

# Newsletter of the Seismological Association of Australia Inc. Quarter 4, 2022



Seismological Association of Australia Inc.

## EARTHQUAKES

SOUTH AUSTRALIA

JUMP HERE

### EARTHQUAKES

Seismological Association of Australia

IT'S EVERY DAY





## Seismological Association of Australia Inc.

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

**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 by email or [you may download it here](#).

### **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. Images should be high resolution and uncompressed, although high resolution JPEGs are acceptable. Your name may be withheld only if requested at the time of submitting.

All enquiries and submissions should be addressed to the Editor and preferably sent by email to [weaksignals@iinet.net.au](mailto:weaksignals@iinet.net.au)

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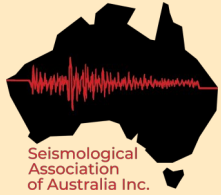
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The SAA can be contacted by post to the address above, or by email to any member of the Committee.

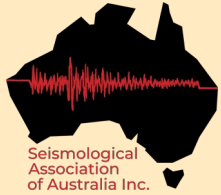


# SAA News

**2022 SAA Member Meeting Schedule** - The Annual General Meeting will be held on Monday, October 17th at 7:30pm ACST, 8:00pm AEST and 10:00 UT. via ZOOM. All members should have received an invitation and link to attend this important meeting, along with an agenda. As the outgoing Newsletter Editor, I would like to thank all contributors to this year's newsletters for the excellent articles that they have researched and written for the association and its members. They have made my job as SAA Newsletter Editor for the past 4 or 5 years an experience that I will miss and look back on with some regret in not being able to continue on in the job for 2023.

**Science Alive! 2022** - This year's Science Alive event was held at the Adelaide Showgrounds, Wayville just after publication of the last newsletter. By all accounts, the event was a success for the association with many members attending and an eager public passing through on each day. There is a happy snap of the SAA's exhibit on the cover of this newsletter. Please ensure that you're eager and available for next year's event.

**The SAA now has its own website** - Thanks to the efforts and resources of many of our members, the SAA now has a [website](#) available to the public. While still in its infancy and being updated and expanded regularly, many of our usual resources such as the mappage pages are already functional and ready for you to bookmark and use, assuming that you have yet to do so. The SAA website should become your one stop shop for everything to do with the association. You will be able to participate in guiding the future development of the website at the AGM later this month.



# A decade of South Australian earthquakes, 1860-1869

Kindly submitted by Kevin McCue

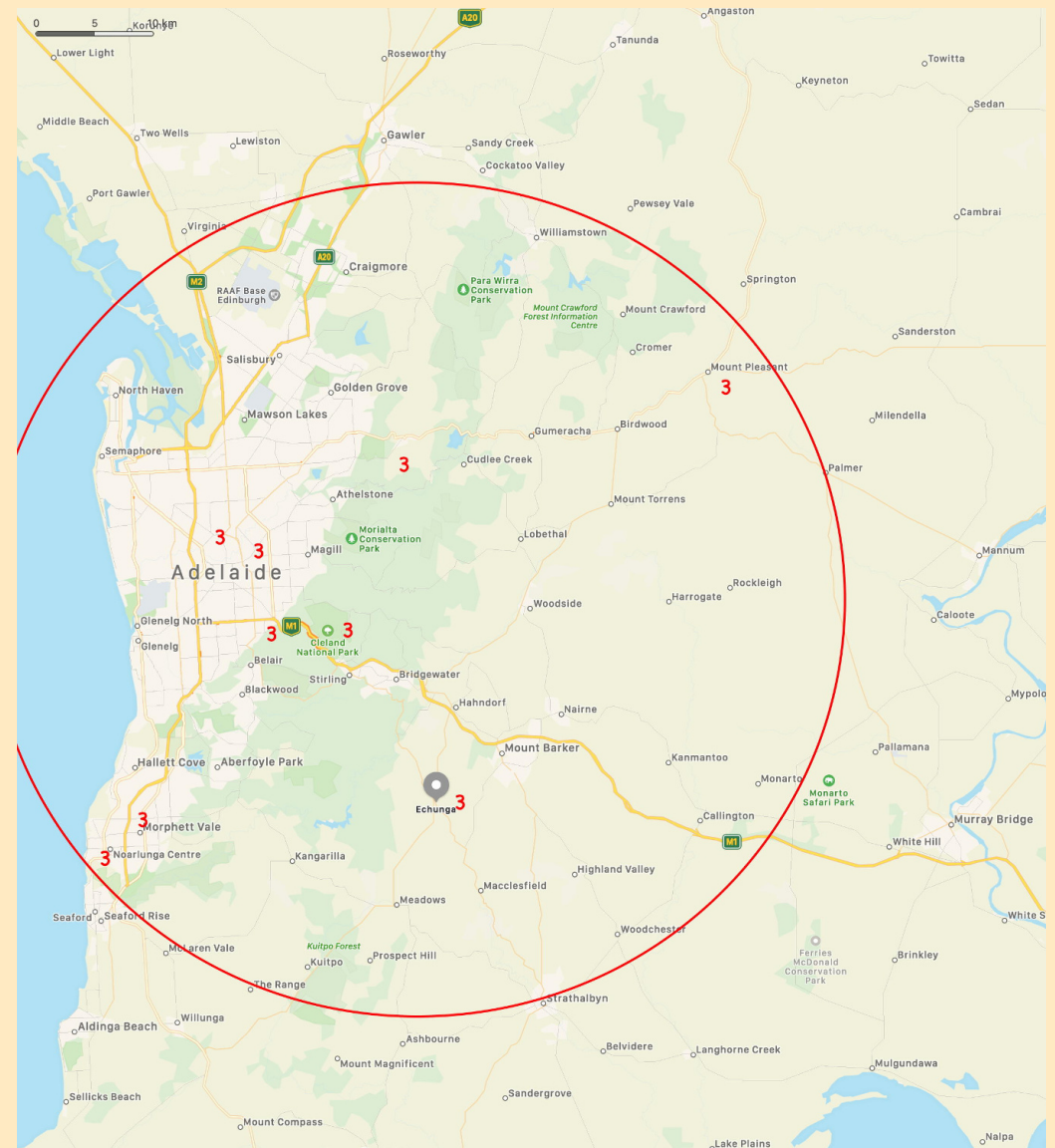
Just 24 years after the formation of the colony of South Australia, the locals had become quite aware of local earthquakes. They dutifully reported their experiences to the state newspapers or to the Chief Meteorologist, Charles Todd, who included them in his monthly reports which were duly printed in the newspapers.

A moderate to large earthquake is reported widely enough that an isoseismal map or felt area can be constructed, and from the felt area and centre of the map the size of the earthquake and a location of the epicentre can be imputed. See Figure 1/1862, a small earthquake just east of Adelaide was widely felt out to a distance of about 35km but at low intensity. The lack of higher intensities would suggest a focal depth of 20 to 30km which is matched by some of the well located earthquakes there today.

Compare that with a similar sized earthquake later the same year at Tothill's Creek on the next page, which shows a different pattern that would be expected from an earthquake with perhaps a 5 to 10km focal depth; strong near the epicentre, rapidly decreasing in intensity with distance.

If there are too few reports, because the earthquake was not large or was in an isolated area then an estimate of the size and location can still be assessed though with greater uncertainty. Typically a magnitude 2.5 earthquake may only be felt out to a distance of a few kilometres so the location and size can be well estimated.

That an earthquake was not felt at a site is useful for limiting both the location and magnitude. The first earthquake of the decade to be large enough to draw a felt map is shown in Figure 1/1862.



**Figure 1/1862: Felt extent of the Adelaide earthquake  
on 19 March 1862.**







# A decade of South Australian earthquakes, 1860-1869

What is interesting is that the earthquakes are all in zones defined by epicentres recorded in the period during which modern seismographs were deployed, 1965-2022; Eyre Peninsula, the Southeast and most of them in the Mt Lofty and Flinders Ranges. No significant earthquake damage was reported in the decade.

The level of seismicity during the decade can be compared with that of more recent times following the installation of short period seismographs in the State by David Sutton and his team at Adelaide University in 1965. A graphic comparison is shown in Figure 4 where the black line is fitted to the observed cumulative number of earthquakes per year in the period 1965-2020 and the red line the equivalent for 1860-1869.

We conclude that either the number of M3 earthquakes is just a third of the expected number or fewer observations were reported. Both lines suggest a very similar 1 in 100 year event.

The implied 'b' value for the decade is about 0.75, quite low compared with the value of 0.91 for the modern period but within the range of other decades examined by the author. Should the 'b' value be a constant for any region or is it simply an indicator of a variable rate of activity?

## Acknowledgment

Catherine Dix had located many of the earthquakes discussed here but some of the parameters have changed due to the scanning of more newspapers.

Clive Collins patiently drew the epicentre map, several versions of it.

I would like to thank David Love for his continuing support for this project.

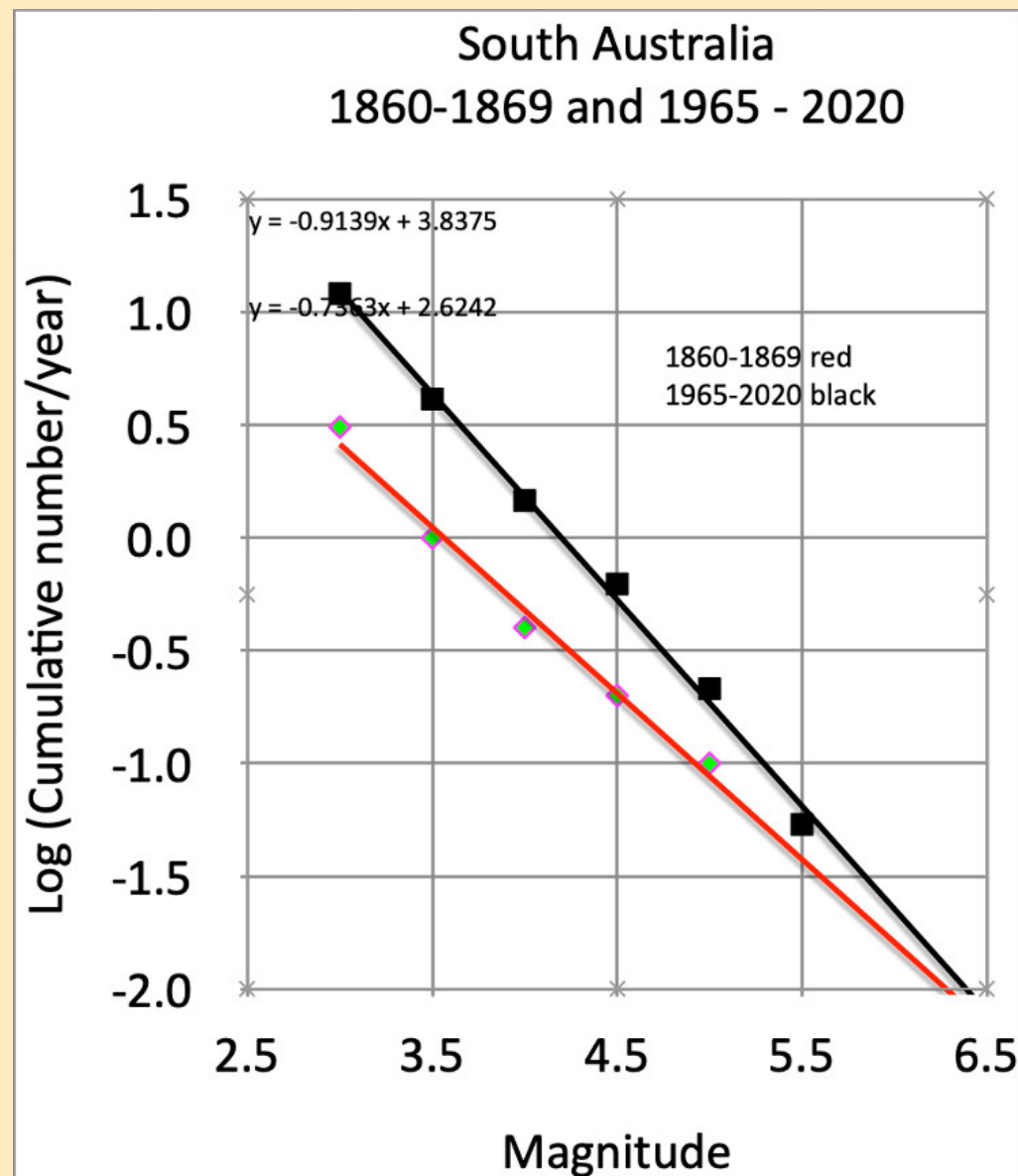


Figure 4: Recurrence relations for the 1860-1869 period compared with that for 1965-2020.





# PNG Earthquake 2022-09-10

Kindly submitted  
by Kevin McCue

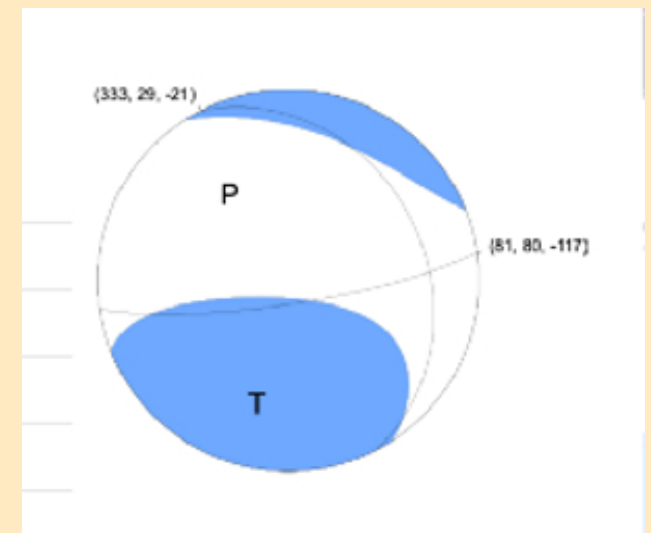
23:46:57 (UTC) 66 km E of Kainantu, Magnitude 7.6, epicentre  $6.26^{\circ}\text{S}$   $146.47^{\circ}\text{E}$ , focal depth 90 km

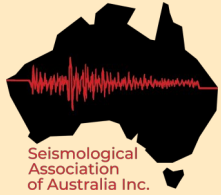


The earthquake location is under the Markham Valley east of Kainantu and west of the Morobe District capital Lae.

The mechanism was normal faulting, both location and mechanism by the USGS. The focus was near the Australian / South Bismarck Sea / Solomon Sea Plate triple junction.

On the following pages, a report from the PNG National Command Centre and links to several Papua New Guinea and international media reports are included.





# PNG Earthquake 2022-09-10

23:46:57 (UTC) 66 km E of Kainantu, Magnitude 7.6, epicentre 6.26° S 146.47° E, focal depth 90 km

## Statement by Commissioner of Police David Manning

"I have been briefed by our team at the National Command Centre that has been stood up at Morauta Haus. At 9:46 yesterday morning, Sunday 11th September, a 7.6 magnitude earthquake struck in the Markham Valley, reported by the US Geological Society to be at a depth of 90 kilometres. A second 5.0 magnitude earthquake was recorded at 10:42 occurring 70 kilometres north of the original tremor, at a depth of 101 kilometres underground. The most significant damage reported to date has been in districts of Morobe, Eastern Highlands and Madang provinces. The tremors caused damage to buildings and public roads in these provinces, and a number of landslides were triggered

Sadly, seven people have been confirmed dead as a result of these landslides. Three in Kabwum District and three in Wau Town, Morobe Province, and one in Rai Coast, Madang Province. I offer our condolences to the families of those who have died in these tragic circumstances.

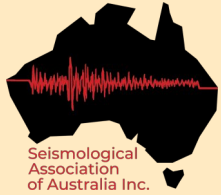
This was a significant earthquake, however it occurred deep below ground level and this meant damage was less than if the epicentre had been closer to the surface. To put this into perspective:

- The Markham Valley earthquake was similar in size to the 2018 Highlands Earthquake;
- The difference being that the 2018 Highlands earthquake was 23 kilometres underground, whereas the Markham Valley earthquake was 90 kilometres below the surface.

The immediate response that was directed by the Prime Minister was the standing-up of the National Command Centre at Morauta Haus. The National Command Centre is staffed by specialist personnel from Police, Defence and other relevant Government agencies. Their immediate task of was to identify affected district communities in the affected provinces, and then ascertain the type of response required and deploy this immediate support. These actions and the ongoing exchange of information the provincial disaster office and other government agencies has enabled a coordinated and immediate response. Aerial reconnaissance is ongoing to identify landslides in remote and rural areas for relay to the National Disaster and Emergency Services, the National Command Centre and provincial authorities. Calls to the hotline number, 1 800 200, have been coming in with information to be provided to relevant agencies, and seeking information on the current response situation.

I will provide you with a summary of the information we have currently from each of the three affected provinces. Overall, there have been reports of damage to the regional power grid, internet cables, and roads and highways. Damage to the Ramu hydropower station infrastructure has resulted in serious system outages across the Highlands, Madang, and Morobe and this is being assessed by engineers at the current time. PNG DataCo has reported disruptions to services that have disrupted operations of the Kumul Submarine Cable Network express link between Port Moresby and Madang, and the PPC-1 cable between Madang and Sydney. This is affecting customers in Momase, the Highlands and New Guinea Islands. No damage has been reported to aviation infrastructure and regional commercial airports remain operational."





# PNG Earthquake 2022-09-10

23:46:57 (UTC) 66 km E of Kainantu, Magnitude 7.6, epicentre 6.26° S 146.47° E, focal depth 90 km

## **"In Morobe Province:**

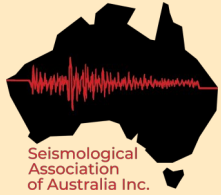
- The most significant damage was in Kabwum District, where three deaths have been reported and an unknown number of injuries. Medical evacuations have taken place from Kabwum;
- Landslides have been identified in Bulolo, Wau and Boana, and damage was sustained by houses and other infrastructures in these areas;
- Damage was identified on several public roads and highways;
- Damage was also sustained by the Muya Power Plant infrastructure causing supply outages; and,
- Minor damage was reported in the Lae Metro area to buildings and roads.

## **In Eastern Highlands Province:**

- There has been damage to public and private infrastructure. This includes cracks appearing in buildings at the University of Goroka male dormitory and other tall structures inside the campus;
- There are reports of injuries to students on the campus and they have been admitted to hospital. Further details on these injuries are being collated;
- Cracks have been reported on the bridge just after Kainantu towards Yonki, and minor cracks have occurred in the road to Yonki;
- Two minor landslips occurred near Kolwara close to the fish market area;
- Engineers are undertaking assessments on damage to Yonki Dam infrastructure that has resulted in power outage in most part of the Eastern Highlands Province;
- A major land slide noted at Kassam Pass where a 25-seater bus windscreen was damaged, fortunately passengers escaped unhurt from the vehicle; and
- The Kainantu Mine reported that there was damage to its' underground operations or its' other site infrastructures.

## **In Madang Province:**

- One death has been reported in the Rai Coast, with medical evacuations taking place from Nankina;
- There have been reports of building damage at New Town with 13 people injured at Fox Nest House;
- The Government Store compound reported that 23 semi-permanent houses were damaged;
- 22 semi-permanent houses at the Wagol settlement were damaged;
- At the DCA Compound, one permanent building and 76 semi-permanent houses were damaged with one report of a person injured;
- Damage to the Yonki Hydropower Station is being assessed;
- The North Coast highway into Madang Town has been affected with reports of damage to buildings, power lines and public roads;
- Due to power blackouts, reports from Rai Coast, Usino Bundi and other rural stations, damage reports are still being collated and provided to the National Command Centre."



# PNG Earthquake 2022-09-10

**23:46:57 (UTC) 66 km E of Kainantu, Magnitude 7.6, epicentre 6.26° S 146.47° E, focal depth 90 km**

"It is now 24 hours since the initial earthquake struck and response operations are underway and being strengthened. There remains a significant risk of aftershocks, so our people must be vigilant and think of the safety of their families and communities above all else. This means avoiding areas where there is the potential for landslides and coastal areas that could be at risk of tsunamis.

The Northern Divisional Commander and his Provincial Police Commanders (PPCs) are maintaining round the clock operations to:

- Identify all areas and communities affected by the earthquake in their respective districts, and facilitate immediate requirements for medical support and the delivery of urgent supplies.
- The National Command Centre is working with the Provincial Disaster Office, provincial administrations, and other relevant stakeholders including Churches and NGOs to maximise our collective response actions.

## **In conclusion**

- All efforts are being undertaken to facilitate immediate responses to areas requiring support, particularly medical support;
- Our country has faced many similar potential disasters, and through the lead of the National Disaster and Emergency Services with the support of Police, Defence and other relevant agencies, we have plans in place that were enacted immediately after the earthquake occurred in the Markham Valley;
- But we must all maintain vigilance for the ongoing risk of aftershocks – I cannot stress this enough.

The National Command Centre will continue to engage with all stakeholders and ensure emergency support is provided where it is needed. I will continue to brief the Prime Minister on current operations, and there will be the ongoing release of public information. I urge our people not to be misled by false information that circulates on social media, and rely on news information that is verified by government agencies. We are a strong and resilient people in Papua New Guinea, and our people stand tall when our communities are threatened by potential national disasters."

**David Manning, MBE, DPS, OStJ, QP  
Commissioner of Police**

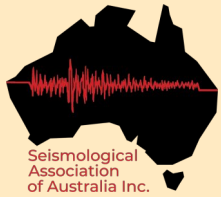
**[The National \(PNG\) report on School exams to be held despite quake damage](#)**

**[The National \(PNG\) report on 15 houses damaged in Madang](#)**

**[NBC News \(USA\) shows surveillance video of shaking in Port Moresby](#)**

**[ABC News \(Aust.\) report of stranded Papua New Guinea earthquake survivors airlifted to safety](#)**





# “Application of high resolution tiltmeters for global and local geodynamical research”

Kindly submitted by Dr. Gábor Papp - Institute of Earth Physics and Space Science

Dr Gabor Papp is the Principal Investigator of a Hungarian research project K128527 “Improvement of interferometric hydrostatic tilt sensor and its application to monitor multi-scale geodynamical processes with beyond nanoradian resolution” financed by National Scientific Research Fund of Hungary. The project is based on the cooperation of Austrian, Finnish and Hungarian researchers. The team includes:

Dr. Judit Benedek, researcher, EPSS

Prof. Dr. Bruno Meurers, emeritus, Institute of Meteorology and Geophysics, University of Vienna, Austria

Dr. Hannu Ruotsalainen, emeritus, Finnish Geospatial Research Institute, Masala, Finland

Dr. Roman Leonhardt, Director of Conrad Observatory (COBS), Zentralanstalt für Meteorologie und Geophysik (ZAMG), Vienna, Austria

Mr. Dániel Csáki, MSc student (Techn. University Budapest, Hungary)

Technical staff include:

Tibor Molnár, Electrical Engineer (EPSS)  
Csongor Szabó, IT specialist (EPSS)  
Frigyes Bánfi, Electrical Engineer (retired)  
Ferenc Schlaffer, Mechanical technician (retired).

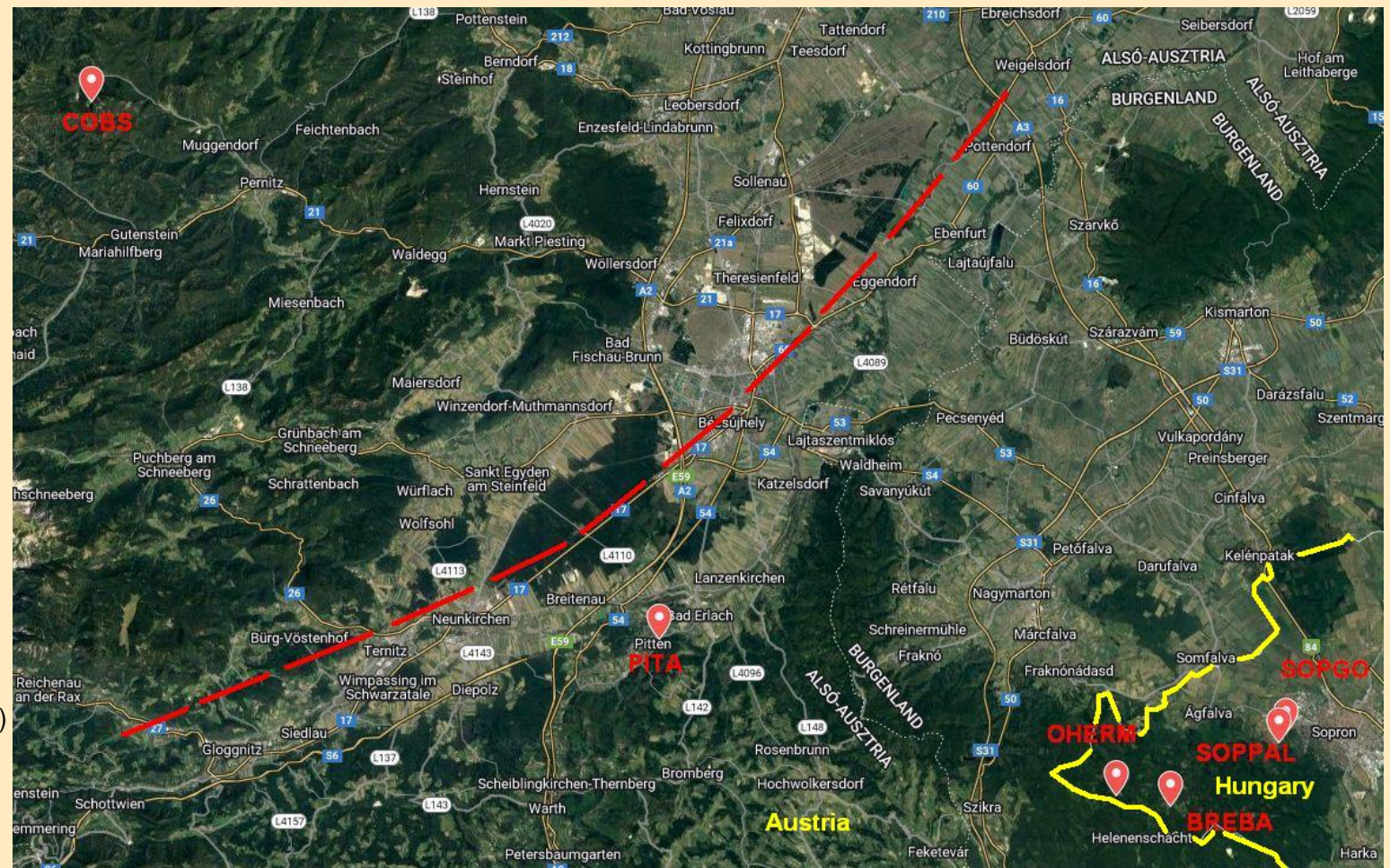


Figure 1: The map of active and planned tilt monitoring sites. The red dashed line shows the approximate trace of Mur-Mürz fault line.





# “Application of high resolution tiltmeters for global and local geodynamical research”



**Figure 2: The entrance building of SOPGO under the 25 m high gneiss cliff**

## **Sopronbánfalva Geodynamical Observatory (SOPGO), Hungary**

The site is operated by EPSS. The vault system (full length is about 50 m) is drilled in gneiss. Instruments: extensometer, tidal recording gravity meter LCR G949, tiltmeter LTS SOP3, radon detector, meteorological sensors (inside, outside).

## **Conrad Observatory (COBS)**

The Conrad Observatory operated by Zentralanstalt für Meteorologie und Geodynamik (ZAMG) has a 145 metre long tunnel, which holds the seismic vault temperature at 6.9°C all year round. It hosts seismometers, a superconducting gravity meter (GWR iGrav), meteorological sensors, a Lippmann Hi-Resolution Tiltmeter and an interferometric hydrostatic tiltmeter being under improvement.



**Figure 3: Entrance to the Seismic Gravity Observatory (SGO), part of Conrad Observatory**





# “Application of high resolution tiltmeters for global and local geodynamical research”



Figure 4: Instrument piers in the Conrad Observatoy SGO tunnel



Figure 5:  
Frigyés Bánfi electrical engineer and Gábor Papp at the entrance  
of the blind vault hosting the instrument pier at Soppal Station





# “Application of high resolution tiltmeters for global and local geodynamical research”

## SOPPAL station

The site is operated by EPSS with the courtesy of Eszterháza Nonprofit Ltd, Fertőd, Hungary. The instrument pier is located in a blind vault opening from the main vault served as a cellar when Pauliner monks (later on Carmelites) lived nearby in a monastery.

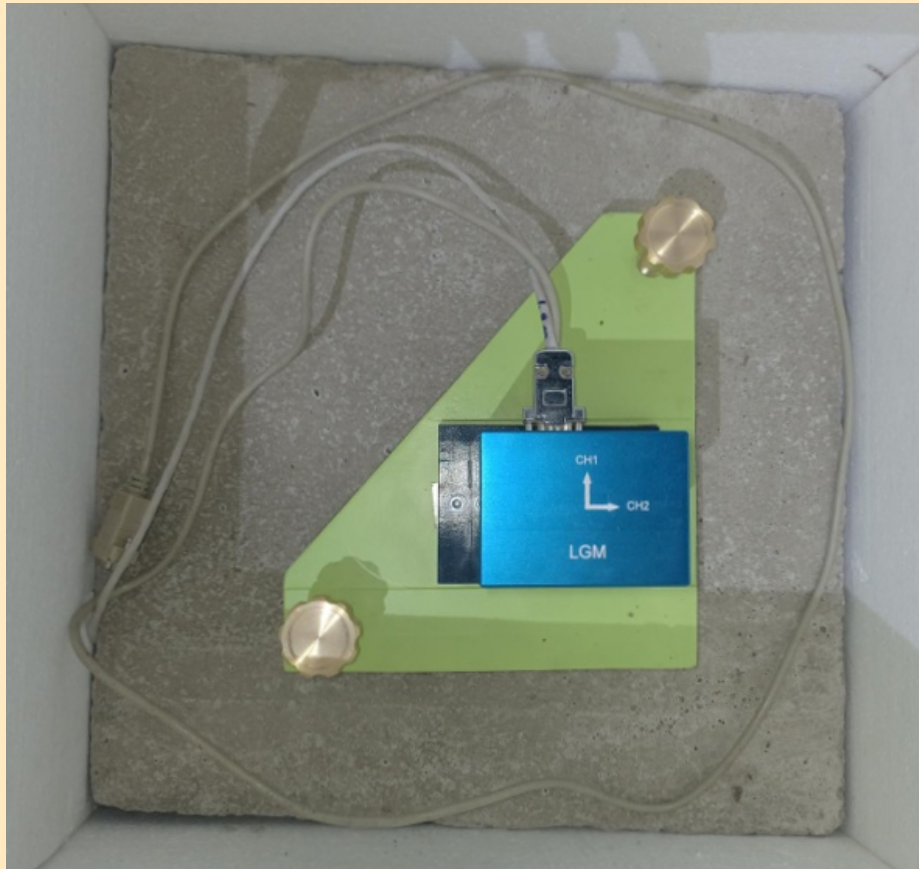


Figure 6: LTS SOP4 sensor on the pier at Soppal Station

## BRENBA station (under preparation)

The site is located in the old mining area of Brennbergbánya and prepared in a complex vault system used as a bunker in WWII. Now it is a natural protection site supervised by the National Park Fertő-Hanság and it hosts several species of bats during winter time. There is no internet access, only narrow bandwidth (~10 kByte/s) GSM communication is possible. GPS timing works fine.



Figure 7: The LTS SOP5 sensor on the instrument pier at BREBA station





# “Application of high resolution tiltmeters for global and local geodynamical research”



**Figure 8: Testing of the autonomous RPiZero system controlling data acquisition**

## **OHERM station (under preparation)**

The site is located in the area of Ó-Hermes, an old traditional mining settlement, close to the Hungarian-Austrian border. This horizontal vault (about 30 m long) was a part of the vault system belonging to the ex Saint Stephan shaft which was the deepest coal mine in Hungary.



**Figure 9: Instrument pier at the end of the OHERM vault**





# “Application of high resolution tiltmeters for global and local geodynamical research”

## OPITA station (under preparation)

The site, which was actually an iron mine called Georgi Stollen, located in Pitten, Austria will be a station of the Austrian Seismological Network operated by ZAMG, Wien. The instrument pier was made in a chamber going to host a seismometer (STS 2) owned by ZAMG and a Lippmann tiltmeter owned by EPSS.



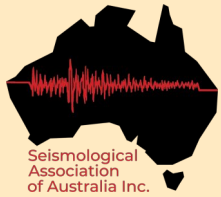
Figure 10: The main horizontal vault of Georgi Stollen



Figure 11: The instrument chamber hosting a seismometer and a tilt meter

## Access of tilt meter data

At stations where internet access is available status plots of the running measurements (time series) in N-S and E-W directions are made hourly. These BMP files and also the daily data files are FTP-d to servers operated by ZAMG and EPSS. From these servers the plots are automatically uploaded to the web page [kepujsag.ggki.hu](http://kepujsag.ggki.hu), which can be accessed by anyone via the internet.



# “Application of high resolution tiltmeters for global and local geodynamical research”

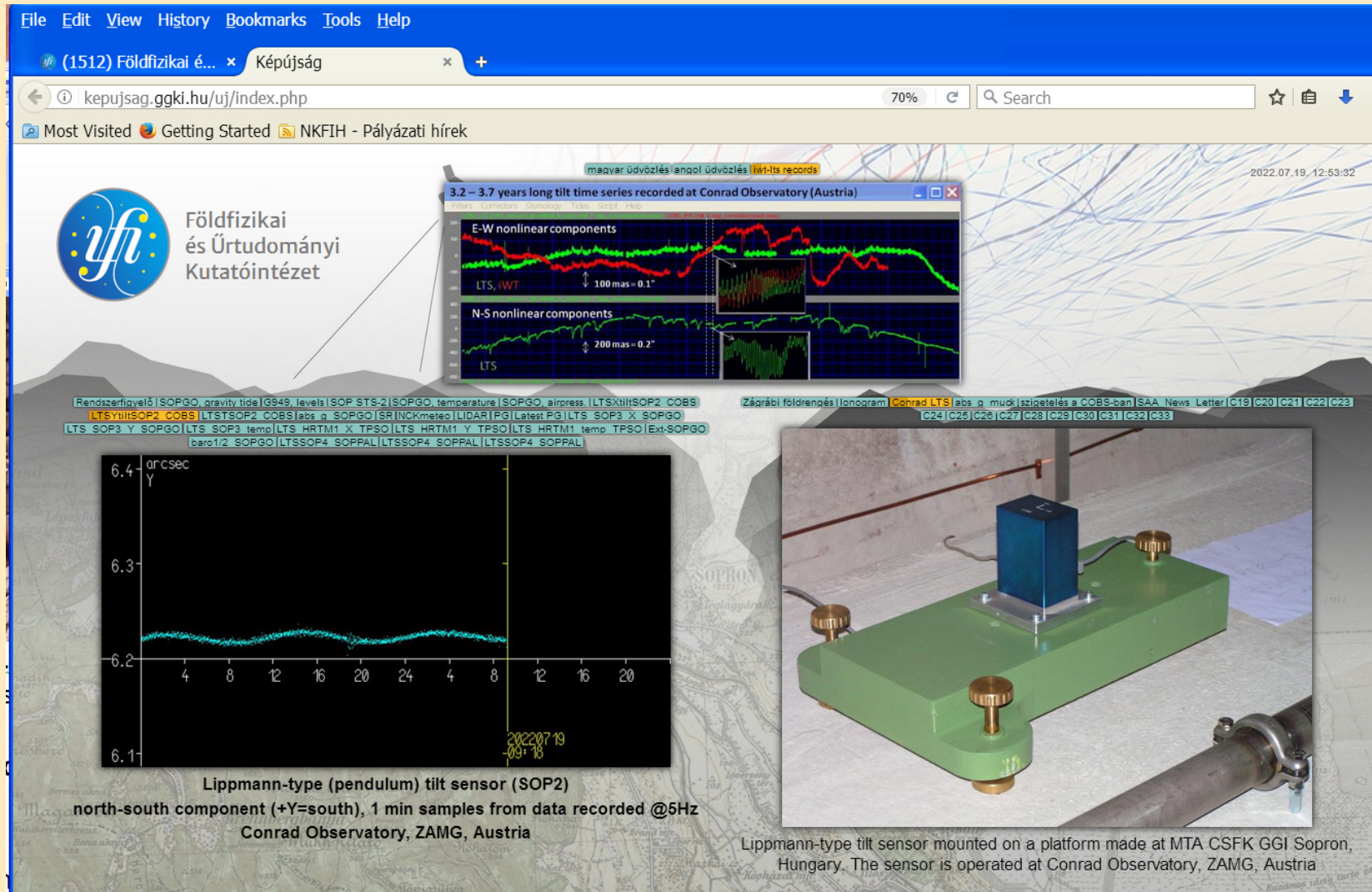
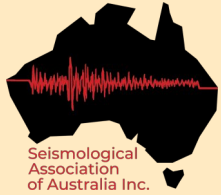


Figure 12: The screen shot from [kepujsag.ggki.hu](http://kepujsag.ggki.hu) showing a lot of active geophysical and geodetic measurements from different observatories and monitoring sites. The labels above the pictures can be clicked on to change the displayed image.





# A new look at the July 1931 Adelaide Earthquake

Kindly submitted by Kevin McCue

## Abstract

A review of Australian newspaper reports into this earthquake has enabled the author to draw an isoseismal map which indicates an epicentre between Adelaide and Port Adelaide or slightly offshore in Gulf St. Vincent, a shallow focal depth, and a magnitude of about 4.7. The duration of shaking was about 10s. It is tempting to associate the earthquake with the Redbanks Fault.

## Introduction

For many years the 1954 Adelaide earthquake was seen as an enigma, a singular event, particularly by members of parliament and engineers with a short time view and no knowledge of the history of local or regional earthquakes. One earthquake that has slipped the attention of most people was one that occurred in July 1931 during the great depression when South Australians were focussed on more mundane things like food, shelter and employment. It barely rated a mention in the press at the time since no one was killed and there was no serious building damage to speak of.

## Felt Observations

Journalists from the Recorder on Saturday 25 July 1931, wrote a front page story about the earthquake and its effects in Adelaide as follows:

*Adelaide had its worst earth tremor for 29 years at 10.27 a.m. today. It did no damage, but the tremor was distinctly felt in business houses in the city, and reports of it came to the Observatory from various country towns. At Walkerville the tremor shook some pictures down from walls, and sent residents terror-stricken out to the streets. It lasted only a few seconds. Pictures and crockery were displaced in other homes, and walls were shaken. Within a few seconds of the tremor the Observatory telephone was rushed, and the officials were deluged with reports of it from widely separated parts of the metropolitan area, suburbs, and the country. It was felt as far away as Kapunda. Rumbling noises accompanied the tremor.*

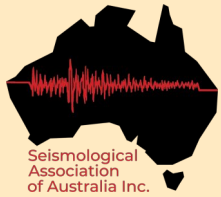
At Port Adelaide:

*Occupants of offices in Lipson and Divett-streets and along North-parade, Port Adelaide, hurried into the open immediately the tremor was felt at the seaport. There was a terrific rumbling sound. In several hotels, bottles were shaken to the ground. The ceiling of one office gave way, and books from shelves fell to the floor in other offices. No serious damage was reported.*

Other reports came from Dry Creek, Alberton and Virginia, near Adelaide. But Dodwell asserted that the intensity in the city was much less than during the 1902 earthquake, lately thought to have occurred under Gulf St Vincent rather than near Warooka on Yorke Peninsula. Any reports from his appeal for more information or the phoned reports to the Observatory have not yet been published.

There is no doubt the earthquake was felt at Kadina and Moonta on Yorke Peninsula. The Kadina and Wallaroo Times of 25 July 1931 reports on page 2 that:

*The earth tremor was distinctly felt at Kadina at a few seconds subsequent to the time it was noted in Adelaide. Doors and windows rattled, and there was a distinct pause between the two shocks. The impression was as of the moving of heavy furniture, with a rumble like the passing of a ponderous vehicle. It was over so soon (each tremor lasted for only 4 or 5 seconds) that few people paid any attention to the occurrence.*



# A new look at the July 1931 Adelaide Earthquake

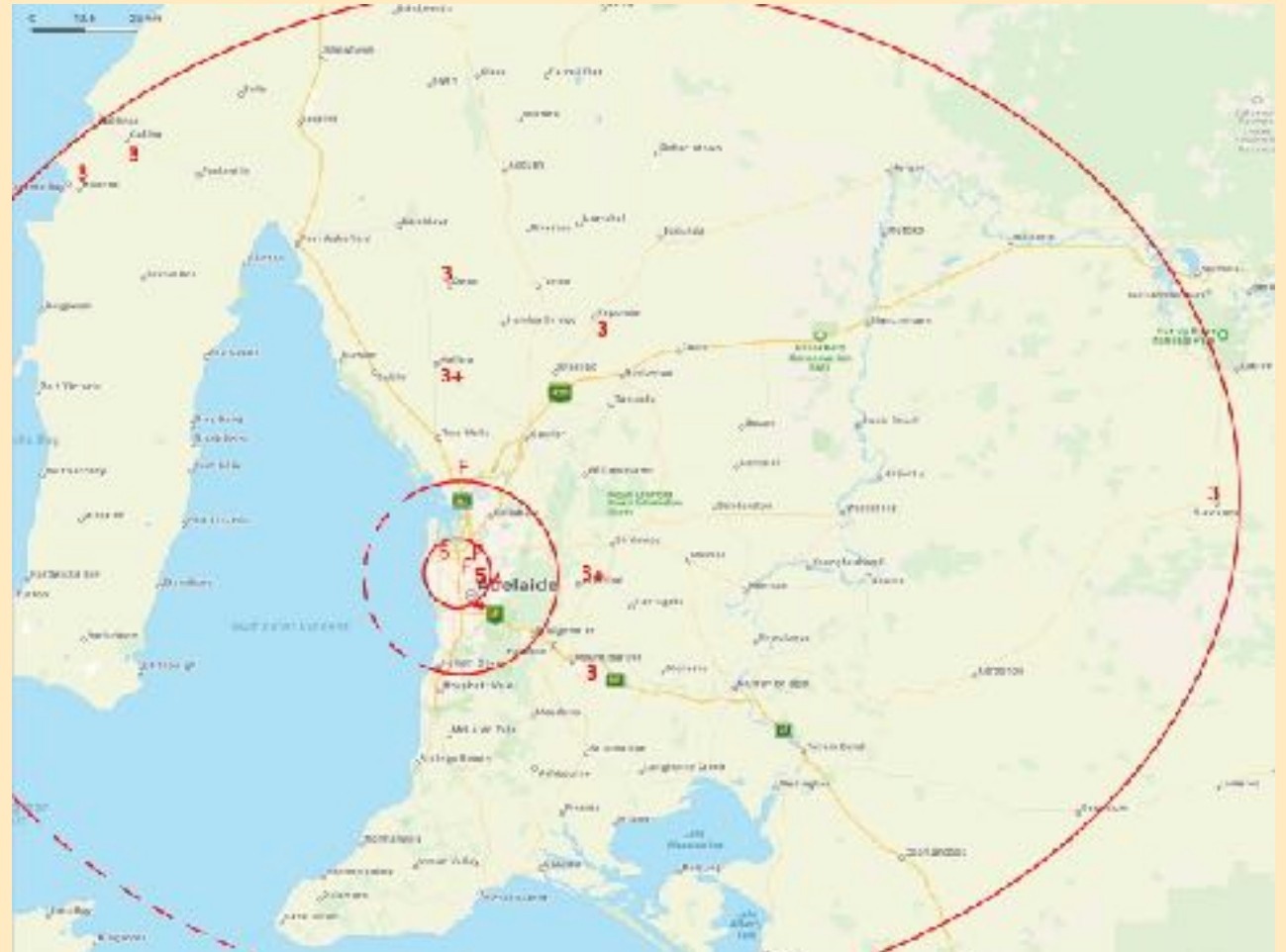
## Seismogram

The seismogram from the Adelaide Observatory Milne-Shaw was disappointing but typical of that for local earthquakes, the shaking too strong and too rapid for the instrument to respond. A blank gap in the trace is the only evidence of the tremor. The shaking was apparently clear on the Weather Bureau's barograph but that record was not published in the local newspapers as far as I can see. It was another 28 years until seismographs capable of recording local earthquakes were installed in South Australia by David Sutton at Adelaide University, following the 1954 earthquake.

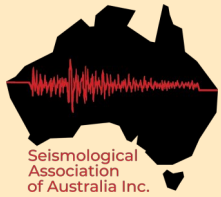
## Epicentre

Dodwell, the then government astronomer and seismologist, reasoned that the 1931 epicentre lay between Adelaide and Kapunda which are about 80km distant, the limits of felt reports. In agreement, Katherine Dix (2013) assigned the epicentre to Two Wells about 40 km north of Adelaide. Our isoseismal map would suggest it was closer to Adelaide and Port Adelaide, perhaps offshore in Gulf St. Vincent given the total lack of damage in either urban area.

At the University of Adelaide, geologist Madigan commented that he felt the 2nd story floor and walls vibrate rapidly 10 or 12 times in 10 seconds and that pictures on the walls slipped sideways. The blank section of seismogram, the light spot moving too fast to be photographed, was similarly about 10s which is reasonable for the claimed magnitude of M4.7.



**Figure 1: Felt area of the Adelaide earthquake of 24 July 1931 at 10:28 local time, magnitude 4.7. It was felt strongly in Adelaide suburbs and Port Adelaide (MM5) and reported felt (F) at other sites in the metropolitan area without details. Isolated reports from Moonta, and Kadina to the northwest and Alawoona 180 km to the east of Adelaide seem to be genuine.**



# A new look at the July 1931 Adelaide Earthquake

At Kadina the duration of shaking was claimed similarly to be 8 to 10 seconds. The blank section of seismogram, the light spot moving too fast to be photographed, was similarly about 10s which is reasonable for the claimed magnitude of M4.7.



## Magnitude

There are large areas within our isoseismals without felt reports. Lighthouse or weather station records might fill some of these gaps; at Gawler, Murray Bridge, Goolwa and Edithburg for example. However on the basis of the felt area shown in Figure 1, the computed magnitude is about 4.7, similar to the value of M4.5 (Dix, 2013 and McCue, 2013).

## Discussion

There is still much uncertainty associated with this earthquake, its location and size, but its effects in Adelaide are not unimportant and the magnitude is at least 4.7. It was the largest earthquake in the immediate Adelaide Region between 1902 and 1954 and we have classified it as a shallow focus event based on the isoseismal map. The earthquake focus can't convincingly be associated with any particular fault, even the Redbank Fault, but it seems that if any of the faults through Adelaide are active then the whole system of

**Figure 2 (left) The Redbanks Fault is the solid red line at the top of the figure, near Virginia, with a family of parallel faults including the Para and Eden-Burnside Faults dipping to the east spanning the built up area. (Figure from the SA Mines Department).**

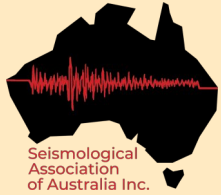
**Figure 3 (right) shows a photo from the front page of News of the useless seismogram except that the line break lasted about 10 seconds, the same duration assessed by Dodwell.**

## Observatory Record



**INSTEAD OF REGISTERING the earthquake the Milne-Shaw seismograph boom, owing to the sudden movement, oscillated and left a blank space where there should have been a black line showing the amplitude. The instrument is a long-distance seismograph.**





# A new look at the July 1931 Adelaide Earthquake

faults is surely active, or the earthquakes are not occurring on these ancient mapped faults. An earlier earthquake of its size in the Adelaide region occurred on 7 July 1883, its magnitude also 4.7 and its epicentre near Mount Barker (McCue, 1980).

Information about these earthquakes is important for evaluating earthquake risk to the city of Adelaide.

## References

Dix, Katherine L. 2013. *South Australian Historical Earthquakes in the Pre-Instrumental Period 1837-1963: A Comprehensive Chronicle and Analysis of Available Intensity Data*. School of Physics University of Adelaide. A Thesis submitted for the degree of Master of Philosophy September 2013.

McCue, K.F. 1980. *Magnitude of some early earthquakes in Southeastern Australia*. *Search*, 11(3), 78-80.

McCue, K.F. 2013. *Historical Earthquakes in South Australia*. [www.aees.org.au/articles/page/10](http://www.aees.org.au/articles/page/10)



# Recent Seismic Activity - Australia

## Australian Earthquakes

July - September 2022

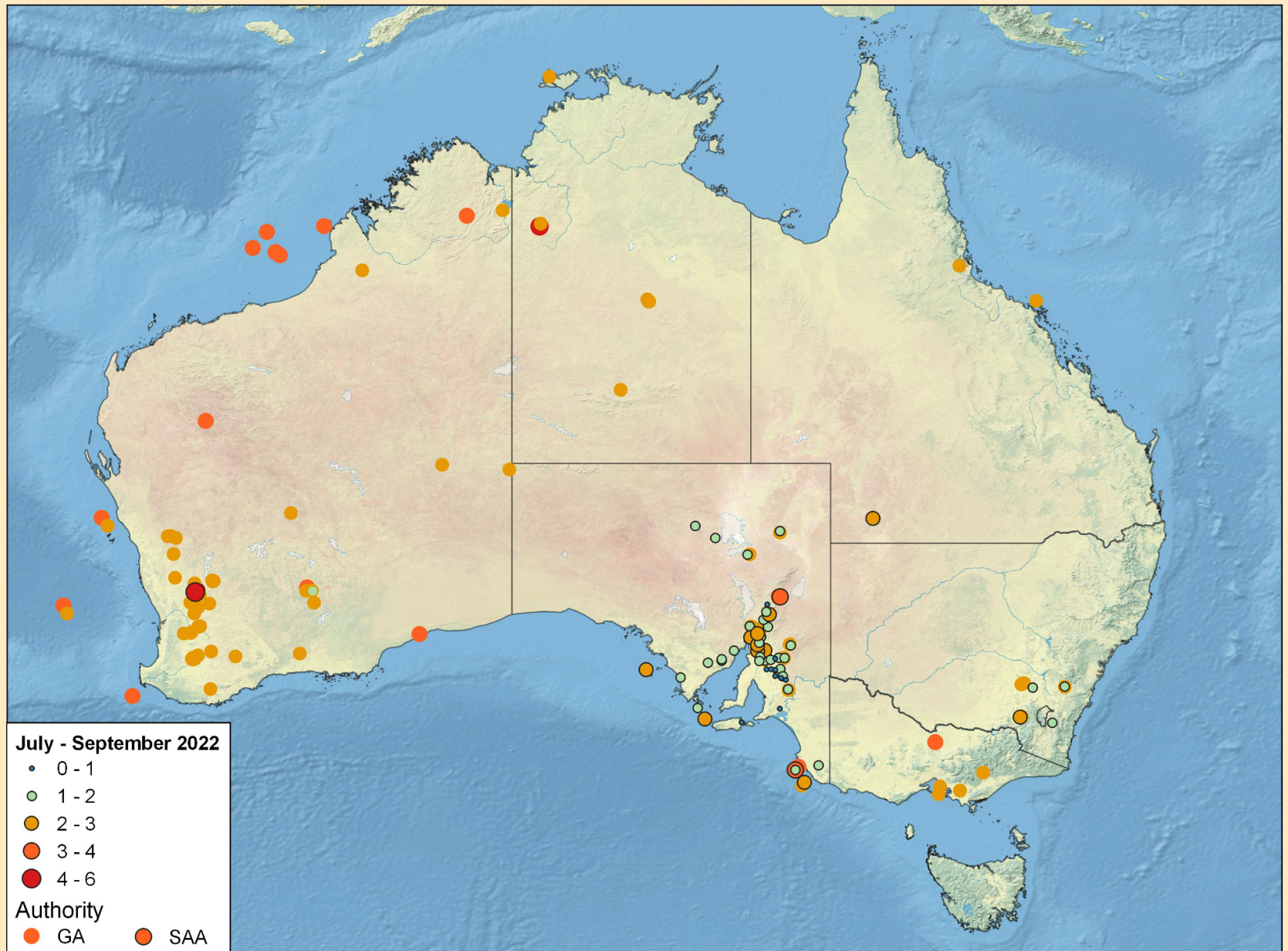
Map produced by Clive Collins

Epicentres from:

[Geoscience Australia](#) &  
[Seismological Assoc. of Australia Inc.](#)

SAA contributions from:

Kevin McCue (NSW)  
Mike Turnbull (CQSRG, Qld)  
Alison Wallace  
David Love



continued next page...





# Recent Seismic Activity - South Australia

SAA computations make use of all data we can readily access including:

- PSN recorders
- Raspberry shakes
- SAA stations
- Seismology Research Centre stations
- Seismometers in Schools
- Geoscience Australia network & occasionally more.

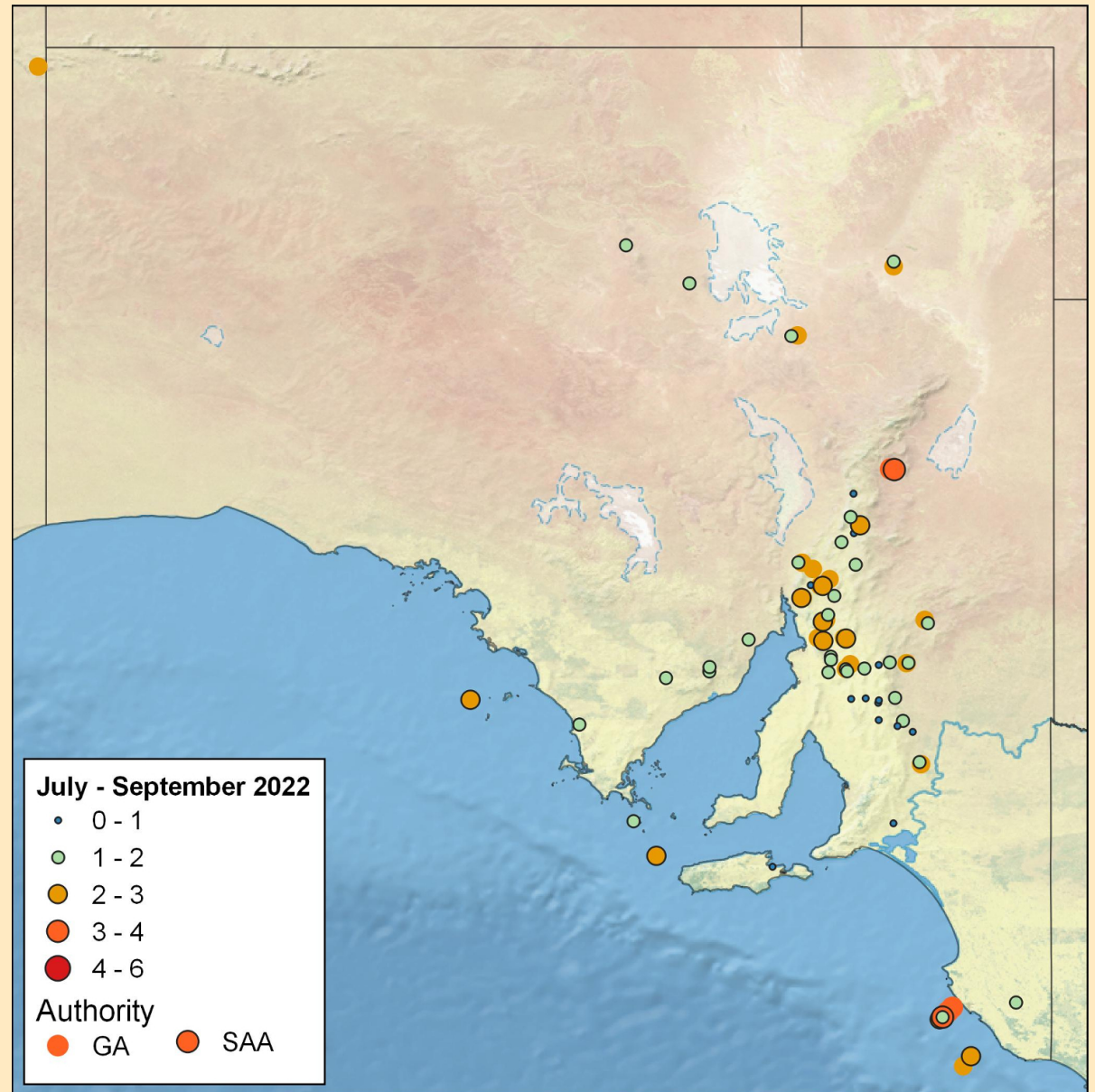
Many thanks to all who keep their instruments running and organisations who keep collecting and making the data available including:

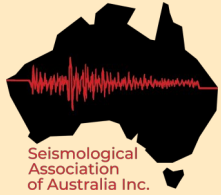
- IRIS (Incorporated Research Institutions in Seismology)
- University of Melbourne
- Australian Centre for Geomechanics - UWA, collecting PSN data
- Central Queensland Seismology Research Group, displaying PSN daily plots
- Australian National University

## South Australian Earthquakes

July - September 2022

Map produced by Clive Collins





# Resources & useful links

Description	URL / Webpage	Notes
<b>SAA Membership Application</b>	<a href="https://earthquake.net.au/wp-">https://earthquake.net.au/wp-</a>	Join up with the SAA using this form
<b>SAA Flier</b>	<a href="https://www.assa.org.au/media/74629/saa-membership-">https://www.assa.org.au/media/74629/saa-membership-</a>	Our current brochure - flier, saying what we do
<b>SAA Newsletters at Trove</b>	<a href="https://nla.gov.au/nla.obj-1685315562">https://nla.gov.au/nla.obj-1685315562</a>	View any SAA Newsletter at Trove
<b>SAA EqServer</b>	<a href="http://ade-eqserver.dyndns.org:8080/eqserver/">http://ade-eqserver.dyndns.org:8080/eqserver/</a>	South Australian miniseed seismometers
<b>Melbourne University EqServer</b>	<a href="https://meiproc.earthsci.unimelb.edu.au/eqserver/">https://meiproc.earthsci.unimelb.edu.au/eqserver/</a>	Australian miniseed seismometers
<b>Regional Seismic Network</b>	<a href="http://www.regional-seismic.net/">http://www.regional-seismic.net/</a>	PSN seismometers - Aust. Centre for Geomechanics
<b>Australian Public Seismic Network</b>	<a href="http://cqsrg.org/psn/stations/">http://cqsrg.org/psn/stations/</a>	PSN seismometers & some Raspberry Shakes
<b>Recent SA Earthquakes</b>	<a href="https://earthquakes.mappage.net.au/q.php">https://earthquakes.mappage.net.au/q.php</a>	Data & summaries of recent SA quakes
<b>Geoscience Australia</b>	<a href="http://www.ga.gov.au/earthquakes/initRecentQuakes.do">http://www.ga.gov.au/earthquakes/initRecentQuakes.do</a>	Our national authority on seismic events
<b>Earthquake Services</b>	<a href="https://www.researchgate.net/profile/Colin_Lynam">https://www.researchgate.net/profile/Colin_Lynam</a>	Citizen Science Consultant - Col Lynam
<b>Seismic Research Centre</b>	<a href="https://www.src.com.au/">https://www.src.com.au/</a>	OEM of seismic instruments & software
<b>symCDC</b>	<a href="http://symcdc.com/">http://symcdc.com/</a>	OEM of seismic instruments & software
<b>IRIS Seismic Monitor</b>	<a href="http://ds.iris.edu/seismon/">http://ds.iris.edu/seismon/</a>	Global seismic events
<b>Joint Australian Tsunami Warning Centre</b>	<a href="http://www.bom.gov.au/tsunami/">http://www.bom.gov.au/tsunami/</a>	Bureau of Meteorology site
<b>Australian Earthquake Engineers Society</b>	<a href="https://aees.org.au/">https://aees.org.au/</a>	An organisation with similar interests
<b>Atlas of the Underworld</b>	<a href="http://www.atlas-of-the-underworld.org/">http://www.atlas-of-the-underworld.org/</a>	Mapping the Earth's mantle
<b>Atlas of Living Australia</b>	<a href="https://www.ala.org.au/">https://www.ala.org.au/</a>	A Citizen Science initiative