

FRANZ 2007 - Heta on Niue

Scenario – Background material

Niue - Characteristics

Niue is a small independent state comprising a single, small limestone island of approximately 260sqkms (roughly 23 by 18km) and with an estimated (and declining) population of around 1500. Niue is on top of a large dormant volcano that rises steeply from a 3000-4000m deep ocean. It rises to only 68m above sea level, with most of the island no higher than 30m.



Located between Tonga on the west and the Cook Islands to the east, it marks the boundary of the paths taken by large tropical cyclones, which originate in the warm tropical seas to the north. Niue experiences regular trade winds from the south-east, which renders this part of the island inhospitable. The NW side of the island is more sheltered. As a result, most of the population lives here and goods are landed here by ship. But this is also the side facing the path of cyclones.

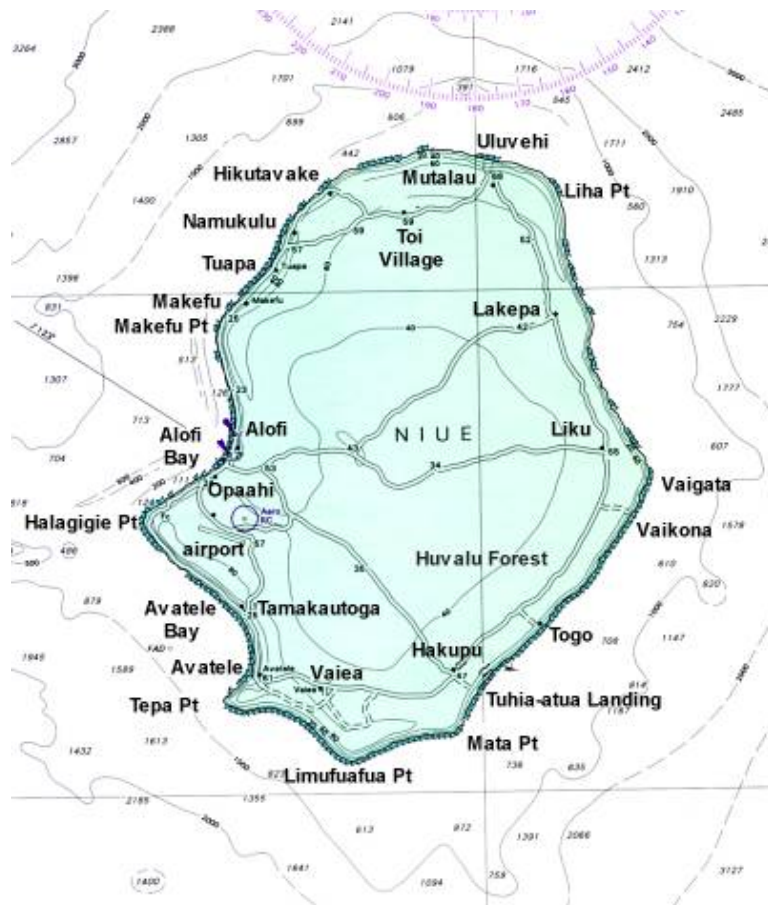
Infrastructure

Niue has 14 villages which are linked by an 86km paved ring road. In total 96% of the islands roads are sealed. Most households have at least one vehicle.

There is one airport in the capital of Alofi that has a paved runway. Air New Zealand operates a weekly service from Auckland and Polynesian Airlines operate a weekly service from Apia.

There are no ports with only offshore anchorage available. Reef Shipping operates a monthly service.

Communications infrastructure includes internet access as well as landline and mobile telephone communications. All the villages are connected by a single-line telephone system.

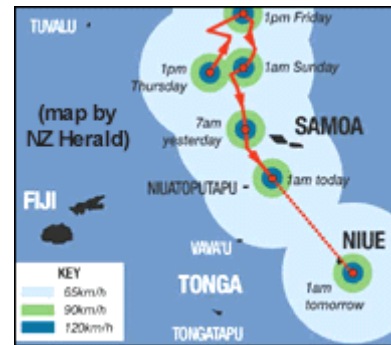


Cyclone Heta

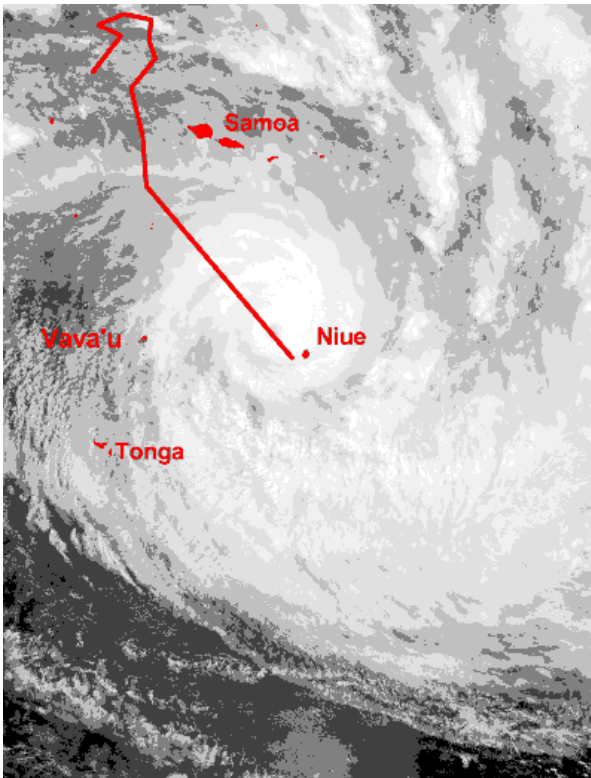
Heta formed on 25 December 2003 from a tropical wave roughly between Rotuma and Fiji. The wave moved eastward to a position north of Fiji, where, on December 28th, it was designated Tropical Depression 3-F. The depression then migrated northward before turning towards the east on 2nd January 2004, when it reached tropical storm strength and was named Heta. At this point, low wind shear and high sea surface temperatures caused Heta to intensify rapidly.



Track of Heta 3-11 January



On January 2, meteorologists at the Australian Foundation for the Peoples of Asia and the Pacific (AFAP) warned that Heta could hit Tokelau, and predicted that the storm would turn south and pass to the west of Samoa. However, the following day, the advisory area was extended to include Samoa and then Niue and Tonga. At that point, AFAP forecasted that the storm would be likely to hit Niue the following day.



On January 3rd, Heta, aided by a weak steering current, slowly began to move to the southeast whereupon it continued to intensify. In Niue, anticipating that the storm would bring catastrophic damage, 1300 residents sought shelter in their homes while others left coastal areas for higher ground.

In Samoa and American Samoa, although hurricane warnings were in effect, there were no reports of evacuations or storm shelters being opened before the storm.

The centre of Heta passed around 110kms to the west of Samoa as the storm reached Category 2 status. At its peak, winds reached a peak intensity of 235 km/h (160 mph) and maintained this for 24 hours. By that time, Heta was centred 80kms (50m) northeast of Tonga and close to Niue.

By January 7th, Heta had exited the Nadi Regional Meteorological Service Centres (RMSC) area of responsibility and entered that of the Tropical Cyclone Warning Center in Wellington. The storm slowly began to weaken as it encountered the cooler waters of

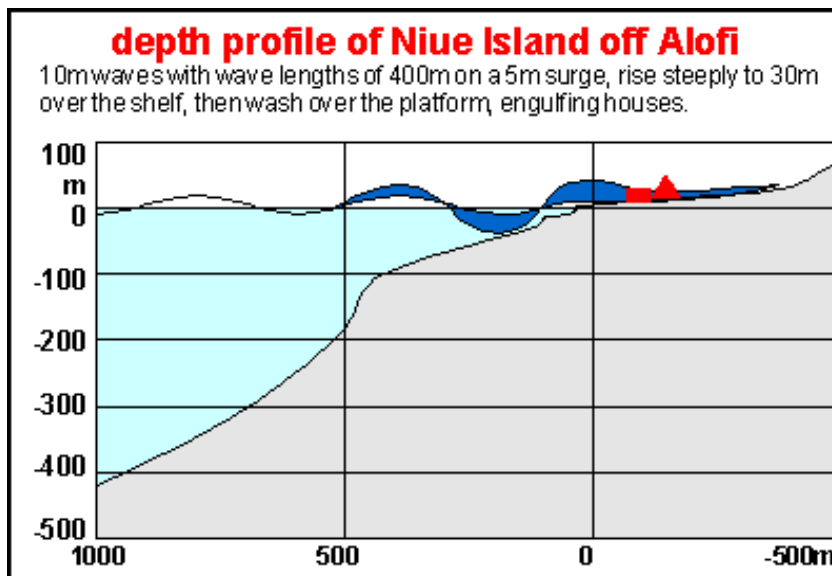
the far South Pacific. The remnants of Heta slowed and moved westward, where they finally dissipated on January 11 east of Norfolk Island.

Impact to adjoining countries

Cyclone Heta caused over US\$150 million dollars (2004 USD) in damage across three countries. During its early stages, Heta brought heavy rains and light winds but caused little damage. In Wallis and Futuna, however, high winds knocked out power and there was minor to moderate damage to buildings and crops. In Tonga, strong winds damaged houses and caused severe crop damage. In Tafahi and Niuatoputapu, 50-100% of the homes and buildings were destroyed. However, because of advanced warnings, there were no deaths or injuries. In Samoa, heavy rains caused isolated flooding although storm surge washed out several roads. In Savai'i, winds damaged power lines which made communications with the city difficult.

Impact on Niue

In Niue, the capital Alofi took the brunt of the storm. Most of the commercial and financial areas were wiped out by the winds. There was significant damage to communications and electronic infrastructure, with damage to a satellite dish. Over 75% of Niue's computer database was disabled. The storm surge left two people dead. In all, the storm caused NZ\$50 million (2004 NZD) in damage on the island.



The hospital (jointly funded by WHO, NZ and Australia) was completely destroyed. Most buildings in the capital were either badly damaged or destroyed.

Regeneration of vegetation was estimated to take 15-20 years to recover. Over 80% of all foliage was stripped.

The fuel tanks at the port were damaged with the main diesel tank beyond repair. The Government concluded that the main risks included:

- fire (ongoing hot, dry winds and a lack of fire fighting equipment and water);

- exposure to asbestos;
- risk of water contamination;
- loss of crops and inability to fish;
- damaged buildings (such as the two-storey Hotel Niue);
- septic tank failure; and
- almost complete removal of top soil on the western coastal edge.

The small private sector was badly damaged. With no cyclone cover available, some businesses lost virtually everything. A number of trust funds were immediately established and it became apparent that coordination was necessary. Several other donor countries (EU, Japan, and China) also offered assistance and in order to maximise effectiveness, the Niue Government, largely through its High Commission in Wellington, coordinated efforts.

The Government of Niue sought international assistance to:

- Reestablish international communication links
- Provide on-going food supplies for around 200 people (around 90% of crops lost and most of the fishing boats.
- Provide medical equipment
- Provide clothing and household items for 200 people
- Provide structural engineering expertise for the removal of buildings.
- Provide technical experts to assist with the removal of asbestos.

Immediate Response

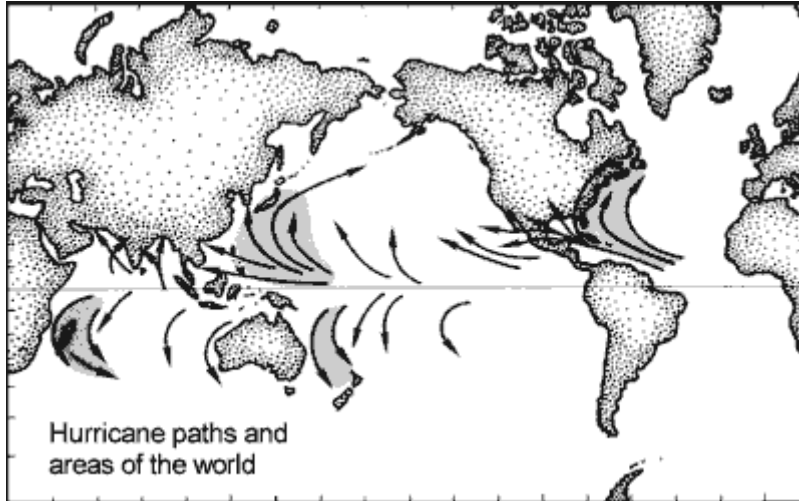
- Damage was widespread, with an NZAID Manager suggesting that 99% of the island was now literally 'brown' with crops (including the staples of taro and coconut) virtually wiped out.
- 7th January, two air medical evacuations took out two seriously injured patients. The first RNZAF Hercules arrived shortly after with relief supplies that included priority medical equipment, tarpaulins, blankets, water containers and water purification equipment and personnel from Ministry of Civil Defence and Emergency Management (MCDEM), NZAID, AusAID and the Red Cross whose role it was to assist with immediate and medium-term needs assessments.
- A Cook Islands aircraft carrying a satellite dish was forced to turn back.
- Cabinet assumed the role of the National Disaster response Committee on the second day.

- 9th January, a second RNZAF Hercules arrived with communications equipment, medical supplies, food, trades people, a doctor and a number of Niuean MPs and community leaders who were on holiday in New Zealand over the Christmas period.
- 11th January, an Australian Hercules arrived with a field hospital and medical supplies and personnel, asbestos removal equipment and water testing equipment. Australia took the lead on primary health care which included a field hospital and 12 medical personnel medical staff as well as environmental health officers and an officer from Emergency management Australia (EMA) to assist with the coordination between medical and disaster specialist's on the Island.
- A French Polynesian flight brought food, water and other supplies.
- 13th January, Australian and French flights brought in medical supplies, food and water.
- The final RNZAF flight included equipment necessary to undertake longer-term cleaning operations. The flight took back to New Zealand a number of frail, elderly and special needs people.
- Two shipments provided fuel, dump trucks and excavation equipment. Another ship from the Cook Islands carried a temporary satellite dish as well as food stocks and water.
- Donor coordination meetings took place in Wellington and Canberra. Public offers of assistance were coordinated by NZAID.

ANNEX

Tropical Cyclones

Tropical Cyclones (hurricanes, typhoons) are spiralling winds moving towards a centre of low pressure. They are spawned above warm seas in still wind conditions. The energy contained in water vapour rises, causing updrafts but at height where the temperature drops as the air expands, it condensates to form very small droplets as cloud. These clog together to form rain, which causes a down draft.



The circular rings of updrafts and down drafts then form a powerful motor for drawing air from far around towards its centre and a tropical cyclone is born. Over several days above a warm sea, such a hurricane can increase its size and strength to monstrous proportions. Likewise, hurricanes lose their strength over

land or over cold seas, and as they die, they produce torrential rains.

The winds around a cyclone do not blow equally fast from all directions, and neither are the waves beneath such a rotating storm of similar magnitude. As a cyclone wanders, its centre may attain speeds of 20-50km/h. Winds coming from behind then have to catch up with the cyclone's centre, so that they are more powerful than those coming towards it.

Their occurrence is felt long afterwards in irregular weather patterns and an unusual period of drought following immediately. As this map shows, Niue is not located in an area frequented by cyclones. The previous one (Ofa) occurred in 1990 and the one before that in 1979.

Nautical chart

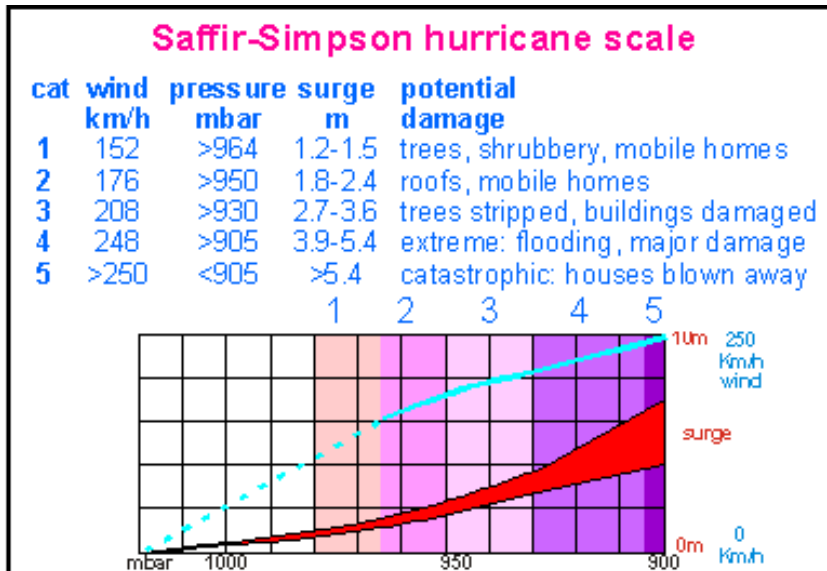


This nautical chart of Alofi and the sea shows the centre of Alofi with buildings between the 30m and 10m height contours. Niue does not have a protected harbour but a shallow quay, approached by boats along the line joining two navigational lights. Locally based boats and fishing vessels need to be lifted out of the water when storms rage.

Note the blue intertidal coral reefs are fringed by a shallow platform at high tide level. This coralline platform dips suddenly to 6-10m. From here it slopes down gradually to about 30-40m depth where the slope becomes steeper as also the available light becomes insufficient for coral growth.

Saffir and Simpson scale

Scientists Saffir and Simpson came up with a hurricane scale. While this expresses the damaging power of a storm in simple numbers, each step produces twice the damage of the previous one. The table stops at class five, which is the worst storm with waves of 10m plus and a storm surge of 4-7m.



A storm surge is a bulge of water produced by the storm's low pressure centre with winds mopping the sea towards it. The storm's surge increases rapidly towards class 5 whereas wind speeds increase more gradually. A storm with the strength of cyclone Heta is a once in a thousand years event where hurricanes occur, causing large over-wash and extensive damage on a regional scale.

Eye witness account

Richard StClair in a 'white paper' of the Internet Users Society of Niue (IUS-N) writes:

"Again, dodging downed trees, power lines, chunks of houses, we make our way to town. Coming down the hill we see the treasury building and police station . . .around the corner and down the main street south. Heavy damage to all the buildings we see. The roads are a mess. Trees down everywhere. Rocks the size of small cars in the road and in people's yards. We don't know it yet, but that is nothing compared to what we are going to see in a few minutes. The IUS-N office and Internet Cafe are still there but the roof is gone. Part of the roof is behind the building, the rest could be anywhere. The ceiling inside the office itself actually has protected the inside room from most of the ocean spray

Leaving our downtown office for the moment, we drive to Alofi South (the south side of Niue's capital city), we travel only a short way when suddenly realize, it's basically gone. The road is there, we see where we think we should be, but there is nothing recognizable. Eventually we see some parts of some buildings that survived, and realize we are in front of Alofi Rentals, Niue's car rental service. Across the street we see the place where Ernie Welsh's house used to be. It's not only gone but the only hint there was ever a house there is the cement foundation that is not only cleaned off completely, but polished shiny from the sandy ocean water rushing over it through the night.

The Niue we have known all these years is truly gone. It is a different island and a different country. Hundreds are homeless, the hospital is a total loss, the flagship Niue Hotel is in total ruins, the dive shop is gone, the museum and cultural centre are gone, the land court is destroyed.

We can only imagine what the rest of the island looks like, since we are unable to drive there. Most of the roads are closed and we can't spare the fuel anyway, since we've heard that Niue's only petrol station has been damaged. We also know the main fuel tanks by the ocean (wharf) have been damaged and are leaking fuel into the ocean.

Eventually the realization of what has actually happened, starts to sink in. People are milling around looking through the rubble for clothing and personal effects. Over the course of the next few hours we will learn that Kathy Alec, a young 26 year old nurse has given her life as a human shield in an attempt to protect her two year old son when the tsunami crashed her house".

Communication/s - Exercise note

We will all be meeting in the following rooms which have the following phone numbers:

13:10 ph 439 8663

13:11 ph 439 8664

13:12 ph 439 8666

15:01 ph 439 8686

15:02 ph 439 8689

To call internally - just use the final 4 digits.