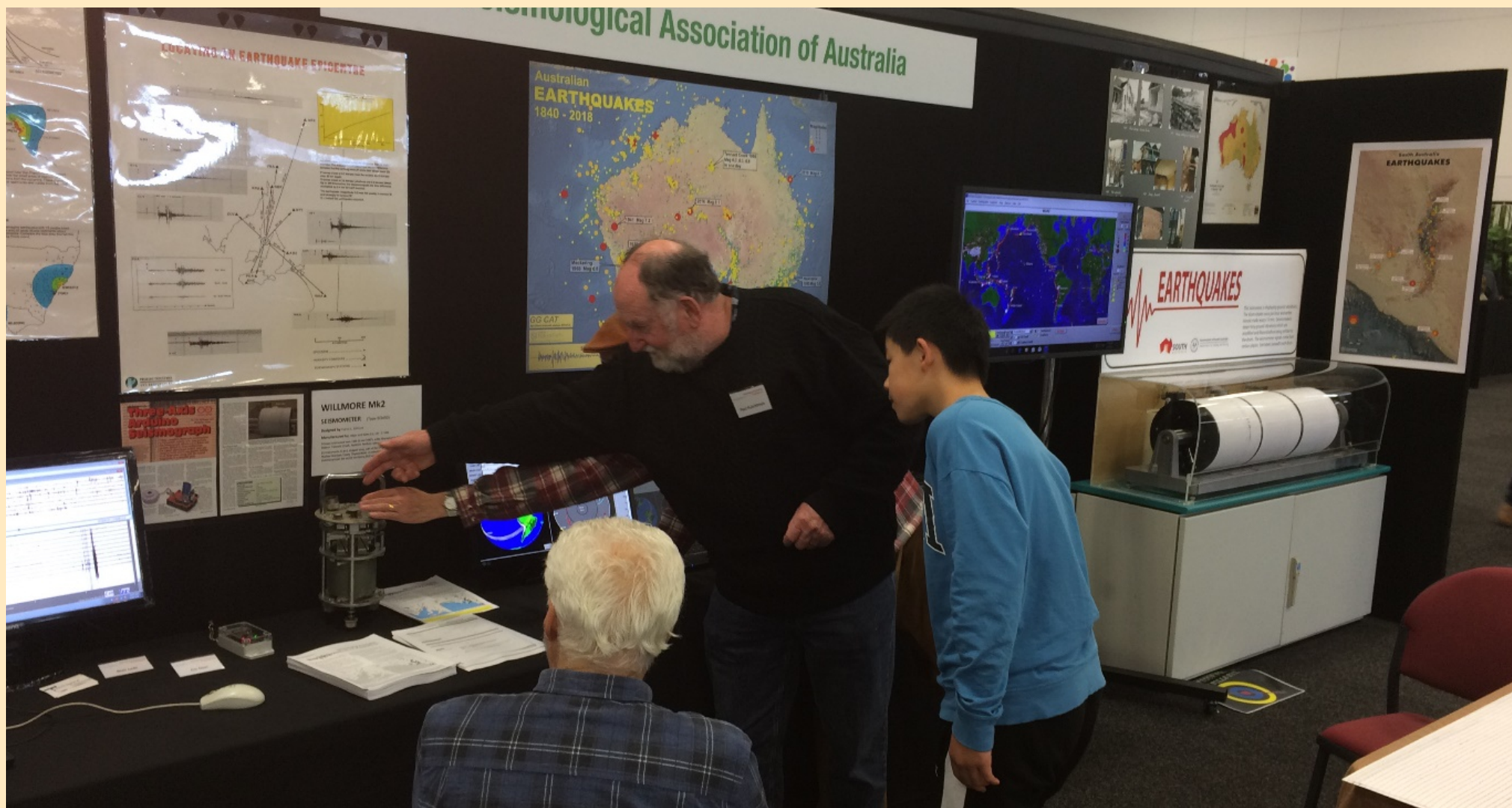
SAA at Science Alive - Adelaide 2018



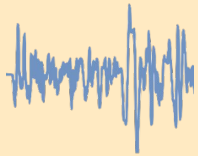
John Duffield (left) searches a laptop for something to distract this family away from Paul Hutchinson (middle), as Paul demonstrates the Seismic Eruptions program by Alan Jones.



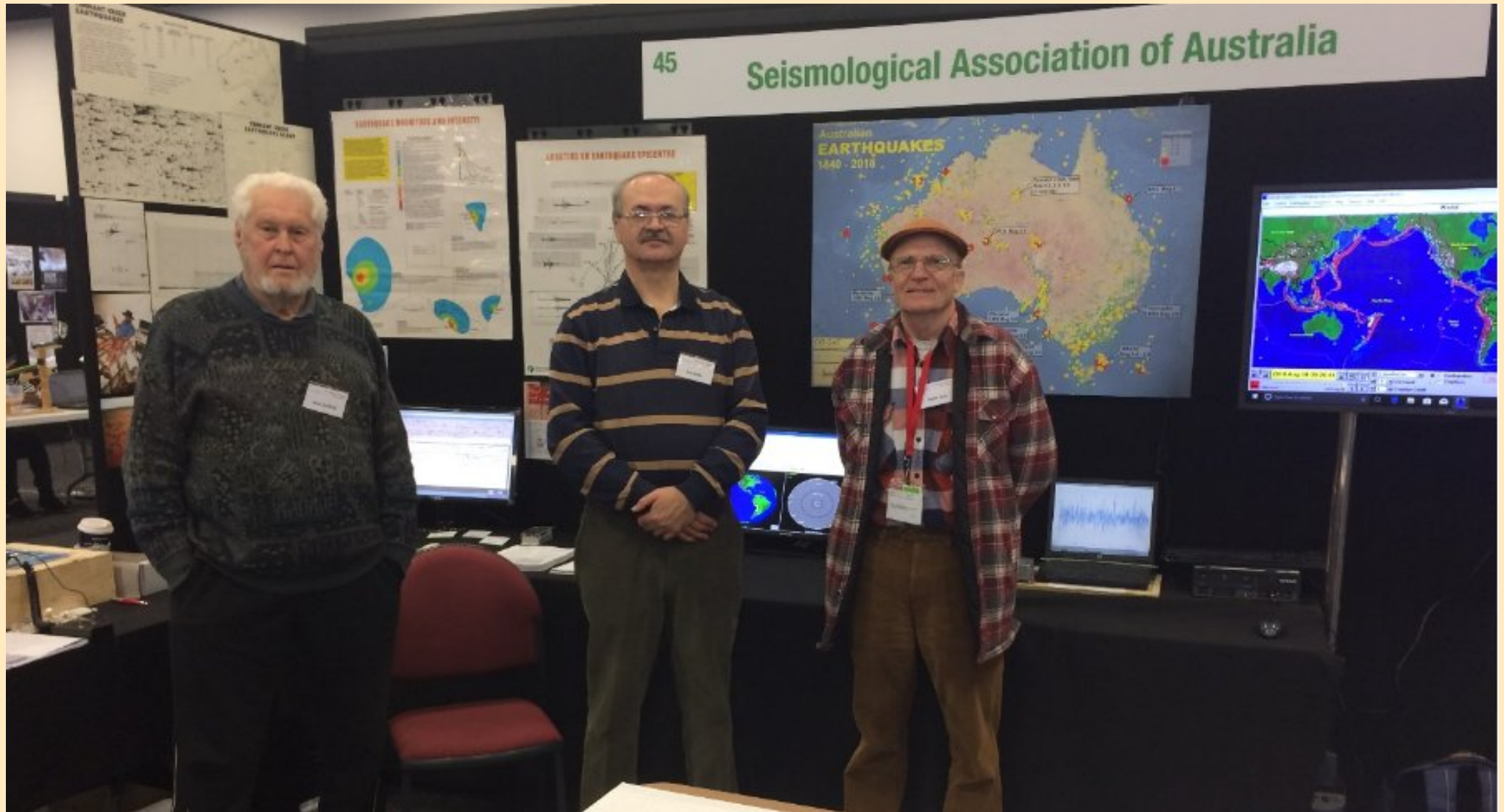
SAA at Science Alive - Adelaide 2018



Paul Hutchinson explains the inner workings of the Willmore seismograph to a visitor. John Duffield is seated. The drum recorders at right, displayed live feeds from Christchurch NZ, Leigh Creek SA and localised tremors induced by children jumping on the bullseye on the floor.



SAA at Science Alive - Adelaide 2018



**Saturday morning, August 4. Booth manned by, from left, John Duffield, Joe Grida & David Love.
Paul Hutchinson, Blair Lade & Jim Deer also manned the stand on the day**

Suitable
for year
6-10 students



EARTHQUAKE SEISMOLOGY

investigation

Understanding the Earth's shakes, rattles and rolls

Activity 1

You will need:

- A pencil
- A ruler with millimetre markings
- A geometric compass for drawing circles

When the Earth's thin crustal rocks are squeezed and buckled too quickly they snap, making the earth shake.

We call this an earthquake, and machines called **seismographs** can record the earth's vibrations, as shown in the example on the next page. This is called a **seismogram**.

The seismogram paper is wrapped around the machine's drum, which turns throughout the day and night with a pen drawing the vibrations picked up by a ground movement sensor, known as a **seismometer**.



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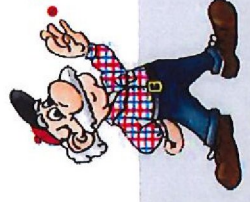
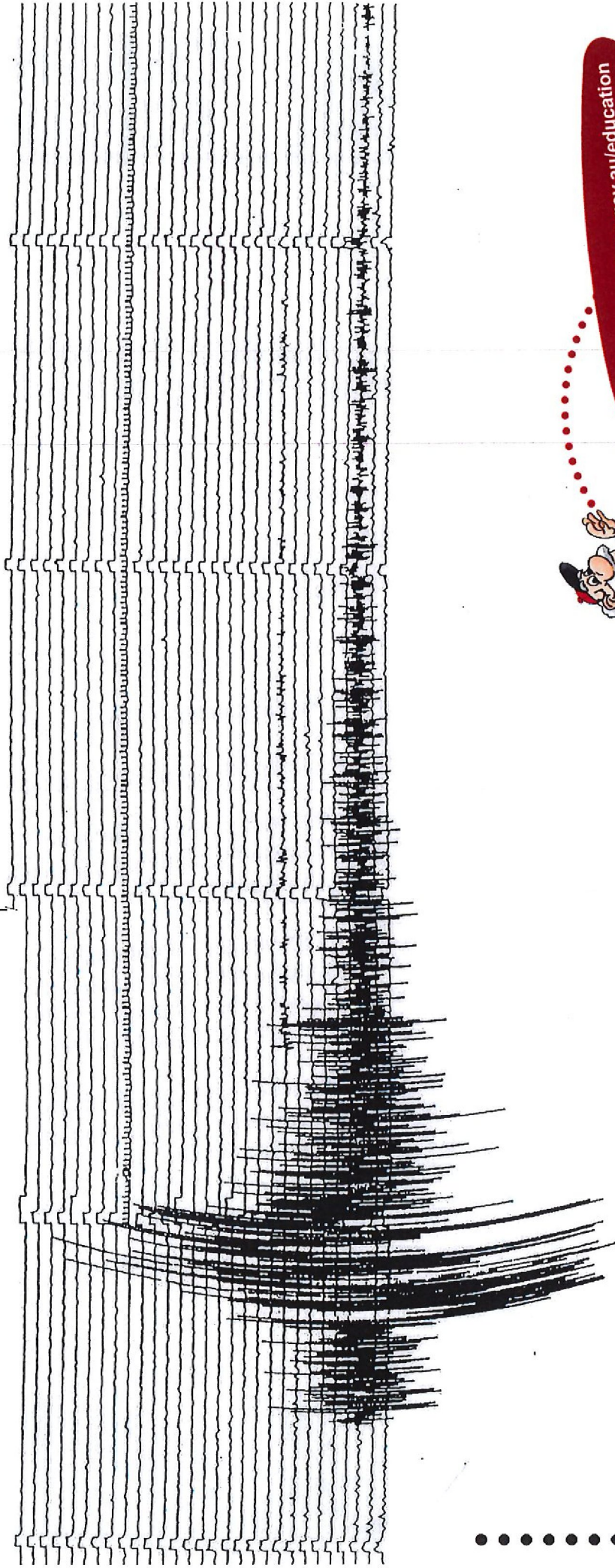
Suitable
for year
6-10 students

EARTHQUAKE SEISMOLOGY

Earthquake Seismogram Event 1

investigation

9.00 am



www.minerals.pir.sa.gov.au/education

Government of South Australia
Primary Industries and Resources SA



Suitable
for year
6-10 students



EARTHQUAKE SEISMOLOGY

investigation

The parallel lines make a continuous spiral, if you roll the sheet end to end, showing one-minute time pips every 6 centimetres, and these are further divided into 1 second markings each 1 millimetre along.

Earthquakes make similar patterns of smaller vibrations (**P waves**) followed by bigger ones (**S waves**) because there are two types of waves vibrating from the broken rocks. **P or PUSH** waves which are faster, hit the seismograph first followed by the slower **S or SHAKE** waves. These rapid vibrations of P and S waves are only felt by the seismograph, humans feel the larger slower surface waves which follow, which also rock and damage buildings.

Let's imagine you are the Seismologist on duty, you arrive at work and put new paper on the recorder drum and then go about your daily work. An earthquake happens later in the day not too far from Adelaide and you write a report from that seismogram, which answers the following questions.

Reporting seismologist's name:

Question 1

At what time was the seismograph started?

Answer

Question 2

Find the spot on the seismogram where the earthquake's first ground shaking reached the seismograph, and mark it with a pencil line.

Question 3

Now count how many minutes and seconds had passed from when the seismograph had been started up to when these earthquake waves were detected by it.

Answerminutesseconds

Question 4

What time of the day was it? Hint: Add the answer from Q3 to the starting time

Answer



Suitable
for year
6-10 students



EARTHQUAKE SEISMOLOGY

investigation

Question 5

Was it daytime or night?

Answer

Question 6

How long did the earth movements recorded by the seismograph last for?

Answerminutesseconds

Question 7

Find the spot where the push (P) wave starts and mark it with your pencil then do the same for the shake (S) wave.

Question 8

How many seconds passed between the arrival of the P and S waves. This is called 'separation time' or 'lag time'?

Answerseconds

Question 9

Do you think that lag time, increases or decreases as distance from the earthquake centre increases?

Answer

Question 10

Someone has worked out all the lag times and corresponding distances from earthquakes, and drawn them into a graph as shown on the next page.

Using your seismogram lag-time and the graph find how far away from the Adelaide seismograph station the earthquake was located.

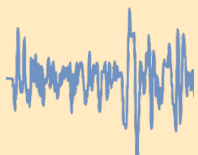
Answerkm

Question 11

Does this tell you which direction the earthquake vibrations came from?

Answer



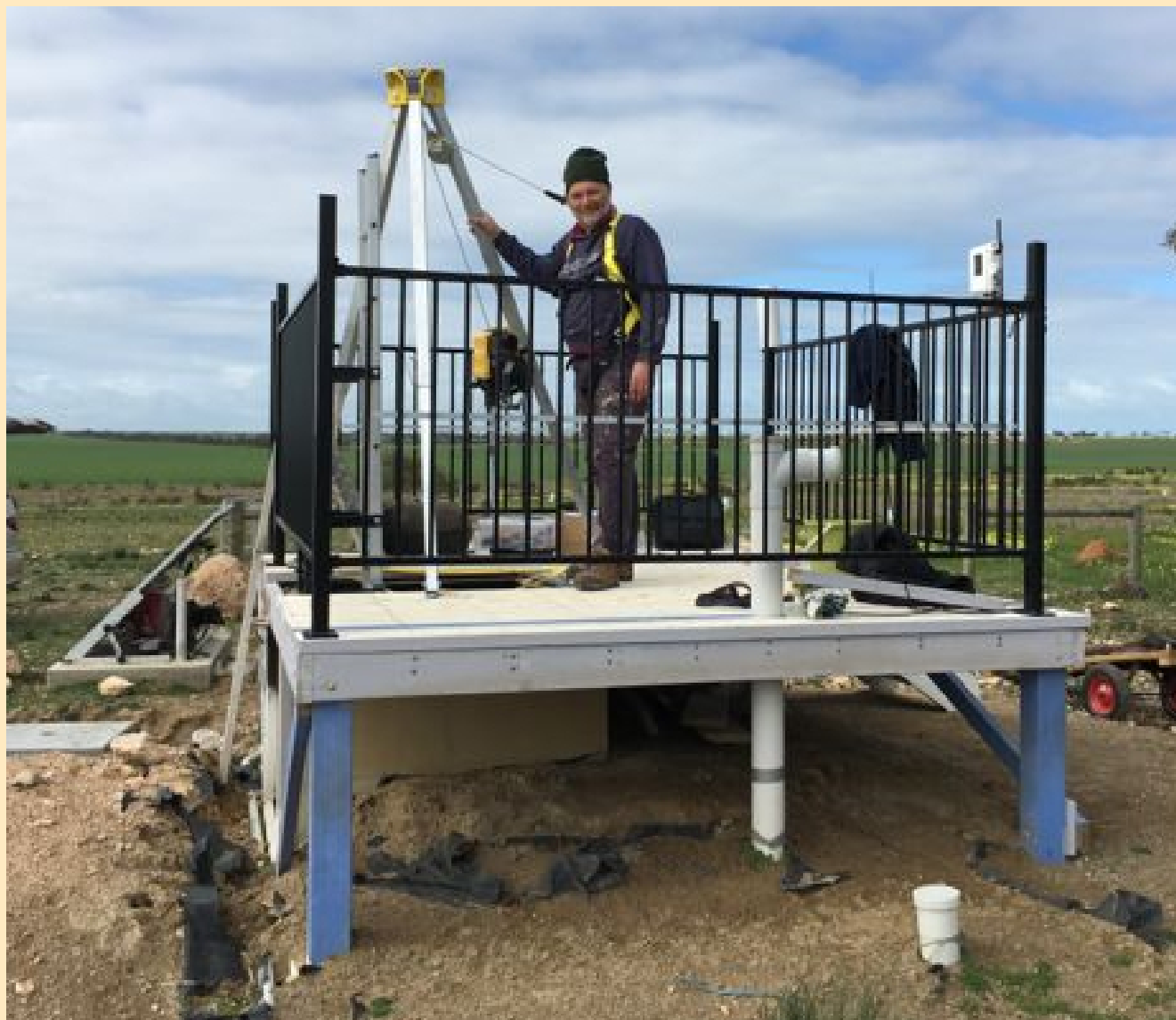


SAA Member Sites

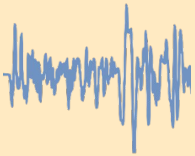
THE COVENEY- POLGLASE GEOPHYSICAL VAULT - NETWORK UPGRADE ON THE COPPER COAST

Blair Lade and David Love travelled to Wallaroo on 7th August, a cold but dry day on the Copper Coast. We met Dave Miller on his property, tending hundreds of trees. First task was to set up safety equipment before entering the vault. Harnesses were put on, and safety straps connected. A tripod and winch were assembled, before Blair entered the confined space. He did the housekeeping (sweeping etc), before the seismograph gear was gently lowered. Dave Miller assisted above and below with cabling, while the other David began to freeze sitting on the platform. Eventually the Davids swapped. The seismometer and recorder were installed, and data flowed via mobile phone to the Melbourne Uni server. The recorder is an EchoPro, with an S6000 seismometer. At a later stage, the seismometer will be swapped for David Miller's Trillium sensor, which is currently running alongside an STS-2 in the TPSO vault.

This site is about 70km distant from the nearest seismograph (MRAT), and will fill a considerable gap in the SA network. It will be very useful for earthquakes in the Clare to Jamestown region.



David Miller takes in the view from his vault's entry platform



SAA Member Sites

THE COVENEY-POLGLASE GEOPHYSICAL VAULT - NETWORK UPGRADE ON THE COPPER COAST cont.

The site does suffer from some background noise due to the proximity of the Wallaroo to Moonta main road about 200 metres away. The low temperature variation in the vault means that it may be useful for other experiments. Dave Miller also intends to set up a continuous recording magnetometer later. The vault structure contains only a limited amount of magnetic material.

The Moonta, Wallaroo, Kadina area was once famous for its copper mines. The area has low seismicity, but there are occasional small events. It is uncertain whether these may be related to some of the old workings. At one of our early meetings, David Miller suggested a local survey, to see if any activity could be detected near old workings. Our association probably has the resources and capability to carry out such a survey.

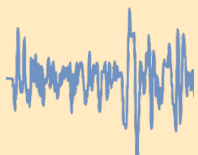
David Love, Chief Seismologist



Blair Lade makes an exit from the vault



David Love inside the vault, Sprengnether S6000 in place



Resources & useful links

Description	URL / Webpage	Notes
SAA Membership Application	https://www.assa.org.au/media/74629/saa-membership-	Join up with the SAA using this form
SAA Flier	https://www.assa.org.au/media/74629/saa-membership-	Our current brochure - flier, saying what we do
SAA Newsletters	https://www.assa.org.au/resources/technical-special-	Download any SAA Newsletter from this site
SAA EqServer	http://ade-eqserver.dyndns.org:8080/eqserver/	South Australian miniseed seismometers
Melbourne University EqServer	http://meiproc.earthsci.unimelb.edu.au/eqserver/	Australian miniseed seismometers
Regional Seismic Network	http://www.regional-seismic.net/	PSN seismometers - Aust. Centre for Geomechanics
Regional Seismic Users Website	http://www.rsuw.daleh.id.au/index.html	PSN seismometers - RSUW
Recent SA Earthquakes	http://earthquakes.mappage.net.au/q.htm	Data & summaries of recent SA quakes
Central QLD Seismology Research Group	http://www.cqsrq.org/	CQSRG - Kevin McCue
Astronomical Society of SA	https://www.assa.org.au/resources/technical-special-	ASSA - Seismology page
Geoscience Australia	http://www.ga.gov.au/earthquakes/initRecentQuakes.do	Our national authority on seismic events
QLD Uni Environmental & Earth Sciences	https://sees.uq.edu.au/	The University of Queensland - Col Lynham
Seismic Research Centre	https://www.src.com.au/	OEM of seismic instruments & software
symCDC	http://symcdc.com/	OEM of seismic instruments & software
IRIS Seismic Monitor	http://ds.iris.edu/seismon/	Global seismic events
Joint Australian Tsunami Warning Centre	http://www.bom.gov.au/tsunami/	Bureau of Meteorology site
Australian Earthquake Engineers Society	https://aees.org.au/	An organisation with similar interests
Atlas of the Underworld	http://www.atlas-of-the-underworld.org/	Mapping the Earth's mantle
Atlas of Living Australia	https://www.ala.org.au/	A Citizen Science initiative