

# **SOUTH AUSTRALIA SEISMICITY REPORT 2009**

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## **Seismicity**

308 earthquakes were located during the year, including 13 far offshore events south of Kangaroo Island, and 1 in NSW. There were 7 events over magnitude 4, with the largest being magnitude 4.5, but 5 of these were in the far offshore sequence, resulting in about an average year for the state. There were 28 events over magnitude 3, but 12 of these were offshore, resulting again in a close to average year. The largest onshore event was magnitude 4.5, 30km north-east of Peterborough in 26<sup>th</sup> January.

There were 17 events reported felt, mostly in the South Flinders Ranges area. An offshore event was felt at Streaky Bay, an unusual occurrence that far west. The most notable felt event was a magnitude 3.4 slightly offshore from Normanville on 3<sup>rd</sup> November, the closest magnitude 3 to Adelaide since 1973. The event was even weakly felt in the Adelaide CBD. No isoseismal maps were produced.

There were very few earthquakes that occurred outside the usual areas. An unusual sequence occurred 300 km south of Kangaroo Island. This was reported in MESA Journal V54 p19. The events could not be associated with any major structure, and timing seemed to be associated with a 7 day sequence. One earthquake was located far west of Coober Pedy. No earthquakes were located within 40 km of Adelaide, mirroring the low activity of recent decades. A number of events were located on Fleurieu Peninsula well south of Adelaide. This is probably due to the addition of an extra privately owned station HMV1.

## **Network**

There were a number of changes to the seismograph network. Geoscience Australia (GA) installed new equipment at 4 existing sites (GHSS, NAPP, PTPS, WHYH), and 1 new site (TWOA), and took over operation of these sites from PIRSA. These stations were established in the early 1990s as part of the Joint Urban Monitoring Program (JUMP). GA also installed equipment at HTT vault in March, including a satellite dish. In July, PIRSA turned off the analogue equipment, which had operated since 1963. A digital recorder continued to send realtime data to PIRSA also.

GA and PIRSA examined various remote locations, and chose 4 where GA plan to install equipment in coming years.

STR2 installation was completed and began continuous realtime transmission in October, finalising the new Adelaide network (National Disaster Mitigation Program).

The station HMV1 near Victor Harbor began continuous realtime transmission to PIRSA in March. This station was funded and established by a private individual, Paul Hutchinson. His interest has led to an increase of earthquakes being located in the area.

There is another private station running at Mount Torrens, which sends data to a collection centre at the Australian Centre for Geomechanics in Perth.

Realtime data is also sent to PIRSA from 2 private stations interstate.

The PIRSA network now comprises 10 analogue stations, 5 dial-up stations, 11 continuous realtime stations, and 1 visit and download station (suburban)

## **Procedures**

Standard procedure for earthquake location is:

Blasts are usually not located, and are not included in the catalogue

Overseas events are not located

Interstate events are occasionally located

Local events triggering the central system are reviewed as soon as possible, sometimes including GA or dial-up station data.

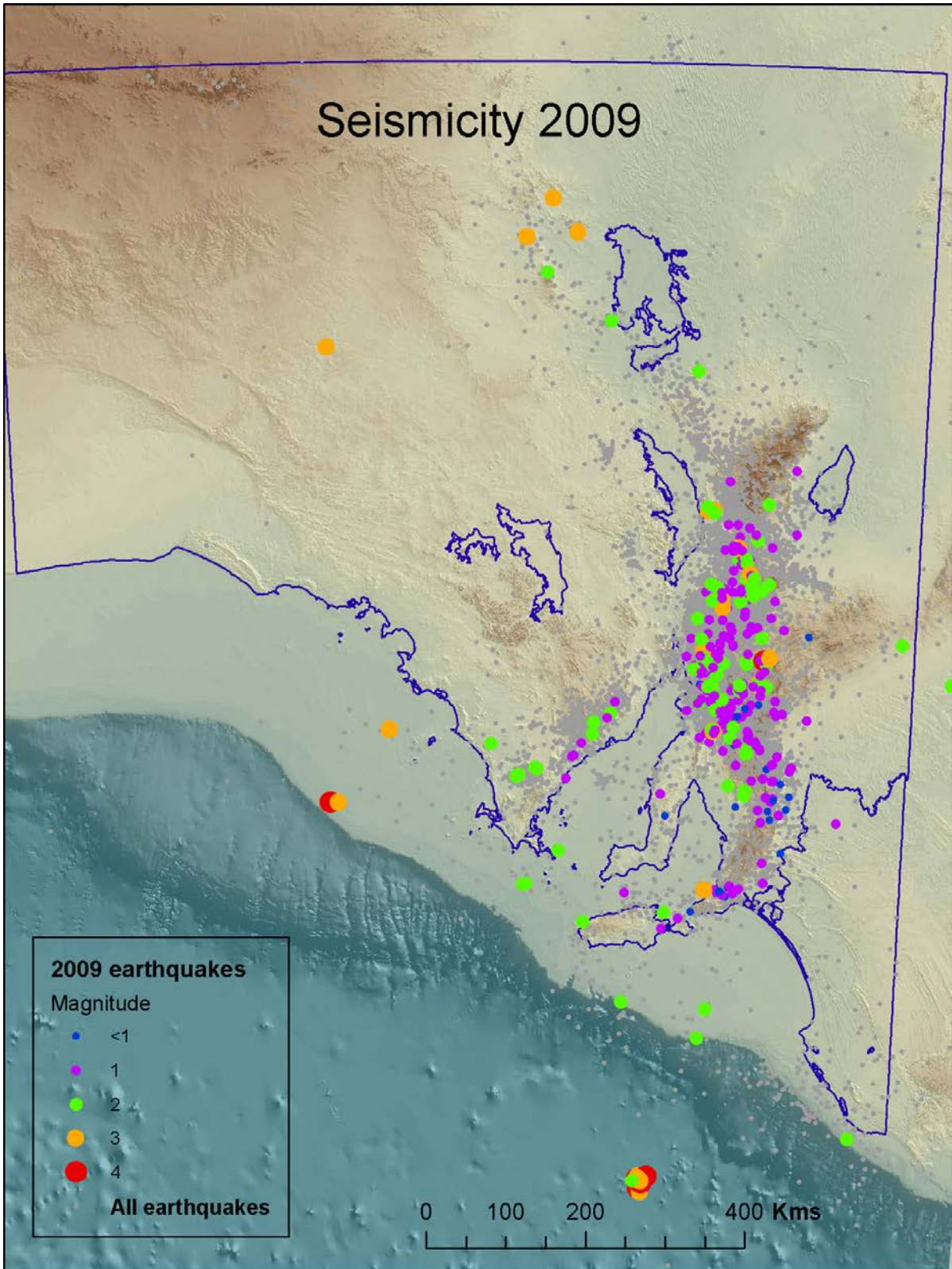
Reviewed events are put on the PIRSA website as soon as possible

Final locations are calculated using the old software Eqlocl, one to two months after actual date, using all available data, including data from GA and Environmental Systems and Services.

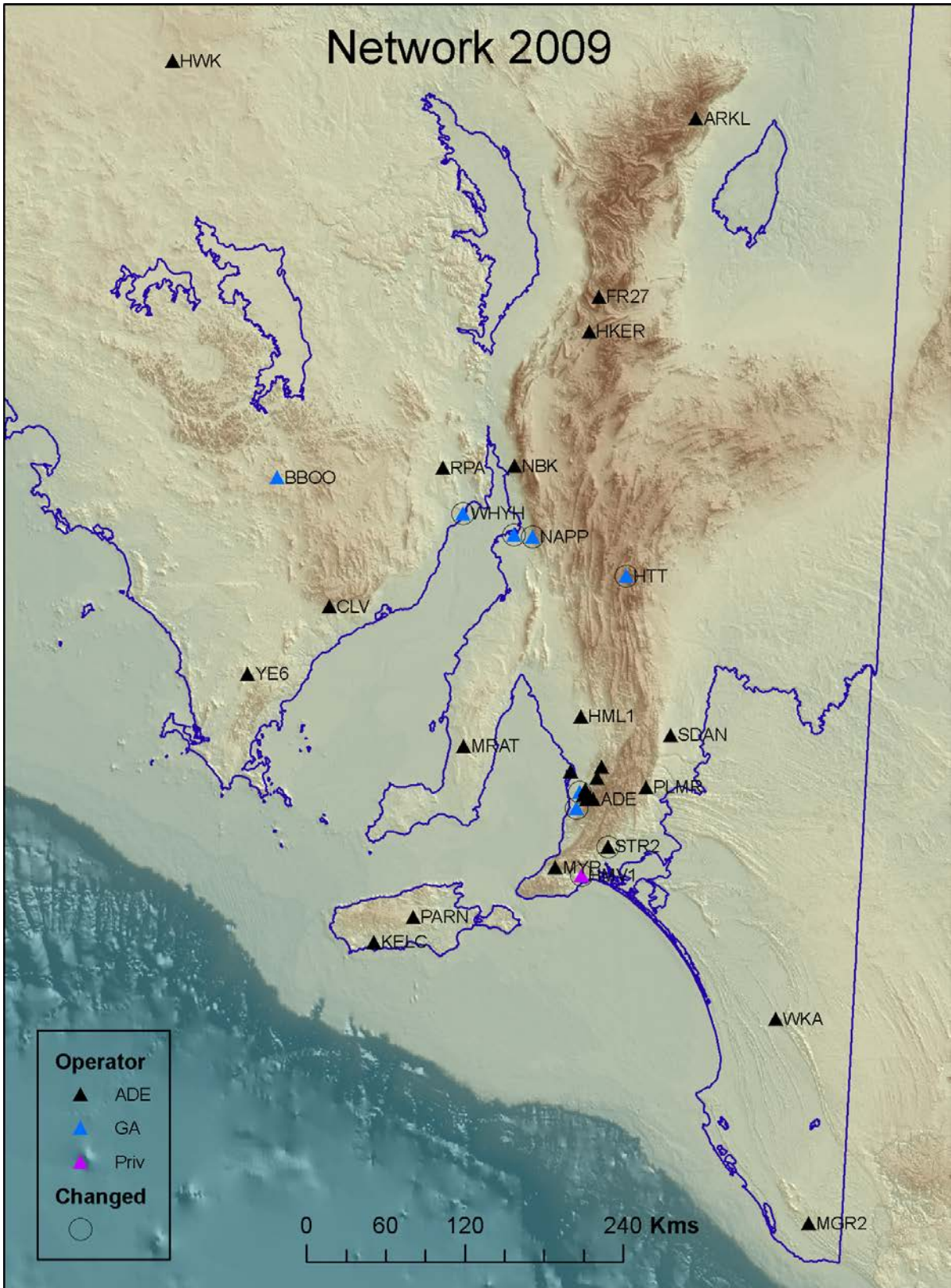
Final locations are uploaded overnight to the PIRSA spatial data library and is publicly available on SARIG website.

Some GA data is collected via Seedlink. The most common method is AutoDRM.

Initial magnitudes are calculated using the Richter formula. Final magnitudes are calculated using the Greenhalgh formula.



Seismicity for 2009 shown in colour, and the complete list of earthquakes (from 1840) shown in grey.



South Australian seismographs in 2009, showing those where changes occurred.

Date	Time - UT	Long	Lat	Depth km	Place	Mag	MMI	Acc A-F	Stns
2009-01-02	1251	138.921	-33.030	5.7	PETERBOROUGH 10KM SE	3.1	4	C	21
2009-01-14	2257	133.172	-29.228	12.5	COOBER PEDY 155KM W	3.0		D	7
2009-01-15	1015	138.399	-32.045	13.8	HAWKER 17KM S	3.0		C	17
2009-01-17	0231	138.321	-32.872	16.2	PORT PIRIE 47KM NE	2.5	3	C	16
2009-01-19	0435	138.933	-31.960	16.7	HAWKER 48KM E	2.6	3	C	13
2009-01-26	0029	138.988	-32.763	8.3	PETERBOROUGH 28KM NE	4.5	4	C	23
2009-01-30	0817	138.983	-30.977	17.7	LEIGH CREEK 77KM SE	2.9		C	16
2009-02-18	0325	138.415	-32.163	19.9	HAWKER 30KM S	3.1		C	21
2009-02-27	1713	138.009	-29.488	38.0	LEIGH CREEK 117KM N	2.8		D	9
2009-03-04	2320	138.170	-32.672	20.4	PT AUGUSTA 43KM SE	3.3		C	17
2009-03-05	2013	138.604	-31.482	11.9	HAWKER 48KM N	3.2		C	16
2009-03-14	1309	136.032	-28.391	28.4	ODNADATTA 111KM SE	2.9		E	8
2009-04-04	1240	133.943	-33.593	8.7	STREAKY BAY 122KM S	3.8	3	C	23
2009-04-07	0728	135.769	-35.351	9.9	PORT LINCOLN 69KM S	2.7		C	15
2009-04-14	0140	135.762	-27.990	10.3	ODNADATTA 59KM SE	3.6		D	16
2009-05-08	1113	138.229	-37.060	7.2	ROBE 137KM W	2.9		D	18
2009-05-29	1445	138.189	-31.070	9.9	PARACHILNA 21KM W	3.5		C	18
2009-05-29	1220	138.258	-31.065	14.3	PARACHILNA 15KM NW	3.2		C	19
2009-05-29	1121	138.267	-31.096	19.3	PARACHILNA 13KM W	2.9		C	14
2009-07-09	2216	138.564	-34.188	10.1	CLARE 39KM S	2.6		C	18
2009-07-10	1220	138.720	-31.652	22.2	HAWKER 38KM NE	2.5		C	14
2009-07-26	2013	138.270	-32.084	10.0	HAWKER 26KM SW	2.6		C	15
2009-07-30	1801	137.427	-38.678	15.2	KANGAROO ISLAND 330KM S	4.1		D	28
2009-07-30	1808	137.455	-38.631	12.3	KANGAROO ISLAND 330KM S	3.3		D	15
2009-07-30	1815	137.457	-38.743	4.8	KANGAROO ISLAND 330KM S	2.6		E	14
2009-08-05	2143	137.555	-38.643	9.4	KANGAROO ISLAND 330KM S	4.5		D	29
2009-08-05	2227	137.447	-38.779	25.2	KANGAROO ISLAND 330KM S	4.3		D	24
2009-08-05	1910	137.487	-38.700	7.7	KANGAROO ISLAND 330KM S	4.1		D	26
2009-08-06	1351	137.481	-38.811	14.5	KANGAROO ISLAND 330KM S	3.1		D	17
2009-08-10	0705	137.401	-38.703	7.0	KANGAROO ISLAND 330KM S	2.9		D	20
2009-08-11	1039	137.511	-38.675	8.7	KANGAROO ISLAND 330KM S	2.7		D	15
2009-08-12	0456	137.488	-38.721	6.8	KANGAROO ISLAND 330KM S	4.5		D	31
2009-08-12	0551	137.482	-38.688	4.7	KANGAROO ISLAND 330KM S	3.5		D	21
2009-08-12	0546	137.438	-38.655	12.7	KANGAROO ISLAND 330KM S	3.0		D	17
2009-08-15	1954	138.765	-31.774	19.9	HAWKER 34KM E	3.3	3	C	20
2009-08-17	1846	137.361	-38.691	10.0	KANGAROO ISLAND 330KM S	2.7		E	12
2009-08-19	2207	135.699	-34.103	6.8	CUMMINS 18KM N	2.7		C	19
2009-08-20	1157	135.676	-34.113	6.7	CUMMINS 17KM N	2.8		C	18
2009-08-25	0947	138.174	-32.741	10.3	PORT AUGUSTA 47KM SE	2.5		C	15
2009-09-20	2058	136.101	-27.550	17.4	ODNADATTA 65KM E	3.3		D	17
2009-10-16	0224	133.119	-34.419	32.3	PORT LINCOLN 250KM W	4.1		C	25
2009-10-16	0733	133.238	-34.411	4.6	PORT LINCOLN 250KM W	3.1		D	13
2009-10-26	2241	139.070	-32.719	1.8	PETERBOROUGH 36KM NE	3.5		C	25
2009-11-03	0604	138.278	-35.375	10.3	VICTOR HARBOR 36KM NW	3.4	4	C	23
2009-11-17	1227	136.415	-27.935	33.0	ODNADATTA 106KM SE	3.1		E	13
2009-11-26	1238	138.331	-33.571	9.7	CLARE 39KM NW	3.1		C	24
2009-12-19	1605	138.793	-34.238	10.4	CLARE 48KM S	2.7	3	C	17

Table of events of magnitude 2.5 or greater located by PIRSA.