Quakes warn of seismic danger closer to home

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More earthquakes along the fault that caused the Boxing Day and Easter Monday earthquakes are “inevitable” and may cause shocks and tsunamis close to north-western Australia.
Dr Wouter Schellart, who is working on modelling to predict movement and forces in the tectonic plates that cover the earth’s surface, believes it is only a matter of time before there is another quake along the fault and that quakes are likely nearer Australia. Earthquakes are caused by sudden and violent movement along faults and most occur at the edges of the huge tectonic plates due to slow movement of these plates relative to one another.

“When the next earthquake will occur is as yet undeterminable, but that it will occur is inevitable,” Dr Schellart said. “The Boxing Day earthquake and last week’s earthquake have increased stresses at other segments of the same subduction fault. There will have to be new slip along the edges of the segment that has recently slipped to release these stresses.

“This will generate new earthquakes, and possibly new tsunamis. It is likely that new large earthquakes will occur further to the southeast along the same subduction plate boundary, which runs off shore of Sumatra, Java, Bali and Timor.

“These new earthquakes could potentially generate tsunamis closer to the Australian northwest shore.”

Research by Dr Schellart and colleagues shows that forces resulting from subduction of the Indian Ocean underneath Indonesia are greatest near Sumatra, especially near the north-western tip of the island, near the epicentres of the two recent large earthquakes.

“This might indicate that future earthquakes occurring further along the same subduction fault near Java and Bali will be of less magnitude and less devastating than the previous two earthquakes, because the pull forces resulting from subduction are smaller in these regions. These matters are subject of continuing research and hopefully new modelling will be able to provide more definite answers,” he said.

Earlier this year, Dr Schellart revealed that forces, including those that caused the Boxing Day earthquake and tsunami, are being transferred back across Australia’s tectonic plate, causing it to split in two.

Scientists had long understood why earthquakes happen where tectonic plates meet (the plates are forced against each other by movements in the mantle beneath the Earth’s surface), but the causes of earthquakes — such as the 1989 Newcastle earthquake — in apparently ‘safe’ areas in the middle of the plate had remained a mystery.

The research by Dr Schellart and colleagues in Melbourne and the United States showed these earthquakes were caused by transfer of forces generated at the plate boundaries, in particular near Sumatra, where the subducting Indian Ocean transmits up to 10 per cent of its force back to the surface.

Source: Australian National University