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# Submarine landslides and tsunami potential Off SE Australian Margin: results from the voyage SS2008/12

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Although the continental margins around Australia are themselves passive, they are surrounded by the Pacific Ring of Fire characterized by a great many earthquakes, tsunamis and submarine landslides. The Earthquake Catalogue of Geo-science Australia shows that in Australia earthquakes with a magnitude 5.5+ occur on average every two years with the potential of a disastrous earthquake of magnitude 6 or more every six years. Historical records also show that there were 47 tsunami hits in Australian Coasts during the last 150 years. The main objective of Voyage SS2008/12 onboard RV Southern Surveyor in 2008, was to map out the submarine landslides in the region off northern New South Wales and southern Queensland in order to investigate its tsunami-genic potential that could impact their densely populated coastal cities. During the survey ca. 13,000 square km of multi-beam swath bathymetry data (MBES) along with TOPAS high resolution seismic and different types of ground truth samples were collected in the continental slope. This study presents the preliminary morpho-tectonic analysis of the collected acoustic images of the seabeds and near surfaces.

In the survey area, the continental slopes extend from the shelf break to the abyssal plain between $\sim$150m to $\sim$4500m water depth. The survey area can be divided into northern and southern areas separated by relatively stable seabed of the Nerang Plateau. The average slopes range from a minimum of 2.8º on plateau to a maximum of 8.5º in steeper segments. Submarine slides of all sizes from 0.5 to 20 cubic km were encountered, there having different morphologies. They can be characterized as slab slides, debris flows and carbonate platform slides. The gravity cores takes from selected slide planes suggest that they have different ages (between ca. 6 to 25 ka) and the northern slides are older than the southern ones. Other bathymetric features are box canyons, linear canyons, volcanic cones, carbonate mounds and pockmarks. The most important discovery seems to be the observation of a “hanging block” in the mid continental slope off Merton Island, Queensland. The block has a volume of over 100 cubic km with prominent crown cracks. It seems that the block is a remnant left by canyon excavations in the mid to lower continental slopes. The crown cracks indicate its instability and the inception of the sliding processes. The toe of the block is already wasted and characterized by plunge pools. The tsunami-genic potential of this giant block depends on how it would fail: either altogether or piecewise, and how rapid the process would be. Many big landslides observed in the survey area show the evidence for multiple and recurrent sliding events. Our future research activity would focus to determine the tsunami-genic potential of these potential, massive, submarine landslides.