

Darwin shaken by a deep Mw 7.3 earthquake in the Banda Sea

By Paul Somerville, Chief Geoscientist, Risk Frontiers

Darwin was shaken at around noon today by a deep Mw 7.3 earthquake that occurred in the Banda Sea. Both Geoscience Australia and the United States Geological Survey reported that the earthquake occurred at a depth of about 200 km. Such deep earthquakes do not generate tsunamis, and no tsunami warning has been issued.



Figure 1. Location of the Mw 7.3 Banda Sea earthquake of 24 June 2019. Source: Geoscience Australia.

There was an alarming level of shaking in Darwin, but the earthquake was far enough away that damage would not be expected, and none has been reported to date. Parts of the Darwin CBD were evacuated, but we are not aware of any evacuation order and surmise that the long duration of the earthquake shaking caused sufficient alarm to prompt voluntary evacuation.

If proper procedures had been followed, the people who evacuated would have followed the “drop, cover and hold on” procedure described here:

<https://www.shakeout.org/dropcoverholdon/>, and would not have evacuated the building until the shaking was over.

Unlike the sharp (high frequency or short period), short duration ground motion that is experienced near small earthquakes in Australia, the shaking from large distant earthquakes

is often described as “rolling” (low frequency or long period) ground motion that can last for a long time. Some people reported shaking lasting 5 minutes. This long duration may have added to the sense of alarm and prompted people to evacuate. This shaking is expected to have been most pronounced in the upper floors of the taller buildings in the CBD, because their height causes them to have relatively long natural periods of vibration and they are thus “tuned” to the long period of the incoming seismic waves. In contrast, low-rise buildings are most vulnerable to the short period ground motions from nearby small earthquakes, and are less vulnerable to long period ground motions.

Unfortunately, it appears that we have missed an opportunity to record the ground motions in these Darwin CBD buildings. Without such recordings, we are left with uncertainty in the level of ground motion that they experienced. We need recordings so that we are better able to estimate the ground shaking levels that should be used in northern Australia to design buildings and infrastructure to withstand large earthquakes to our north. The frequent large earthquakes that occur to the north and east of Australia are illustrated by the earthquake epicenter map for 2019 shown in Figure 2.

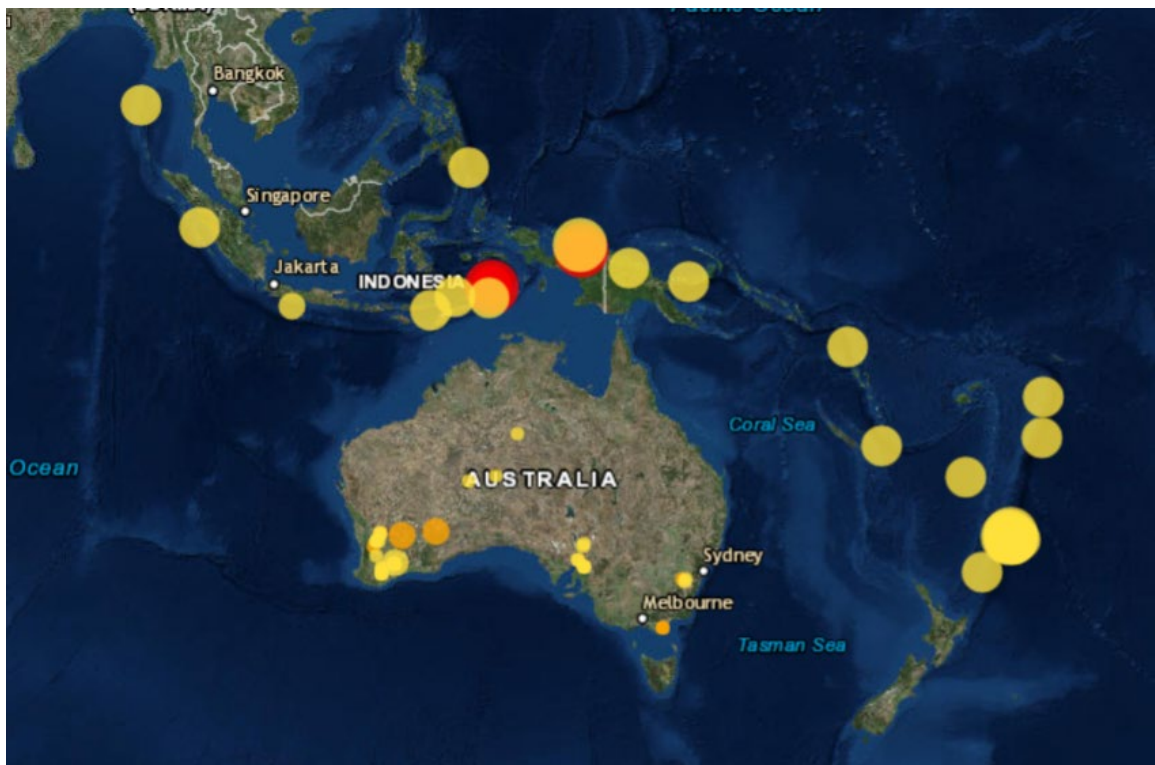


Figure 2. Locations of earthquakes that have occurred in 2019. The Mw 7.3 Banda Sea earthquake of 24 June 2019 is shown by the large red circle north of Darwin. The radius of the circle increases with increasing magnitude. Source: Geoscience Australia.