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91007



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Level 1 Geography, 2016

91007 Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s)

9.30 a.m. Wednesday 16 November 2016
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate in-depth geographic understanding of environments that have been shaped by extreme natural event(s).	Demonstrate comprehensive geographic understanding of environments that have been shaped by extreme natural event(s).

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Low
Excellence

TOTAL

21

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INSTRUCTIONS

In the box below, name ONE type of **extreme natural event**, and an **environment case study (studies)** in which it has occurred, that you will use to answer ALL of the questions in this booklet.

Extreme natural event: Tropical Cyclone /

Environment case study (studies): Tropical Cyclone Winston (Fiji)
Tropical Cyclone Pam (Vanuatu)

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QUESTION ONE: Natural Processes

Read the geographic concept below and refer to it when answering this question.

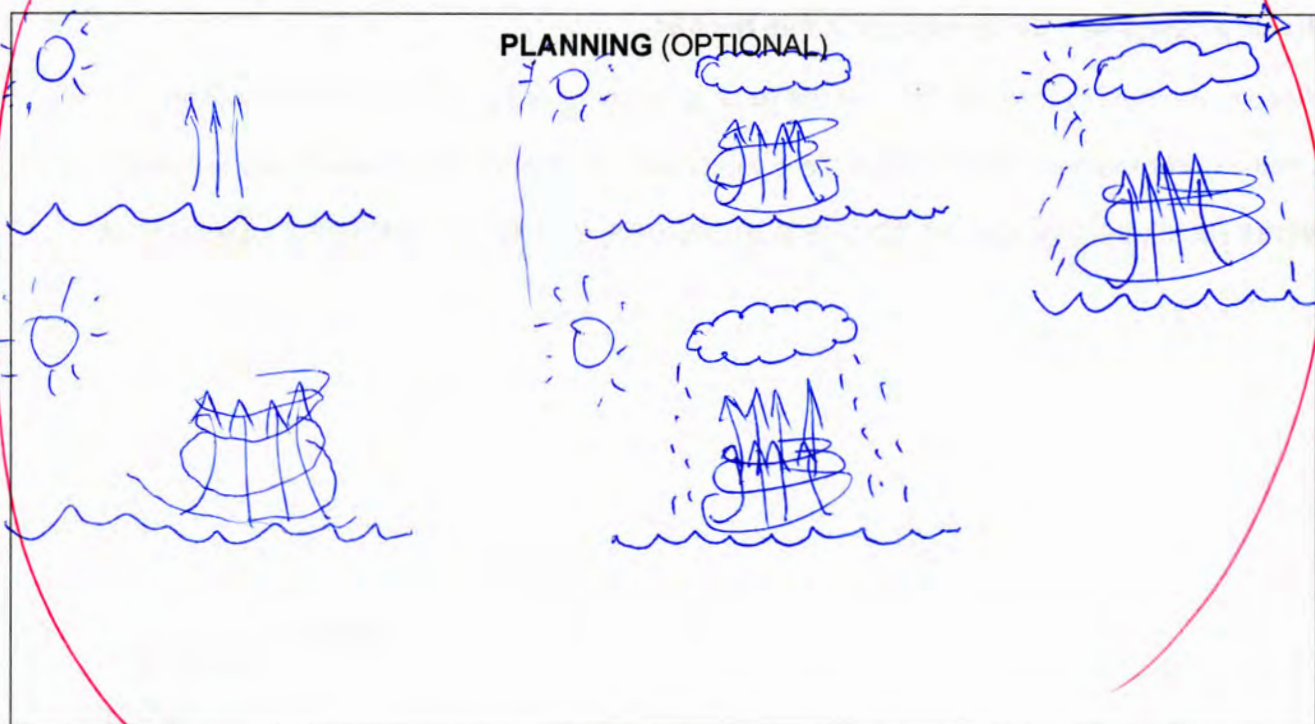
Geographic Concept

Processes are a sequence of actions, natural and / or cultural, that shape and change environments, places, and societies. Processes vary in time and space, and in magnitude (size) and frequency.

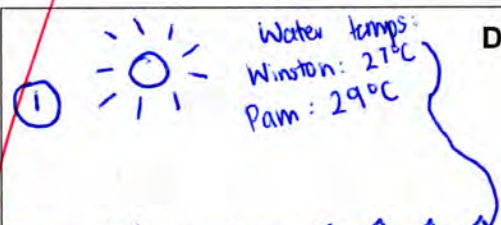
Fully explain the natural processes that operated to produce your chosen extreme natural event named above.

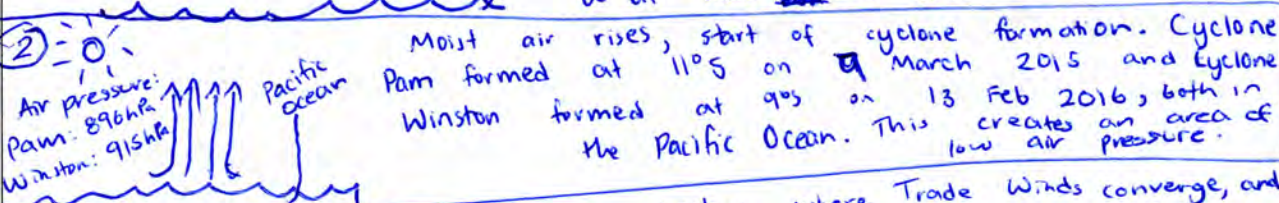
In your answer, include the geographic concept of processes, with integrated detailed supporting evidence from your case study (studies), and relevant supporting diagrams and/or maps.

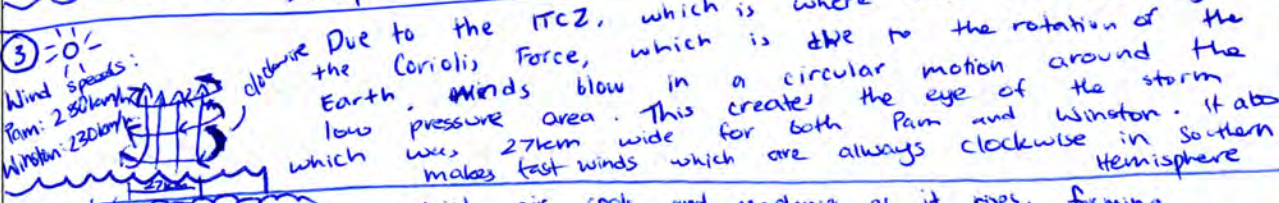
PLANNING (OPTIONAL)

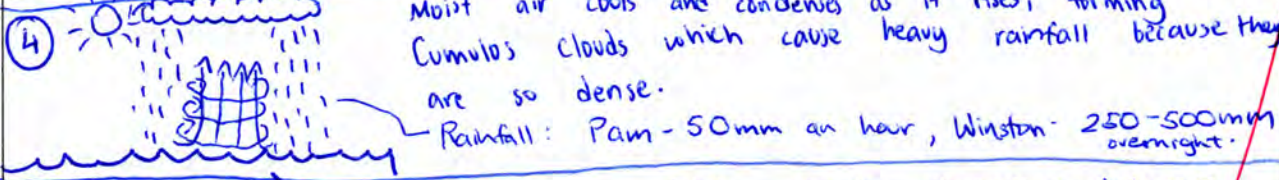


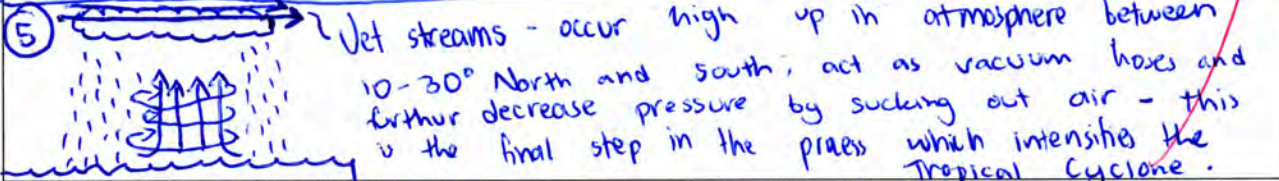
Diagrams and/or maps

①  First part of the process is the heating of large bodies of water, happens usually between $5 - 15^\circ$ North and South because these areas are closer to the sun. Water must be at least 26.5°C to ~~bottom the water to~~

②  Moist air rises, start of cyclone formation. Cyclone Pam formed at 11°S on 9 March 2015 and Cyclone Winston formed at 9°S on 13 Feb 2016, both in the Pacific Ocean. This creates an area of low air pressure.

③  Due to the ITCZ, which is where Trade Winds converge, and the Coriolis Force, which is due to the rotation of the Earth, winds blow in a circular motion around the low pressure area. This creates the eye of the storm which has 27km wide for both Pam and Winston. It also makes fast winds which are always clockwise in Southern Hemisphere.

④  Moist air cools and condenses as it rises, forming Cumulus clouds which cause heavy rainfall because they are so dense. Rainfall: Pam - 50mm an hour, Winston - 250-500mm overnight.

⑤  Jet streams - occur high up in atmosphere between $10 - 30^\circ$ North and South, act as vacuum hoses and further decrease pressure by sucking out air - this is the final step in the process which intensifies the Tropical Cyclone.

There are a series of steps that form the process of the creation of a Tropical Cyclone. The first thing that must happen is that the sun must heat a large body of water to at least 26.5°C because that water will then evaporate, creating moist air and an area of low pressure. Both cyclones Pam and Winston formed in the Pacific Ocean - Pam at 11°S and Winston at 9°S , however the water temperatures for Pam were very high at 29°C , making Pam exceptional. Tropical Cyclones usually form between $5 - 15^\circ$ North and South and this is because this area is known as the Inter-Tropical Convergence Zone, where the Trade Winds converge, this means that there is wind blowing toward the areas of low pressure (896hPa for Pam and 915hPa for Winston) and then the Coriolis Force causes

these winds to spin in a circular motion. creating the well known wheel look of a Tropical Cyclone. Both Pam and Winston were in the Southern Hemisphere which means they spun clockwise, ~~the next steps of the~~ and sustained wind speeds reached 280 km/h for Pam and 230 km/h for Winston. The next step in the process is when the moist air cools and condenses as it rises, creating dense Cumulus clouds, which create the rainfall for the cyclone. The rain fall for Pam was 50mm/h and for Winston 250-500mm overnight. Rain does not fall in the 'eye' of the storm because it has low pressure as the air rises. the eye for both cyclones was 27 km wide. The final step in the process of Tropical Cyclone formation is the intensification it undergoes due to jet streams. Jet streams ~~are~~ run high up in the atmosphere between 10 - 30° North and South and they suck out moist air from the eye of the storm - further lowering the air pressure and therefore further ~~the~~ intensifying the storm. Pam and Winston both reached category 5 status on the Saffir-Simpson scale - Pam on 13 March 2015 and Winston on 20 February 2016.

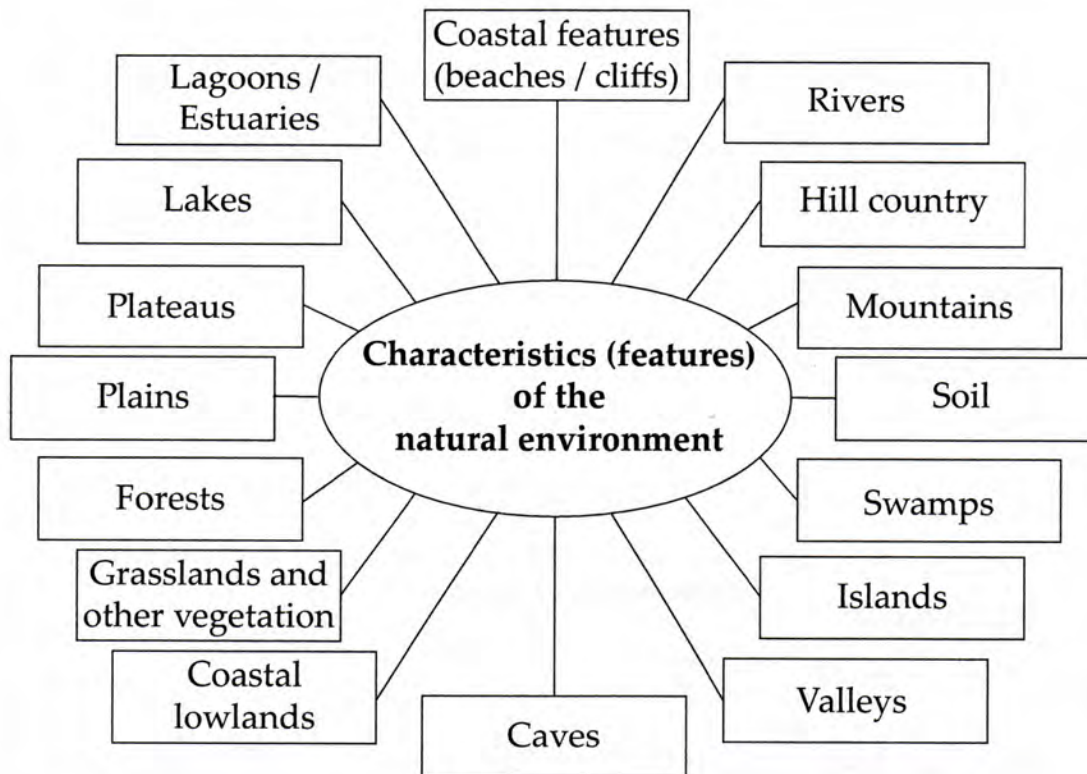
E7

QUESTION TWO: Effects of Extreme Natural Events on Natural Environments

Read the geographic concept below and refer to it, as well as the diagram, when answering this question.

Geographic Concept

Change involves any alteration to the natural environment. Change can be spatial and / or temporal. Change is a normal process in the natural environment. It occurs at varying rates, at different times, and in different places.



- (a) Identify TWO characteristics from the diagram above that were affected by your extreme natural event.

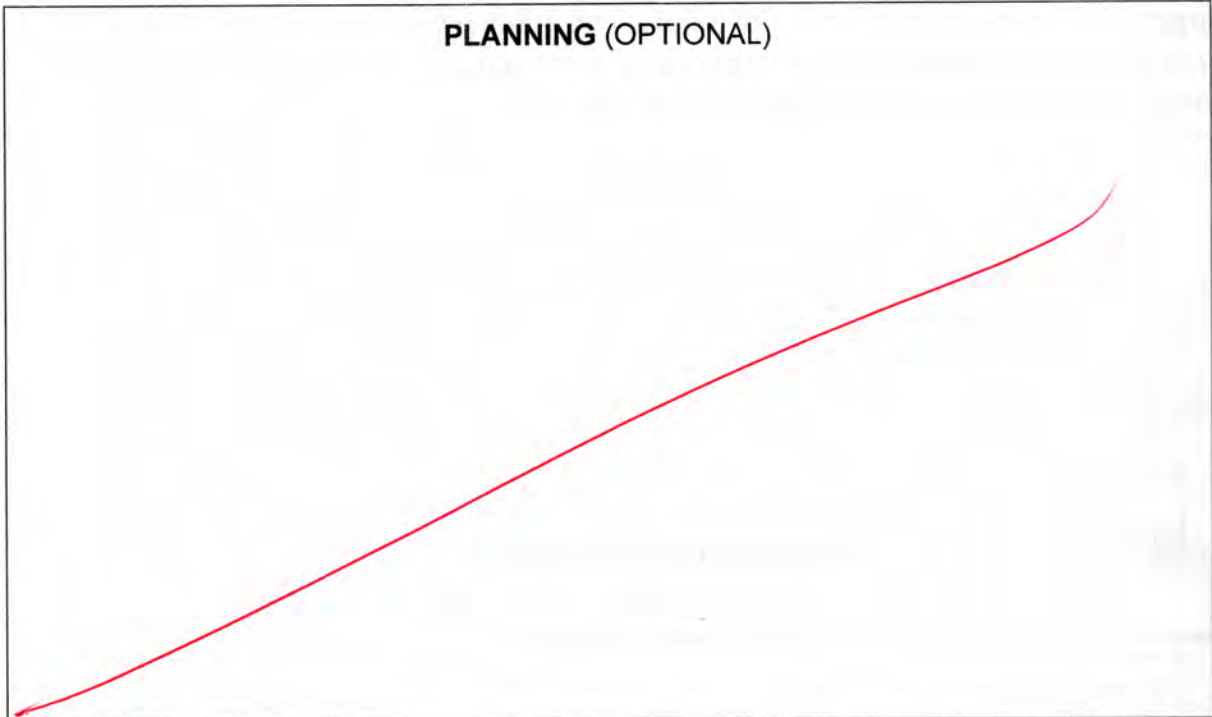
Characteristic (1): Coastal lowlands

Characteristic (2): Islands

- (b) Fully explain the effects of your extreme natural event on these two characteristics in your environment case study (studies).

In your answer, include the geographic concept of change, with integrated detailed supporting evidence from your environment case study (studies), and relevant supporting diagrams and/or maps.

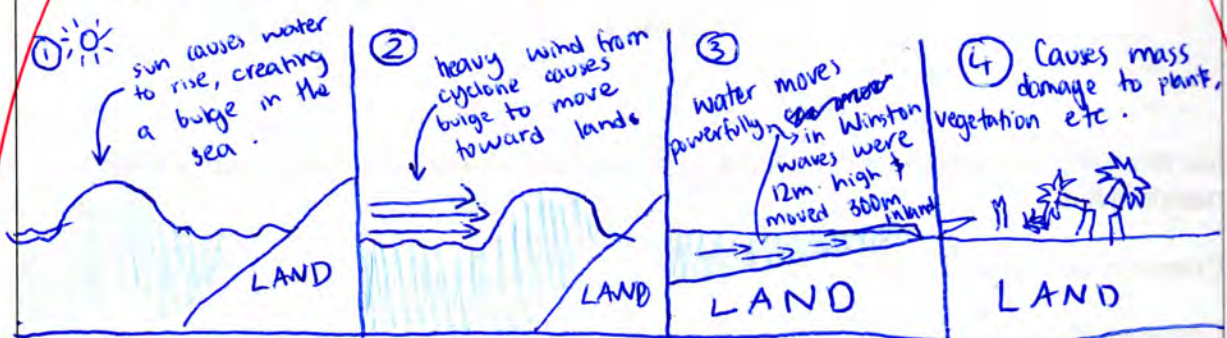
PLANNING (OPTIONAL)



Diagrams and/or maps

Coastal lowlands -

formation of storm surge



Islands -

Two types of islands in Fiji and Vanuatu...



The nations of Fiji and Vanuatu are both Pacific Island nations. Vanuatu is made up of 82 islands and Fiji also has many islands, the two types of island in both countries are volcanic islands, which are high altitude, mountainous landforms. A volcanic island in Fiji is Viti Levu, which is the main island and has an altitude of 1324 metres above sea level. Volcanic ~~mainlands~~^{islands} in Vanuatu include Tanna, Embrym, Efate and Erromango. The other type of island in these countries is an atoll, which are very low lying and predominantly made from coral. The natural environment of a volcanic ~~main~~ island is changed by a tropical cyclone because trees and vegetation are vulnerable to the wind and rain and also ~~land~~ landslides which are a result of the wind and rain. In Fiji after cyclone Winston, 70% of sugarcane ~~plants~~^{trees} were destroyed because of the 250-500 mm overnight rainfall and the winds which reached gust speeds of 306 km/h. The natural environment of coral atolls is also changed in a tropical cyclone because of storm surges, which are large, powerful bodies of water that ^{can be 8-12 m high and} can move as far as 300m inland, as they did in Fiji during cyclone Winston. This is also the way in which all coastal lowlands are affected, because the lowlying regions of Fiji and Vanuatu are situated on atolls. In Fiji, the Rewa River ~~on~~ ~~the~~ was flooded which changed the natural environment around the river. Also, in Vanuatu, the capital city of Port Vila is surrounded by mangrove swamps which were flooded in Cyclone Pam and therefore destroyed surrounding plants and land.

E7

QUESTION THREE: The Human Response to an Extreme Natural Event

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Read the geographic concept below and refer to it when answering this question.

Geographic Concept

Perspectives are the way people view and interpret environments. Perspectives and values may be influenced by culture, environment, social systems, technology, economics, and politics. They may influence how people interact with environments, and the decisions and responses that they make.

People respond to the **impact or effects** of an extreme natural event in many different ways.

Circle below TWO time periods, and fully explain how a group of people responded to your extreme natural event during these time periods.

Note: You should use a different group of people for each time period.

Before the extreme
natural event

Immediately after the
extreme natural event

Days, weeks, or months after
the extreme natural event

In your answer, include the geographic concept of perspectives, with integrated detailed supporting evidence from your environment case study (studies).

PLANNING (OPTIONAL)

Time period (1): Immediately after the extreme natural event ✓

Group of people: ~~Red Cross~~ Governments of the affected countries. ✓

How this group of people responded to your extreme natural event during this time period:

~~The International Red Cross were one of the first groups to arrive on the scene following Tropical Cyclone Pam. They deployed 200 workers who managed to help 20 000 people because they brought with them supplies such as 240 first aid kits, 900 water containers, 1200 tarpaulins and more. In Fiji after Cyclone Winston, 700 first aid shelters were set up across the country.~~

The Vanuatu Government used SMS / texting as a way of evacuating ~~the~~ and communication during Cyclone Pam and in Fiji a curfew ~~the~~ was enforced during the cyclone.

Because Both nations experience 2-3 cyclones each season, ~~so~~ the citizens are familiar with practices however cyclones Pam and Winston were exceptionally powerful. ~~Winston~~ Winston affected 40% of Fiji's population (350 000 people) and killed 44 while Pam affected nearly all of Vanuatu's 370 000 people, 80% of whom live rurally, and killed 24. The governments responded to this mass destruction with a pro-active perspective, they made the most of their resources and following Winston, 700 first aid shelters were set up all across the country - which were very helpful because the government set them up in remote villages, as well as main populated areas, so people in villages were very grateful for the help available. The

~~Go to back~~

Question Three continues on the next page

One of these places was Koro Island which is East of Viti Levu and had reportedly been 'flattened'. It was among one of the worst hit places so the government's help was vital there.

Time period (2): Days, weeks, or months after the extreme natural event

Group of people: International Red Cross

How this group of people responded to your extreme natural event during this time period:

The International Red Cross were one of the first groups to arrive in Vanuatu after Tropical Cyclone Pam and their help proved vital because they sent 200 workers who helped 20 000 Vanuatu citizens who needed aid urgently due to the extensive damage that had been inflicted on villages and towns. The Red Cross workers brought and distributed essential items such as 240 first aid kits, 900 water containers and 1200 tarpaulins. Also, in Fiji following Cyclone Winston, 1800 people required psychological support due to the terror they had endured so the International Red Cross also aided with providing this emotional support. As these examples show, the Red Cross took a very sympathetic ~~and~~ perspective and they therefore focussed their energy toward providing things that were going to help people recover and feel safe again. ~~They~~ In the months after Cyclone ^{Winston} ~~Pam~~, they also helped to establish 4 medical centres across Fiji which provided healthcare to hundreds of people who would not have otherwise recieved this care due to the routes to major cities from the villages being blocked off by trees, fallen buildings and other debris.

Extra space if required.
Write the part number(s) if applicable.

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QUESTION
NUMBER

3

(time period 1) ~~government~~ Fijian government also set to work immediately, trying to re establish communications across the country - 80% of Fiji lost power supply, including the whole island of Vanua Levu, and even as late as 2 days after the cyclone had passed, ~~contact~~ the government had not yet been able to contact more than 6 inhabited islands due to the mass damage and destruction caused by the wind, rain, flooding etc. ~~They~~ the Vanuatu government also appealed for international aid because the damage done was too extensive ~~for them to fix~~ ~~to make~~ ~~fixed~~ a lone and therefore ~~many~~ international governments responded too, such as New Zealand who deployed their largest ever army operation to go and give aid in Vanuatu.

Extra space if required.
Write the part number(s) if applicable.

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QUESTION
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91007

Low Excellence exemplar for Geography 91007 2016			Total score	21
Q	Grade score	Annotation		
1	E7	The candidate fully explains the natural processes that operate to produce an extreme natural event and integrates detailed supporting evidence within a named case study environment. A relevant set of diagrams is included, which add to the answer. There is reference to the concept of process and an attempt to use geographic terminology. In its structure, it lacks some insight for a comprehensive and full understanding of natural processes, which would have resulted in the perfect score.		
2	E7	The candidate shows a clear understanding of the effects of the extreme natural event on two characteristics of the natural environment, and this is fully explained. Relevant diagrams are included, which enhance the explanation. Integrated supporting evidence is included. There is application of the concept of change, and an accurate and deep understanding of the effects demonstrated. As with Question One, it lacks a little insight for an E8.		
3	E7	The candidate fully explains how two different groups have responded to the extreme natural event in two different time periods, including integrated supporting evidence. In this case, the concept of perspective is inferred, rather than perfectly applied.		