

# The new ISC-GEM catalogue and the implications on the magnitude of significant Australian earthquakes

Glanville, D.H., Leonard, M.

Geoscience Australia

## Introduction

The recently released ISC-GEM catalogue was a joint product of the International Seismological Center (ISC) and the Global Earthquake Model (GEM). In a major undertaking it collated, from a very wide range of sources, the surface and body wave amplitude-period pairs from the pre digital era; digital Ms, Mb and MW; collated MW values for 970 earthquakes not included in the Global CMT catalogue; used these values to determine

new non-linear regression relationship between Ms and MW and Mb and MW. They also collated arrival picks, from a very wide range of sources, and used these to recompute the location, initially using the EHB location algorithm then revised using the ISC location algorithm (which primarily refined the depth). The resulting catalogues consists of 18 871 events that have been relocated and assigned a direct or indirect estimate of MW. Its completeness periods are, Ms ≥7.5 since 1900, Ms ≥6.25 1918 and Ms ≥5.5 1960.

This catalogue assigns, for the first time, an MW estimate for several Australian earthquakes. For example the 1968 Meckering earthquake the original ML, Mb and Ms were 6.9, 6.1 and 6.8, with empirical estimates of Mw being 6.7 or 6.8. The ISC-GEM catalogue assigns an MW of 6.5. Also notably missing from this list is the Newcastle earthquake, its assigned MW is less than 5.5.

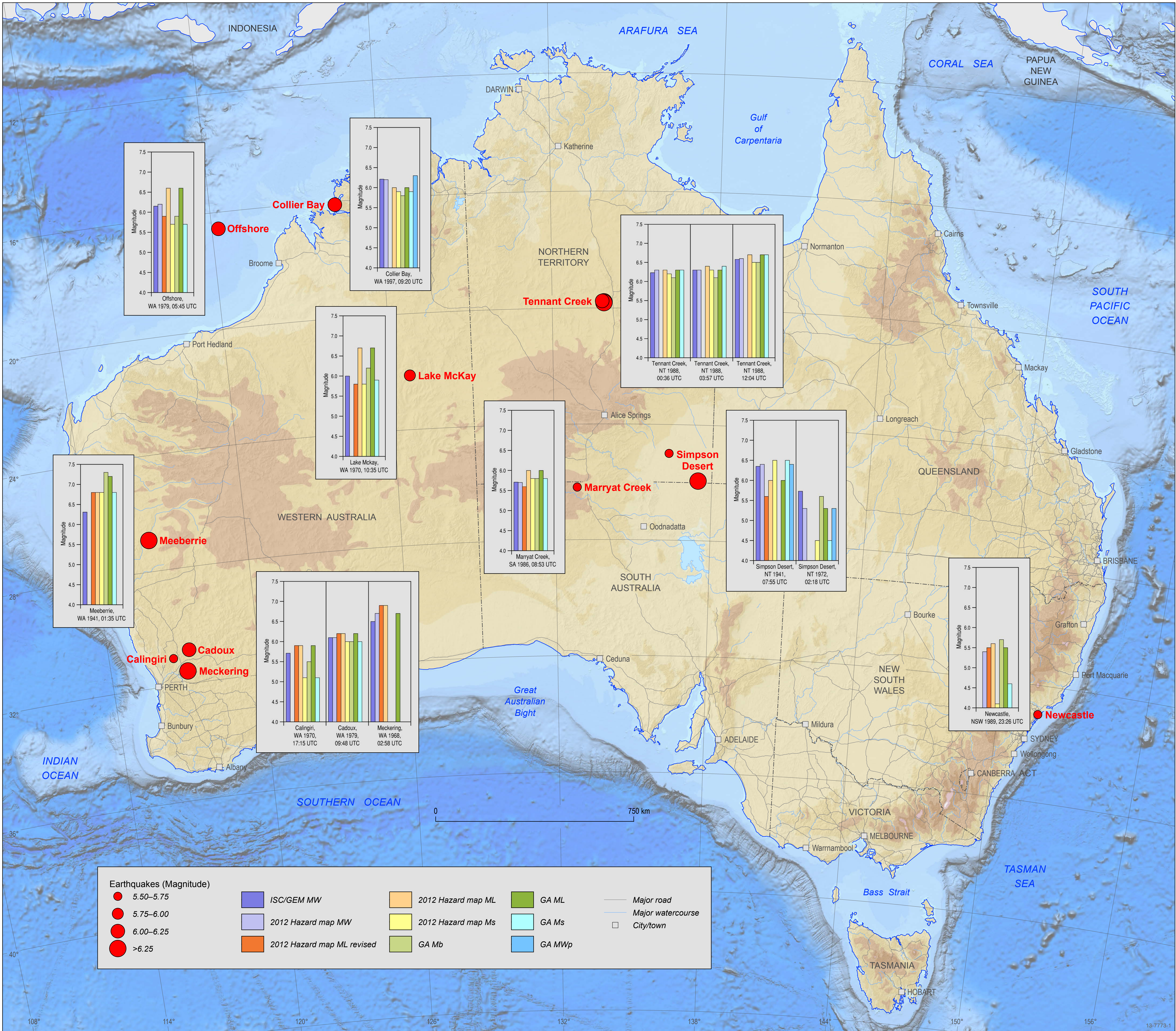


Figure 1: Earthquake locations with graphed magnitudes for comparison.

Table 1: Magnitudes of large Australian earthquakes.

Location	ISC/GEM MW	2012 Hazard Map MW	2012 Hazard Map ML revised	2012 Hazard Map ML	2012 Hazard Map Ms	GA Mb	GA ML	GA Ms	GA MWp
Meeberrie, WA 1941, 01:35 UTC	6.31		6.8	6.8	6.8	7.3	7.2	6.8	
Simpson Desert, NT 1941, 07:55 UTC	6.35	6.4	5.6	6.0	6.5		6.0	6.5	6.4
Meckering, WA 1968, 02:58 UTC	6.5	6.7	6.9	6.9			6.7		
Calingiri, WA 1970, 17:15 UTC	5.71		5.9	5.9	5.1	5.5	5.9	5.1	
Lake Mckay, WA 1970, 10:35 UTC	6.0		5.8	6.7	5.8	6.2	6.7	5.9	
Simpson Desert, NT 1972, 02:18 UTC	5.73	5.3			4.5	5.6	5.3	4.5	5.3
Offshore, WA 1979, 05:45 UTC	6.15	6.2	5.9	6.6	5.7	5.9	6.6	5.7	
Cadoux, WA 1979, 09:48 UTC	6.1	6.1	6.2	6.2	6.0	6.0	6.2	6.0	
Marryat Creek, SA 1986, 08:53 UTC	5.71	5.7	5.6	6.0	5.8	5.8	6.0	5.8	
Tennant Creek, NT 1988, 00:36 UTC	6.23	6.3		6.3	6.2	6.1	6.3	6.3	
Tennant Creek, NT 1988, 03:57 UTC	6.3	6.3		6.4	6.3	6.1	6.3	6.4	
Tennant Creek, NT 1988, 12:04 UTC	6.58	6.6		6.7	6.5	6.5	6.7	6.7	
Collier Bay, WA 1997, 09:20 UTC	6.21	6.2		6.0	5.9	5.8	6.0	5.9	6.3
Newcastle, NSW 1989, 23:26 UTC		5.4	5.5	5.6	4.1	5.7	5.5	4.6	

