

91193



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

2

SUPERVISOR'S USE ONLY

## Level 2 Earth and Space Science, 2013

### 91193 Demonstrate understanding of physical principles related to the Earth System

2.00 pm Tuesday 26 November 2013

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of physical principles related to the Earth System.	Demonstrate in-depth understanding of physical principles related to the Earth System.	Demonstrate comprehensive understanding of physical principles related to the Earth System.

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 space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–13 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.**

TOTAL

ASSESSOR'S USE ONLY







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**QUESTION THREE: THE GULF STREAM**

The Gulf Stream is a fast-moving ocean current that carries warm water from the tropics, north past Scotland.



Adapted from [www.earthlyissues.com/gulfstream.htm](http://www.earthlyissues.com/gulfstream.htm)

Using the diagram, explain in detail how the Gulf Stream keeps Stornoway in Scotland warmer than Hopedale in Canada, even though they are at similar latitudes.

In your answer you should include:

- reasons why the Gulf Stream originates between the Equator and the Tropic of Cancer.
- an explanation of why the Gulf Stream is a warm current
- a detailed explanation of heat transfer from the ocean to the atmosphere and the land
- an explanation of the relative temperatures in Hopedale and Stornoway.

A labelled diagram may assist your answer.

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