

3.3 Ranongga Island

3.3.1 Location and bathymetry

Ranongga Island is located 20 km west of Ghizo Island and 10 km north of Simbo Island, as shown in Figs. 3.3.1.1 and 3.2.1.1, respectively. The island is a long and narrow one, being 30 km long and 7 km wide, and roughly runs from north to south. Coral reefs are not so developed around the island, compared with other islands such as Ghizo Island and Simbo Island. This seems to mean the sea bottom slope of the shore around Ranongga Island is relatively steep.

A field survey was carried out at nine villages and one point on the island; Lale, Keara, Saguru, Kundu, Mondo, Vori, Vori Point, Koriovuku, Pienuna and Suava (see Fig. 3.3.1.2).

Clear ground upheaval was recognized on the island, which ranged from about 0.9 m (Vori and Vori Point) to about 3 m (Lale) from north to south. The heights of ground upheaval were estimated by subtracting the height of the mean low tide level after the earthquake from the height of the upper limit line of coral bleaching after the earthquake or the height of the low tide level before the earthquake. The low tide level before the earthquake was determined on the basis of eyewitness accounts of inhabitants. Photo 3.3.1.1 shows a bleaching coral reef uplifted more than 3 m at Lale village located on the west coast in the southern tip of the island.

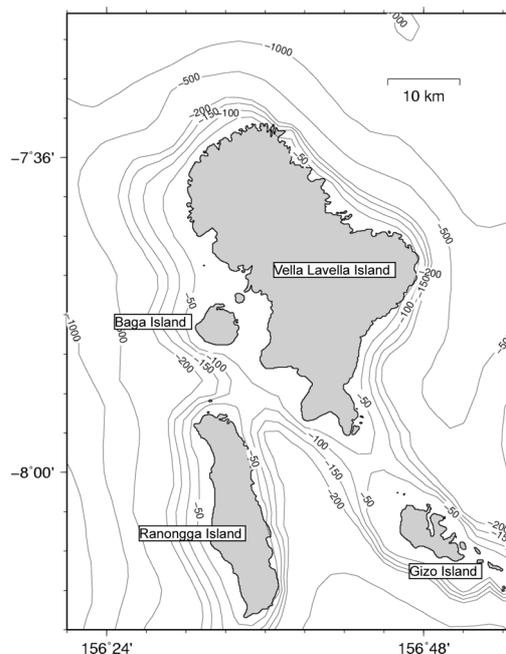


Figure 3.3.1.1 Topography around Ranongga Island.

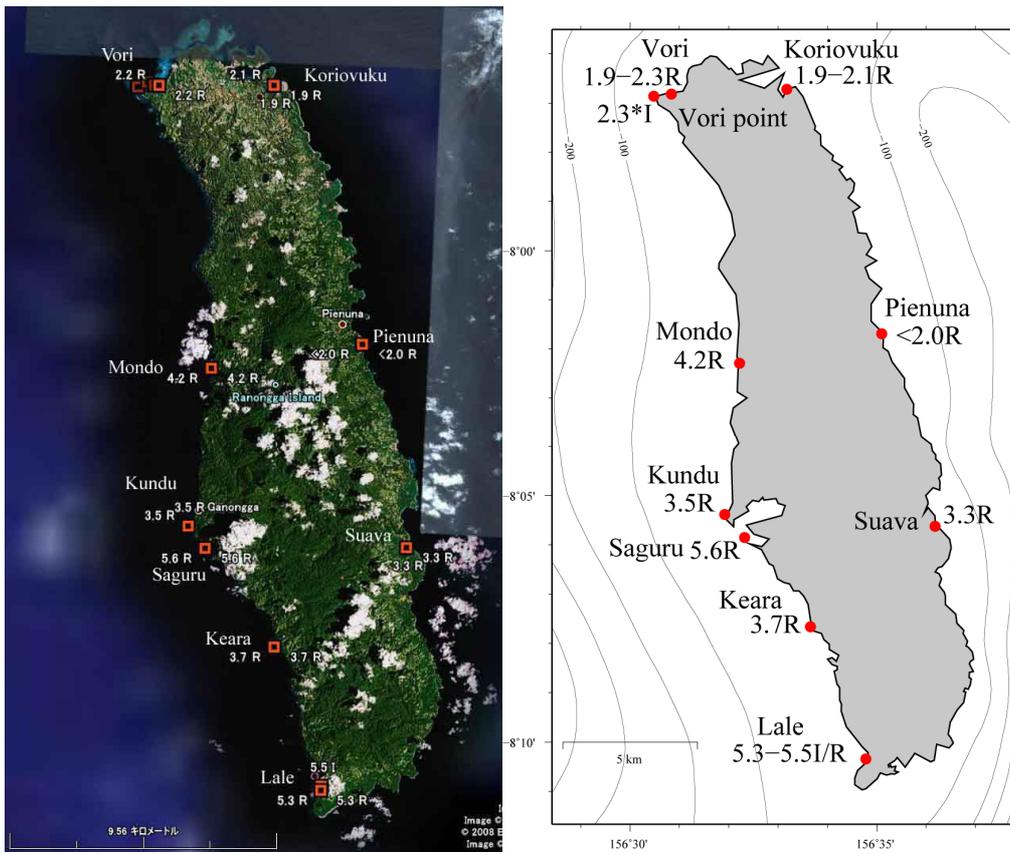


Figure 3.3.1.2 Surveyed sites in Ranongga Island and bathymetry around the Island



Photo 3.3.1.1 Bleaching coral reef uplifted more than 3 m at Lale village. The white broken line shows the possible low tide level before the earthquake.



Photo 3.3.1.2 Small scale landslide at Mondo village on the west coast in the middle of Ranongga Island

The tsunami run-up and inundation heights ranged from about 1.9 (Vori and Koriovuku) to about 5.5 m (Lale) from north to south, except for a measurement of 5.6 m at Saguru located on the west coast in the middle of the island.

Both the ground upheaval and the tsunami-trace height obtained at Lale village were highest in Ranongga Island. At every surveyed site, the height of tsunami was greater than that of ground upheaval. The tsunami heights on the west coast were greater than those on the east coast. The maximum tsunami height of 8.6 m for the present event was measured at Tapurai village in Simbo Island, and the ground subsidence was confirmed in Simbo Island, as stated in 3.2. These facts suggest that the maximum ground deformation in the present event was occurred between Ranongga Island and Simbo Island.

Because the ground of the island was uplifted, the damage from the tsunami was light, considering the runup height of the tsunami. On the island, two persons were killed not by the tsunami, but rather by a landslide, which occurred almost everywhere on the west coast of the island. Photo 3.3.1.2 shows an example of the landslides at Mondo village where the two were killed. In the photo, a few houses can be seen at the edge of cliff.

3.3.2 Lale

Lale village is located on the west coast in the southern tip of the island. The height of ground upheaval was estimated to be more than 3 m. A bleaching coral reef uplifted by the earthquake is shown in Photo 3.3.1.1. Cracks in the ground were recognized in the residential area, as shown in Photo 3.3.2.1.

The tsunami run-up height at Lale reached 5.3 ~ 5.5 m (Mark 79 and 80). The run-up points were decided on the basis of eyewitness accounts of inhabitants. Although the tsunami inundated the public water supply facility area, there was no damage to houses except that due to the earthquake. According to eyewitness accounts, the sea level went down just after the earthquake, and the tsunami arrived about 5 minutes after it.

Because there was the large upheaval, the postseismic deformation is likely. According to eyewitness accounts of inhabitants, the ground was uplifted by about 7 m just after the earthquake, and the sea level started to rise up gradually after about 10 days of the earthquake (evidence of subsidence). In order to detect such postseismic deformation, two benchmarks (reference points) were set up. Their location and tsunami-measured points are shown in Fig. 3.3.2.1. Two benchmarks were near Mark 79. One is located at the top of the base in water supplies shown in Photo 3.3.2.2 (Bench 1). The height of the top is measured as 5.787 m above Mean Sea Level. Other is located at the top of the base in the different water supplies shown in Photo 3.3.2.3 (Bench 2). The height of the top is measured as 5.750 m above Mean Sea Level. We recommend future survey team to measure the heights of the benchmarks and compare them to the above values.



Photo 3.3.2.1 Cracks in the ground due to the earthquake in the residential area

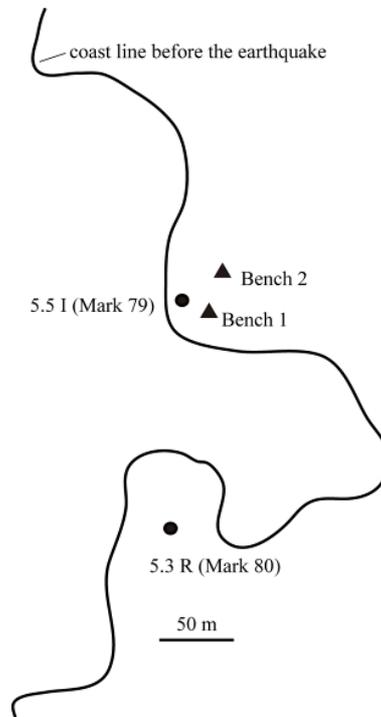


Figure 3.3.2.1 Location map of benchmarks at Lale



Photo 3.3.2.2 Bench mark of Bench 1 at Lale

The reference point is at the intersection point between the staff and concrete base.



Photo 3.3.2.3 Bench mark of Bench 2 at Lale

The reference point is at the intersection point between the staff and concrete base.

3.3.3 Keara

Keara village is located on the west coast in the south part of the island. The height of uplift was estimated to be 1.9 m. A bleaching coral reef uplifted by the earthquake is shown in Photo 3.3.3.1. According to the eyewitness accounts, usually the height between top of the coral and sea level is the almost same as that between heel and knee.

The tsunami run-up height reached 3.7 m. The run-up points were decided on the basis of eyewitness accounts of inhabitants. Only one house was damaged by the tsunami. The total population of the village is about 600, and nobody was killed or injured. The negative wave of the tsunami arrived 5 minutes after the earthquake. Some houses were destroyed by the earthquake, and landslide occurred.



Photo 3.3.3.1 Bleaching coral reef uplifted by the earthquake in Keara

3.3.4 Saguru

Saguru village is located on the west coast in the middle of the island. The height of ground upheaval was estimated to be 2.5 m. A bleaching coral reef uplifted by the earthquake is shown in Photo 3.3.4.1.

There was no damage from the tsunami, but there was slight damage from the earthquake. All the houses are on a hill above the coastline. The tsunami arrived 1-2 minutes after the earthquake, and came three times with the almost same heights.



Photo 3.3.4.1 Bleaching coral reef uplifted by the earthquake in Keara

3.3.5 Kundu

Kundu village is located on the west coast in the middle of the island. The height of uplift was estimated as nearly 2.5 m. Photo 3.3.5.1 shows a clear upper limit line of coral bleaching after the earthquake.

The tsunami run-up height reached 3.5 m. The run-up point was located on the beach and decided on the basis of eyewitness accounts of inhabitants (Photo 3.3.5.2). Residential area is located on a cliff. Therefore, there was no damage from the tsunami.



Photo 3.3.5.1 Clear upper limit line of coral bleaching after the earthquake at Kundu village



Photo 3.3.5.2 Tsunami measured point at Kundu village

3.3.6 Mondo

Mondo village is located on the west coast in the middle part of the island. The height of ground upheaval was estimated around 2.6 m. The inhabitants showed the usual high tide level before the earthquake.

There was no damage from the tsunami, but a landslide, shown in Photo 3.3.6.1, killed two people.



3.3.6.1 Landslide in Mondo village

3.3.7 Vori and Vori Point

Vori village and Vori Point are located on the west coast in the northern part of the island. The height of ground upheaval was estimated around 0.9 m. The low tide level before the earthquake was used to estimate the height and decided on the basis of eyewitness accounts of inhabitants.

The tsunami run-up height reached 1.9 ~ 2.3 m at Vori village, and the tsunami inundation height was 2.3 m at Vori Point. The run-up and inundation points were decided on the basis of both debris and eyewitness accounts of inhabitants (Photos 3.3.7.1). The tsunami at Vori village did not overflow a coastal dune.



Photo 3.3.7.1 Tsunami measured points at Vori village (left) and Vori Point (right)

3.3.8 Koriovuku

Koriovuku village is located on the east coast in the northern part of the island. The height of uplift was estimated around 1.9 m. Photo 3.3.8.1 shows a clear upper limit line of coral bleaching after the earthquake.

The total number of houses was 109, and 34 houses were partially destroyed and 15 houses were completely destroyed. Nobody was killed by the tsunami or the earthquake.

The tsunami run-up height reached 1.9 ~ 2.1 m. The measured point was decided on the basis of eyewitness accounts of inhabitants (Photo 3.3.8.2). As the tsunami height was small and the residential area was located on a hill, damage from the tsunami was not recognized at all.

The tsunami arrived about 5 minutes after the earthquake. The ground shaking continued until the arrival of the tsunami. The tsunami waves consisted of three large waves, and the first one has maximum height. A fence was destroyed by the tsunami.

As at Lale, in order to detect expected postseismic deformation, two benchmarks (reference points) were set up in Koriovuku. Their location and tsunami-measured points are shown in Fig. 3.3.8.1 and Photo 3.3.8.3. Two benchmarks were near Mark 125. One is located at the top of the base in water supplies shown in Photo 3.3.8.4 (Bench 3). The height of the top is measured as 4.444 m above Mean Sea Level. The other is located at the base of a shed pillar shown in Photo 3.3.8.5 (Bench 4). The height of the top is measured as 2.713 m above Mean Sea Level.



Photo 3.3.8.1 Clear upper limit line of coral bleaching after the earthquake at Koriovuku village



Photo 3.3.8.2 Tsunami measured point at Koriovuku village

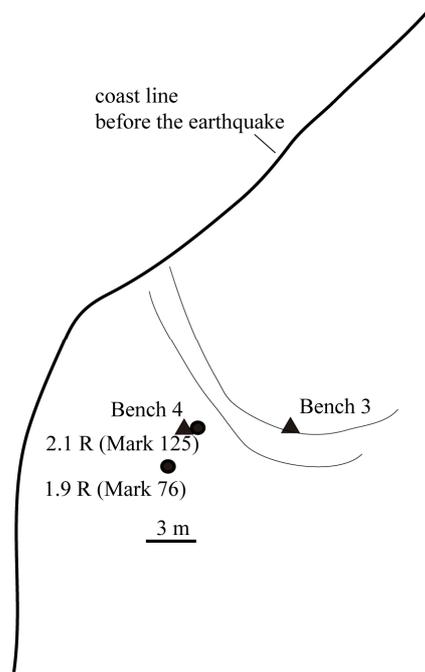


Fig. 3.3.8.1 Location map of benchmarks at Koriovuku



Photo 3.3.8.3 Location of benchmarks and tsunami survey point



Photo 3.3.8.4 Bench mark of Bench 3 at Koriovuku

The reference point is at the intersection point between the staff and concrete base.



Photo 3.3.8.5 Bench mark of Bench 4 at Koriovuku

The reference point is at the intersection point between the staff and concrete base.

3.3.9 Pienuna

Pienuna village is located on the east coast in the middle of the island. No inundation and runup marks were found in the field survey, and residents noticed no tsunamis. Coral reefs were exposed above the sea surface, and now sit 2.22 m above present sea level.



Photo 3.3.9.1 Coral reef uplifted 2.2 m at Pienuna village

3.3.10 Suava

Suava village is located on the east coast in the middle of the island. More than 300 people live in the village. The height of ground upheaval was estimated to be more than 2.2 m. The low tide level before the earthquake was used to estimate the height and was determined from eyewitness accounts of inhabitants. Photo 3.3.10.1 shows a bleaching coral reef uplifted by the earthquake.

The tsunami run-up height reached nearly 3.3 m. The measured point was located on the beach and determined from eyewitness accounts of inhabitants (Photo 3.3.10.2). There was no damage except that caused by the earthquake. Although water tanks were destroyed by the earthquake, new ones had been already supplied by Solomon Islands' government.



Photo 3.3.10.1 Bleaching coral reef uplifted more than 2.2 m at Suava village



Photo 3.3.10.1 Tsunami measured point at Suava village