



## **Mark Scheme (Results)**

Summer 2018

Pearson Edexcel GCE in  
Geography (8GE01)  
Paper 1: Dynamic Landscapes



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### **General Marking Guidance**

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

## Paper 1 Mark scheme (Standardisation)

| Question number | Answer   | Mark |
|-----------------|--|------|
| 1(a)            | <p style="text-align: center;"><b>AO1 (1 mark)</b></p> <p>Award <b>1</b> mark for a correctly identified hazard:</p> <ul style="list-style-type: none"> <li>• Tsunami ❶</li> <li>• Earthquake ❶</li> <li>• Volcano ❶</li> <li>• Landslide ❶</li> </ul> | (1)  |

| Question number | Answer   | Mark |
|-----------------|--|------|
| 1(b)(i)         | <p style="text-align: center;"><b>AO3 (2 marks)</b></p> <p>Award <b>1</b> mark for each correctly identified <b>comparison</b> between trends before and after 2006.</p> <ul style="list-style-type: none"> <li>• There is greater economic damage after 2006 ❶</li> <li>• There is more fluctuation after 2006 ❶</li> <li>• There is more significant / the highest economic damage occurs / 3 highest years for damage happened after 2006 ❶</li> <li>• There were some years with no reports before 2006 whereas every year since 2006 has had a report ❶</li> </ul> <p>Accept any other correct comparison based on figure 1.<br/>Do not accept statements that do not use comparative language.<br/>Do not award marks simply for using data.</p> | (2)  |

| Question number | Answer   | Mark |
|-----------------|--|------|
| 1(b)(ii)        | <p style="text-align: center;"><b>AO1 (2 marks)/AO2 (1 mark)</b></p> <p>Award <b>1</b> mark for analysing the resource to suggest a reason for the difference, and a further <b>2</b> marks for justifying the possible reason, for example:</p> <ul style="list-style-type: none"> <li>• Because infrastructure is more expensive / well protected ❶ so the chances are higher that an EQ destroys better buildings ❶ creating higher insurance claims ❶</li> <li>• Development of countries ❶ could lead to more expensive infrastructure ❶ as well as funding for mitigation / hazard proof design ❶</li> <li>• World population / world urbanisation has increased ❶ so tectonic hazards are more likely to cause damage to a greater number of buildings ❶ so money needs to be spending on rebuilding ❶</li> <li>• Higher magnitude tectonic events ❶ often have a greater areal extent ❶ which inevitably affects more people and infrastructure. ❶</li> <li>• More damage is being reported ❶ because global media is present in more locations ❶ so reporting of smaller hazards is higher ❶</li> <li>• Because people are increasingly living in hazardous locations ❶ because of lack of space in urban areas / can't afford to live in safer locations ❶ rural-urban migration / high fertility ❶</li> </ul> <p>Accept any other appropriate response based on figure 1.</p> | (3)  |

| Question number | Explain two characteristics of volcanic hotspots.<br>Answer  | Mark |
|-----------------|--|------|
| 1(c)            | <p style="text-align: center;"><b>AO1 (4 marks)</b></p> <p>For each reason, award <b>1</b> mark for identifying a characteristic or process that occurs at a volcanic hotspot and a further <b>1</b> mark for explaining it. For example:</p> <ul style="list-style-type: none"> <li>• Intraplate volcanic eruption ❶ because of mantle plume ❶</li> <li>• Thinner lithosphere because of the mantle plume rising ❶ which melts the overlying crust so magma can extrude ❶</li> <li>• Volcanoes are formed and move away ❶ because tectonic plates move over the hotspot, which remains stationary ❶</li> <li>• Volcanic islands / chain of atolls / seamounts are formed ❶ because successive oceanic volcanoes move away from the hotspot / tectonic plates move over the hotspot / cool and subside ❶</li> <li>• Large shield volcanoes with low viscosity lava ❶ because the lava is basaltic so spreads before cooling ❶</li> <li>• Frequent non explosive eruptions of basaltic magma ❶ so pressure and gas doesn't build up ❶</li> </ul> <p>Accept any other appropriate response which explains the characteristic clearly in the context of a volcanic hotspot (e.g. Yellowstone)</p> | (4)  |

| Question number | Explain why volcanic eruptions vary in their magnitude.<br>Answer   |
|-----------------|---|
| 1(d)            | <p style="text-align: center;"><b>AO1 (6 marks)</b></p> <p><b>Marking instructions</b><br/>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b><br/>The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p> <ul style="list-style-type: none"> <li>• Variation is mainly due to type of plate boundary – destructive plate boundaries lead to subduction, strato/composite volcanoes producing viscous acidic lava with high silicates and longer periods of dormant activity, where gases and material built up leading to highly explosive eruptions e.g. Mt Etna –</li> <li>• Volcanoes on constructive plate boundaries are often lower in magnitude, with very fluid basaltic lava, low silicates, which flows easily, E.g. Erta Ale</li> <li>• The amount of dissolved gas is the biggest factor affecting magnitude, as low-viscosity magma allows escaping gases to move through the magma and escape to the surface. Viscous magma traps gas bubbles which cannot escape.</li> <li>• Strato volcanoes are the most powerful, because of the gases within the magma that are placed under immense heat and pressure – these gases are released during an eruption, leading to pyroclastic flows, lava bombs and huge ash clouds, e.g. Mt Pinatubo</li> <li>• Volcanic eruptions cause lava flows, pyroclastic flows, ash falls, gas eruptions, and secondary hazards (lahars, jökulhlaup)</li> </ul> |

| Level   | Mark | Descriptor  |
|---------|------|---|
|         | 0    | No rewardable material.   |
| Level 1 | 1–2  | <ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)</li> </ul>              |
| Level 2 | 3–4  | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)</li> </ul> |
| Level 3 | 5–6  | <ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)</li> </ul>                             |

| Question number | Assess the effectiveness of prediction and forecasting in the management of tectonic hazards.<br>Answer  |
|-----------------|--|
| 1(e)            | <p style="text-align: center;"><b>AO1 (3 marks)/AO2 (9 marks)</b></p> <p><b>Marking instructions</b></p> <p>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p>Responses that demonstrate <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks.</li> </ul> <p><b>Indicative content guidance</b></p> <p>The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Prediction and forecasting strategies means using statistical projections of how likely a tectonic hazard is to happen. Prediction is knowing when and where a natural hazard will strike on a spatial and temporal scale that can be acted on meaningfully. Forecasting is less precise and provides % chances of hazards occurring in a particular place.</li> <li>• Management of tectonic hazards includes the decisions made before a disaster, immediately after and as part of long-term recovery (sometimes represented by the Hazard Response Cycle / Park Model).</li> <li>• Effectiveness can be judged by a reduction in the size of the event (e.g. seismicity, damage), reduced vulnerability (social and economic), increased resilience, and reduced loss because of increased emergency, short-term and longer-term aid so that communities make a recovery.</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Forecasting and predictions <b>can be used</b> by governments to start disaster planning where high frequency or high magnitude events would cause problems for local areas.</li> <li>• Some predictions are easy to make spatially, but difficult temporally (e.g. earthquakes typically occur on plate boundaries, but timing is unknown, making predictions ineffective).</li> <li>• Some predictions are easy to make temporally, but the spatial extent can be difficult to forecast (e.g. volcanoes can erupt in a particular direction, e.g. Mt St Helens), which can result in ineffective predictions.</li> <li>• Scientists can often monitor the build up to an eruption event, leading to plans for evacuation to be implemented with fair warning. Similarly tsunami events can be generated up by earthquake tremors.</li> <li>• Some EQ scientists have worked out where to find stress points along plate boundaries where EQ have recently happened, e.g. the North Anatolian Fault line, which relieve tension. However, scientists currently lack an accurate pre-cursor which limits the effectiveness of this research.</li> </ul> |

| Question number | <b>Assess the effectiveness of prediction and forecasting in the management of tectonic hazards.</b><br><b>Answer</b>  |
|-----------------|--|
|                 | <ul style="list-style-type: none"> <li>• <b>P&amp;F are not always effective</b> - EQ waves travel too fast to take effective action, however the L+S waves travel slowly enough to allow time for immediate action to be taken (e.g. metro system shut down in San Francisco) and for tsunami warnings to be issued, which means prediction and forecasting can be effective.</li> <li>• EQ scientists can statistically forecast EQ events happening, but can't change the attitude of societies to disasters (e.g. Turkey's fatalistic approach). The type of attitude, level of governance and ability to communicate influences the effectiveness of management.</li> <li>• <b>F&amp;P are not the only strategy</b> that might be useful to reduce the impact of disaster impacts.</li> <li>• EQ scientists can also forecast the spatial location of some hazards, but can't change the attitude of individuals / take into account the role of religion in land use zoning (e.g. Mt Merapi, Indonesia). Good understanding can help effective planning, but is ultimately constrained by the decisions people make.</li> <li>• Scientists are better able to advise on projects that attempt to modify events by changing the environment, e.g. higher sea walls, offshore habitats. However, some events are simply so strong that they overwhelm defences (and cost of planning for these events is prohibitive).</li> <li>• Multiple hazard events can sometimes interact in unpredictable ways (e.g. Typhoon at same time of Mt Pinatubo eruption); however the interaction of human beings living in that environment is predictable, which makes tectonic hazard management more effective.</li> <li>• Human aspects of disasters are perhaps easier to manage so it might be sensible to predict where societies are more vulnerable and likely to be affected.</li> </ul> <p>Candidates might distinguish between prediction and forecasting, but this is <b>not</b> necessary for full marks.</p> <p>Judgements will be based around whether prediction and forecasting are possible in physical sciences; most noting that spatial prediction is more possible than timing. Other candidates might consider that the human aspects of disasters are more predictable and, overall, final judgement might comment on the importance of focussing on later stages of the Hazard Response cycle (that are predictable).</p> |

| Level          | Mark        | Descriptor  |
|----------------|-------------|---|
|                | 0           | No rewardable material.   |
| <b>Level 1</b> | <b>1–4</b>  | <ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas, making limited logical connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited relevance and/or support. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to make unsupported or generic judgments about the significance of few factors, leading to an argument is unbalanced or lacks coherence. (AO2)</li> </ul>                       |
| <b>Level 2</b> | <b>5–8</b>  | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas logically, making some relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to make judgments about the significance of some factors, to produce an argument that may be unbalanced or partially coherent. (AO2)</li> </ul> |
| <b>Level 3</b> | <b>9–12</b> | <ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas logically, making relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to make supported judgments about the significance of factors throughout the response, leading to a balanced and coherent argument. (AO2)</li> </ul>                                      |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 2(a)            | <p style="text-align: center;"><b>AO1 (1 mark)</b></p> <p>Award <b>1</b> mark for a correctly identified mass movement:</p> <ul style="list-style-type: none"> <li>• Avalanches ❶</li> <li>• Landslide / rotational slumping / slide / topple / rock fall / mudslides ❶</li> <li>• Solifluction ❶</li> </ul> <p>Allow any other reasonable response. Do not accept Glacial lake outburst flood or jokulhaups.</p> | (1)  |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 2 (b) (i)       | <p style="text-align: center;"><b>AO3 (2 marks)</b></p> <p>Allow <b>1</b> mark for getting the correct number and subtraction from the graph. Allow <b>1</b> mark for the correct final percentage change calculation.</p> <ul style="list-style-type: none"> <li>• Calculating the subtraction ❶ <ul style="list-style-type: none"> <li>12.2-12.4 (range to accept in 1900)</li> <li>4.1-4.2 (range to accept in 2100)</li> <li>Largest change to accept = 12.4-4.1 = 8.3mt difference</li> <li>Smallest change to accept = 12.2-4.2 = 8mt difference</li> </ul> </li> <li>• Calculating the % change ❶ <ul style="list-style-type: none"> <li>8.3/12.4 = 67%</li> <li>8/12.4 = 64%</li> <li>Accept final answers between 64-67% decrease in permafrost area</li> </ul> </li> </ul> <p>If the calculation of the difference is wrong, then 1 mark can still be awarded for the use of the right method for calculating a percentage.</p> | (2)  |

| Question number | Answer  | Mark       |
|-----------------|---|------------|
| 2(b)(ii)        | <p style="text-align: center;"><b>A01 (2 marks)/A02 (1 mark)</b></p> <p>Award <b>1</b> mark for analysing the resource to identify a change to periglacial landscapes a further <b>2</b> marks for explaining how that might have been caused because of permafrost decreasing:</p> <ul style="list-style-type: none"> <li>• Permafrost melts <b>1</b> increasing the amount of meltwater / releasing methane <b>1</b> destroying distinctive landforms / fragile ecosystems / further permafrost melt <b>1</b></li> <li>• Fragile ecosystems destroyed <b>1</b> affects food chain <b>1</b> affecting subsistence communities <b>1</b></li> <li>• Solifluction might increase <b>1</b> because frozen water in the soil will melt <b>1</b> and the saturated layer start to flow downwards / affect building stability <b>1</b></li> <li>• Frost heave might slow down <b>1</b> water might not be frozen so long <b>1</b> putting less pressure on surrounding soil <b>1</b></li> </ul> <p>Accept any other appropriate response.</p> | <b>(3)</b> |

| Question number | Answer   | Mark       |
|-----------------|--|------------|
| 2(c)            | <p style="text-align: center;"><b>AO1 (4 marks)</b></p> <p>For each reason, award <b>1</b> mark for identifying a reason and a further mark expansion explaining how this influences the location of periglacial landscapes, up to a maximum <b>2</b> marks each. For example:</p> <ul style="list-style-type: none"> <li>• Relatively high latitude ❶ because of temperatures are low further from the equator but not so low that surface melting occurs in warmer seasons ❶</li> <li>• High altitudes ❶ because temperatures are low so little surface melting ❶</li> <li>• The world is in an interglacial / Climate has changed / glaciers continue to melt has reduced extent of landscape ❶ so some permafrost has melted / less widespread / so periglacial areas occupy locations previously occupied by glaciers ❶</li> </ul> <p>Accept any other reasonable response.</p> | <b>(4)</b> |

| Question number | Explain the natural causes of long-term climate change.<br>Answer  |
|-----------------|--|
| 2(d)            | <p style="text-align: center;"><b>AO1 (6 marks)</b></p> <p><b>Marking instructions</b><br/>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b><br/>The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p> <ul style="list-style-type: none"> <li>• Eccentricity – Earth’s orbit varies from circular to elliptical over 100,000 year cycles. Less solar radiation is received in an elliptical order when the Earth is furthest from the sun. Some scientists think this is the most important factor.</li> <li>• Obliquity – Earth’s axis tilts, varying from 21.8° to 24.4° over a 41,000 year cycle. The intensity of sunlight at the poles varies, and this affects seasonality of the climate (greater tilt = greater difference between summer and winter)</li> <li>• Precession – Earth wobbles on its axis over a 21,000 year cycle, so the point on the earth which is closest to the sun varies.</li> <li>• The three cycles all occur at the same time, so global temperatures are the by-product of all three factors – perhaps resulting in cooler summers with minimal solar energy, and vice versa.</li> <li>• Sunspots - increased solar energy / sun’s radiation output solar flares / coronal mass ejections / darker spots = greater radiation emissions and higher surface temperatures, e.g. Medieval Warm Period / Little Ice Age (Maunder Minimum)</li> <li>• Volcanic eruptions - Dust / ash /gas (SO<sub>2</sub>) emitted into the atmosphere reflects radiation e.g. Krakatoa 1883 led to 1°C fall in global temperatures</li> <li>• Feedback mechanisms can drive climate shifts (positive feedback), e.g. methane release, or changed albedo with melting ice</li> <li>• Feedback can also be negative, e.g. increasingly cloudy skies can diminish global warming, or disruption to the thermohaline circulation could lead to global cooling</li> </ul> <p>Allow other reasonable explanations.</p> |

| Level   | Mark | Descriptor   |
|---------|------|--|
|         | 0    | No rewardable material.  |
| Level 1 | 1–2  | <ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)</li> </ul> |

|                |            |  |
|----------------|------------|--|
| <b>Level 2</b> | <b>3–4</b> | <ul style="list-style-type: none"><li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li><li>• Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)</li></ul> |
| <b>Level 3</b> | <b>5–6</b> | <ul style="list-style-type: none"><li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li><li>• Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)</li></ul>                             |

| Question number | Assess the threats to the economic and environmental value of glacial landscapes.<br>Answer  |
|-----------------|--|
| 2(e)            | <p style="text-align: center;"><b>AO1 (3 marks)/AO2 (9 marks)</b></p> <p><b>Marking instructions</b></p> <p>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p>Responses that demonstrate <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks.</li> </ul> <p><b>Indicative content guidance</b></p> <p>The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Threats facing glacial landscape include natural hazards (avalanches and glacial outburst floods), human activities (leisure and tourism, reservoir construction and urbanisation) and climate change.</li> <li>• Economic and environmental value refers to opportunities for scientific research, wilderness recreation, farming, mining, hydroelectric power, tourism, forestry, oil extraction and transfer.</li> <li>• Human activity also includes degradation and damage to fragile ecology (e.g. soil erosion, landslides and deforestation).</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Some threats to the environment <b>can be irreversible</b>, e.g. footpath trampling can be hard to recover from when growing season is so short. Equally, further from the poles, growing seasons can be longer, and footpath trampling can be managed. The importance of environmental value varies according to the location.</li> <li>• Climate change can cause irreversible changes to glaciated landscapes particularly with positive feedback cycles; equally these changes can have huge impacts on local culture, particularly when different cultural groups depend on the same resources, (e.g. Himalayan Kashmir).</li> <li>• If culture is threatened, these threats can be irreversible, for example, globalisation can cause loss of language (e.g. to indigenous tribes). Equally local culture can be revived by that same technology (internet preserves local dialect, stories, pictures). Equally tourism can both damage, but also help raise awareness of these environments, helping to preserve their environmental and cultural value.</li> <li>• The introduction of new species can result in irreversible change for existing ecosystems. Endemic species might be destroyed by tourism. Although some species can migrate, it can be harder for indigenous communities to adapt to these changes. Cultural value is very important in this situation.</li> </ul> |

| Question number | Assess the threats to the economic and environmental value of glacial landscapes.<br>Answer  |
|-----------------|--|
|                 | <ul style="list-style-type: none"> <li>• <b>Some threats are relatively easy to manage</b> (e.g. overfishing), but others are context threats (e.g. climate change / albedo positive feedback cycles) that require a global understanding to effectively manage them; so cultural value of landscapes is relatively less important.</li> <li>• Glacial landscapes are important in other ways, e.g. economic value creates many opportunities; the exploitation of some resources are more important than others (e.g. hydroelectric power has less impact on culture and the environment than oil, gas, metals and minerals).</li> <li>• Threats to glacial landscape can have an impact on the long-term environmental record that is stored in the ice/snow (if it melts), however other environmental records are stored in soil and lake layers, that would be less affected by exploitation.</li> </ul> <p>Judgements might be based around whether threats to glacial landscapes significantly impact on their environmental and cultural value. Some candidates might note that these landscapes are important in other ways and therefore the threats might be seen as opportunities. Most are likely to judge that the short-term opportunities could result in long-term irreversible changes to aspects of the environment that are considered important for local people or research.</p> |

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| <b>Level 2</b> | <b>5–8</b>  | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas logically, making some relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to make judgments about the significance of some factors, to produce an argument that may be unbalanced or partially coherent. (AO2)</li> </ul> |
| <b>Level 3</b> | <b>9–12</b> | <ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas logically, making relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to make supported judgments about the significance of factors throughout the response, leading to a balanced and coherent argument. (AO2)</li> </ul>                                      |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 3(a)(i)         | <p style="text-align: center;"><b>AO3 (1 mark)</b></p> <p style="text-align: center;">Award <b>1</b> mark for each correctly identified impact.</p> <ul style="list-style-type: none"> <li>• In total, greater vegetation cover ❶</li> <li>• There is more even vegetation coverage ❶</li> <li>• Less people are going off the footpath ❶</li> <li>• The width of the footpath is narrower / there is more vegetation on either side of the footpath ❶</li> <li>• Vegetation has recovered on the sides of the path ❶</li> <li>• There is now only one clear / wider / safer / singularly defined footpath ❶</li> <li>• There is very little change in the centre of the footpath ❶</li> </ul> <p>Accept any other reasonable response based on Figure 3.</p> | (2)  |

| Question number | Answer   | Mark |
|-----------------|--|------|
| 3(a)(ii)        | <p style="text-align: center;"><b>AO3 (2 mark)</b></p> <p style="text-align: center;">Award <b>1 mark</b> for a valid reason and <b>1 additional</b> mark for justification.</p> <ul style="list-style-type: none"> <li>• It reduces the damage / trampling from walkers ❶ because it directs the walkers to specific areas ❶.</li> <li>• Allows vegetation to regrow ❶ which can act as a stabilisation to the landscape / which is quite a slow process in short-growing seasons ❶</li> <li>• The habitat can recover ❶ so there is greater species richness / biodiversity ❶</li> <li>• Helps reduce the risk to walkers ❶ so that they don't slip on uneven terrain / slippery rocks / moss ❶</li> <li>• The habitats / environment needs to be conserved ❶ for future use / generations ❶</li> <li>• It encourages walkers towards existing footpath ❶ allowing plant species to recover ❶.</li> </ul> <p>Accept any other reasonable response.</p> | (2)  |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 3(a)(iii)       | <p style="text-align: center;"><b>AO3 (1 mark)</b></p> <p style="text-align: center;">Award <b>1 mark</b> for a valid qualitative method.</p> <ul style="list-style-type: none"> <li>• Photographs ❶</li> <li>• Field sketches ❶</li> <li>• Annotated maps ❶</li> <li>• Written descriptions / fieldwork diary ❶</li> </ul> <p>Accept any other reasonable response.<br/>Do not accept interviews and questionnaires, unless clearly linked to the fieldwork situation.</p> | (1)  |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 3(a) (iv)       | <p style="text-align: center;"><b>AO3 (4 marks)</b></p> <p>Award <b>1</b> mark for identifying why a statistical technique is used and upto a further <b>3</b> marks for justification of why it aids the investigation.</p> <ul style="list-style-type: none"> <li>• Allows them to test a null/positive hypothesis that management has been successful or not / Whether the management scheme should be judged successful or not ❶</li> <li>• E.g. Spearman's Rank / T-Test / Mann-Whitney ❶</li> <li>• allows them to confirm a suspicion / judge the strength of the relationship between distance and erosion / that there is a difference between unmanaged and managed section ❶</li> <li>• Because a strong negative relationship / strong statistical significance / correlation / would suggest people walking from the car park causes erosion / strong difference would show people have trampled less ❶</li> </ul> <p>Accept any other appropriate response – noting that students may show how the data from this situation could be manipulated in order to apply tests other than Spearman's Rank (e.g. Chi<sup>2</sup>)</p> <p>Not naming a technique does not prevent candidates being awarded marks for creditable ideas if what they write is in the context of a statistical technique or testing the strength of the relationship.</p> <p>Do not accept standard deviation.</p> | (4)  |

| Question number | Assess the accuracy and reliability of the primary data that you collected as part of your geographical investigation.<br>Answer  |
|-----------------|---|
| 3(b)            | <p style="text-align: center;"><b>AO3 (9 marks)</b></p> <p><b>Marking instructions</b><br/>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b><br/>Content depends on students' choice of enquiry question and the research sources used.</p> <p>Primary data might include:</p> <ul style="list-style-type: none"> <li>• Fieldwork techniques</li> <li>• Sampling strategies</li> <li>• Technology used to collect data more efficiently and accurately</li> </ul> <p>Assessment of reliability/accuracy might include the following:</p> <ul style="list-style-type: none"> <li>• Fieldwork / data collection techniques should be clearly outlined with some supportive detail about their accuracy and reliability</li> <li>• Links between fieldwork techniques and the resulting geographical enquiry question should be clear</li> <li>• Accuracy refers to the absence of errors in the final data. This could arise from instrumental error in the form of calibration, user error in terms of making the same quantifiable mistake each time (i.e. repeatable but imprecise), the degree of precisions of measurements (number of decimal points), and whether the correct variable was actually being measured (e.g. which part of the corrie wall was being measured). For example, an iPad clinometer app might be more accurate than using an actual clinometer.</li> <li>• Reliability refers to the likelihood that a repeated pieces of data collection would yield the same result. This might be because of sampling strategies (systematic / random / stratified) or the timing of the measurements (e.g. are measurements being made in summer vs. winter when the number of tourists might naturally expect to be different).</li> </ul> <p>All judgements are likely to be partial and tentative given the limited range of primary sources used.</p> <p>Do not accept fieldwork contexts for Regenerating Places and Diverse Places.</p> |

| <b>Level</b>   | <b>Mark</b> | <b>Descriptor</b>  |
|----------------|-------------|--|
|                | 0           | No rewardable material.  |
| <b>Level 1</b> | <b>1–3</b>  | <ul style="list-style-type: none"> <li>Shows evidence that fieldwork investigation skills used may not have been fully appropriate or effective for the investigation of the geographical questions/issue. (AO3)</li> <li>Considers the fieldwork investigation process/data/evidence, with limited relevant connections and/or judgements. (AO3)</li> <li>Argument about the investigation is simplistic and/or generic. (AO3)</li> </ul>   |
| <b>Level 2</b> | <b>4–6</b>  | <ul style="list-style-type: none"> <li>Shows evidence that fieldwork investigation skills used were largely appropriate and effective for the investigation of the geographical questions/issue. (AO3)</li> <li>Critically considers the fieldwork investigation process/data/evidence in order to make some relevant connections and valid judgements. (AO3)</li> <li>Argument about the investigation may have unbalanced consideration of factors, but is mostly coherent. (AO3)</li> </ul>                       |
| <b>Level 3</b> | <b>7–9</b>  | <ul style="list-style-type: none"> <li>Shows evidence that fieldwork investigation skills used were appropriate and effective for the investigation of the geographical questions/issue. (AO3)</li> <li>Critically considers the fieldwork investigation process/data/evidence in order to make relevant connections and judgements that are supported by evidence. (AO3)</li> <li>Argument about the investigation includes balanced consideration of factors and is fully developed and coherent. (AO3)</li> </ul> |

| Question number | Evaluate the importance of tectonic processes and weather conditions in creating distinctive glacial landscapes in New Zealand.<br>Answer  |
|-----------------|--|
| 4               | <p style="text-align: center;"><b>AO1 (4 marks)/AO2 (12 marks)</b></p> <p><b>Marking instructions</b></p> <p>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p>Responses that demonstrate <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks</li> <li>• Level 4 AO1 performance: 4 marks</li> </ul> <p><b>Indicative content guidance</b></p> <p>The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• NZ is on a conservative and destructive plate boundary setting; destructive plate boundaries cause fold mountains to form, whilst both plate boundaries cause earthquakes.</li> <li>• Glaciers grow in high altitude locations because of positive mass-balance budgets created by the weather conditions, e.g. low temperatures (less ablation), high precipitation (more accumulation), in this case because of the Roaring Forties and snowfall over the Southern Alps.</li> <li>• Glacial erosion processes include abrasion, quarrying, plucking, crushing and basal melting. Material is then deposited further down the valley.</li> <li>• Glacial landforms include cirques, corries, aretes, pyramidal peaks (e.g. Mt Tasman), glacial troughs.</li> <li>• Melting water can help form fluvio-glacial landforms.</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Tectonic processes have helped create uplift of the Southern Alps, however erosion processes have helped remove newly exposed rock, which create distinctive landforms, such as pyramidal peaks (Mt Tasman) (Fig. 4b)</li> <li>• Tectonic processes can trigger landslides and avalanches; however, stress and tension is also the by-product of sub-aerial rock breakdown processes (Fig. 4b)</li> <li>• Distinctive landforms are often caused by geomorphological processes and rock breakdown, driven by wind/water (e.g. freeze-thaw) associated with the very powerful Roaring Forties (Fig. 4a)</li> <li>• The build-up and subsequent flow of glaciers creates distinctive landforms in the Southern Alps. However, the glaciers are only present because of high accumulation of snow (precipitation) because of the mountain barrier / rain-shadow effect created because of tectonic uplift (Fig. 4a) and climate change can alter the balance of accumulation vs. ablation</li> </ul> |

| Question number | Evaluate the importance of tectonic processes and weather conditions in creating distinctive glacial landscapes in New Zealand.<br>Answer  |
|-----------------|--|
|                 | <ul style="list-style-type: none"> <li>• Sub-aerial rock breakdown results in material that can be transported and deposited (Fig. 4b); however, this is only possible because of a flow of meltwater, which is the by-product of glacial melt. This has nothing directly to do with tectonic processes, however the temperature difference due to altitude is only possible because of the formation of the Southern Alps.</li> <li>• Tectonic uplift occurs over a long-period and over a high spatial area; however geomorphological processes operate over a smaller-scale/quicker speed, meaning that they probably create the greatest geodiversity (range of unique landforms) – climate change operates over a shorter-period with processes impacting a smaller-area, potentially increasing the distinctiveness of landforms – in additional sea-level rise might negate the effect of uplift.</li> <li>• The transported debris from the glacier can be deposited in the valley floor, and this raises the valley floor over time (Fig. 4b), in theory reducing the 'height difference' between the valley floor and the pyramidal peak of Mt Tasman; over a long-period, some might argue that a flat landscape might result, except that tectonic uplift counteracts this.</li> </ul> <p>Some candidates might reference ideas about climate change / shifting climate patterns leading to extreme weather events and might comment about impact on growth/melt of glaciers. This differentiation between ST and LT processes might be a way of doing evaluation.</p> <p>Judgements and conclusions might be based around whether tectonics ultimately are responsible for the formation of Southern Alps, as opposed to glacial processes which eroded them. However, some candidates might note that the interaction between these processes is the reason for the distinctive working of glacial processes. Other candidates might note this interaction might work over a long-period towards a stable equilibrium, or that these unique combination of factors are constantly at work reshaping the landscape. Most are likely to conclude that the tectonics create an environment where glacial processes can erode.</p> |

| <b>Level</b>   | <b>Mark</b>  | <b>Descriptor</b>   |
|----------------|--------------|---|
|                | 0            | No rewardable material.   |
| <b>Level 1</b> | <b>1–4</b>   | <ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas, making limited and rarely logical connections/relationships, to produce an interpretation with limited relevance and/or support. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO2)</li> <li>• Limited synthesis of geographical ideas from across the course of study. (AO2)</li> </ul>   |
| <b>Level 2</b> | <b>5–8</b>   | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)</li> <li>• Argument partially synthesises some geographical ideas from across the course of study, but lacks meaningful connections. (AO2)</li> </ul> |
| <b>Level 3</b> | <b>9–12</b>  | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships to produce a partial but coherent interpretation that is supported by some evidence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to come to a conclusion, largely supported by an argument that may be unbalanced or partially coherent. (AO2)</li> <li>• Argument synthesises some geographical ideas from across the course of study, making some meaningful connections. (AO2)</li> </ul>                               |
| <b>Level 4</b> | <b>13–16</b> | <ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant</li> </ul>   |

|  |  |  |
|--|--|--|
|  |  | <p>connections/relationships to produce a full and coherent interpretation that is supported by evidence. (AO2)</p> <ul style="list-style-type: none"><li>• Applies knowledge and understanding of geographical information/ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2)</li><li>• Argument comprehensively and meaningfully synthesises geographical ideas from across the course of study throughout the response. (AO2)</li></ul> |
|--|--|--|

| Question number | Answer   | Mark |
|-----------------|--|------|
| 5(a)            | <p style="text-align: center;"><b>AO1 (1 mark)</b></p> <p>Award <b>1</b> mark for a correctly identified natural event:</p> <ul style="list-style-type: none"> <li>• Landslide / slumping / rotational slumping / slide / topple / rock fall / mudslides ❶</li> <li>• Cliff retreat / recession / cliff collapse ❶</li> </ul> <p>Accept any other reasonable response.</p> | (1)  |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 5(b)(i)         | <p style="text-align: center;"><b>AO3 (1 mark)</b></p> <p>Allow <b>1</b> mark for getting the correct number and subtraction from the graph. Allow <b>1</b> mark for the correct final percentage change calculation.</p> <ul style="list-style-type: none"> <li>• Calculating the subtraction ❶ <ul style="list-style-type: none"> <li>10-15mm (range to accept in 1950)</li> <li>160-165mm (range to accept in 2010)</li> <li>Largest change to accept = <math>165 - 10 = 155\text{mm}</math></li> <li>Smallest change to accept = <math>160 - 15\text{mm} = 145\text{mm}</math></li> </ul> </li> <li>• Calculating the % change ❶ <ul style="list-style-type: none"> <li>Biggest change to accept: <math>155/10 * 100 = 1550\%</math></li> <li>Smallest change to accept - <math>145/15 * 100 = 966\%</math></li> <li>Accept final answers between 966-1550%</li> </ul> </li> </ul> <p>If the calculation of the difference is wrong, then 1 mark can still be awarded for the use of the right method for calculating a percentage.</p> | (2)  |

| Question number | Answer   | Mark       |
|-----------------|--|------------|
| 5 (b) (ii)      | <p style="text-align: center;"><b>A01 (2 marks)/A02 (1 mark)</b></p> <p>Award <b>1</b> mark for analysing the resource to identify one change eustatic sea-level change makes and a further <b>2</b> marks for explaining how the landscape might be affected, for example:</p> <ul style="list-style-type: none"> <li>• Waves breaking higher on beaches <b>1</b> might cause erosion of cliff-faces / removal of sediment <b>1</b> and eventually cliff collapse / beach disappears / beach rollover <b>1</b></li> <li>• Higher sea level might flood / submerge low-lying coastlines <b>1</b> which might create new tidal zones / cause coastal squeeze / damage to ecosystems / infrastructure / establishing the conditions for haloseres to form <b>1</b> requiring communities to adjust / managed retreat <b>1</b></li> <li>• Higher sea-level might cause storms waves to break higher <b>1</b> which might breach sea defences / beaches / shingle ridges <b>1</b> causing damage to houses / infrastructure <b>1</b></li> <li>• Valleys / synclines can be flooded <b>1</b> creating Dalmatian coastlines / fjords / rias / parallel islands <b>1</b> because glaciers / rivers / deltas / tectonics have already created a distinctive landscape <b>1</b></li> </ul> <p>Accept any other appropriate response.<br/>Reject explanations based on isostatic sea-level change.</p> | <b>(3)</b> |

| Question number | Answer  | Mark       |
|-----------------|---|------------|
| 5(c)            | <p style="text-align: center;"><b>AO1 (4 marks)</b></p> <p>For each process, award <b>1</b> mark for each reason why areas are at risk from coastal flooding and a further mark for an explaining how it increases coastal flood risk, for example:</p> <ul style="list-style-type: none"> <li>• Low-lying coastal nations have flat land <b>1</b> so water is more likely to encroach / covers a large spatial area quickly / harder for people to escape <b>1</b></li> <li>• Mid-latitude locations / low-pressure weather <b>1</b> are likely to receive more frequent depressions / storm events <b>1</b></li> <li>• Tropical locations / latitudes <b>1</b> are more likely to receive tropical storms <b>1</b></li> <li>• Removal of vegetation, e.g. mangroves <b>1</b> removes a barrier to incoming water <b>1</b></li> <li>• Porous geology / coral means water rises through ground <b>1</b> reducing the space for people to live in that environment <b>1</b></li> <li>• Along plate boundaries <b>1</b> because they might be susceptible to tsunamis <b>1</b></li> <li>• coastal subsidence <b>1</b> caused by earthquakes / subduction / water extraction / buildings / isostatic change / melting ice in other parts of the continent <b>1</b></li> <li>• Shape of landscapes / funneled topography <b>1</b> will concentrate the effect of locally-increase sea-level <b>1</b></li> </ul> <p>Accept any other reasonable responses<br/>Do not accept ideas about eustatic change.</p> | <b>(4)</b> |

| Question number | Explain how vegetation helps stabilise sandy coastlines.<br>Answer   |   |
|-----------------|--|---|
| 5(d)            | <p style="text-align: center;"><b>AO1 (6 marks)</b></p> <p><b>Marking instructions</b><br/>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p><b>Indicative content guidance</b><br/>The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p> <ul style="list-style-type: none"> <li>• Plant succession over time happens as pioneer plants colonise areas, add humus, moisture and stabilise loose sand and over time new plants establish themselves in these new conditions and take over.</li> <li>• Newly established salt marshes act as buffer zones between the sea and land to absorb coastal floods and take the impact of storms</li> <li>• If there is enough, sand dries out and blows towards the land, trapped around obstacles to form dunes, which collect more sand and provide conditions for pioneer plants to colonise the dunes and hold the sand together.</li> <li>• Long blades of cordgrass in a salt marsh can trap sediment building up a muddy substrate which helps stabilise the roots of other plant species and leads to further sediment deposition.</li> <li>• Marram grass establishes good root networks in bare sand which stabilises the dune, so it can cope with gale-force winds; it can trap sand / sediment building up a sand dune behind it, which grows by encouraging further sand deposition, and absorb wave energy</li> <li>• River flow is slowed by already established spits / bars / barrier beaches creating low energy salt marsh environments / plant succession as tiny clay particles stick to each other / flocculation.</li> </ul> <p>Accept any other reasonable response.</p> |   |
| Level           | Mark   | Descriptor  |
|                 | 0  | No rewardable material.   |
| <b>Level 1</b>  | <b>1–2</b>   | <ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Understanding addresses a narrow range of geographical ideas, which lack detail. (AO1)</li> </ul>              |
| <b>Level 2</b>  | <b>3–4</b>   | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Understanding addresses a range of geographical ideas, which are not fully detailed and/or developed. (AO1)</li> </ul> |
| <b>Level 3</b>  | <b>5–6</b>   | <ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Understanding addresses a broad range of geographical ideas, which are detailed and fully developed. (AO1)</li> </ul>                             |

| Question number | Assess the social and economic risks of rapid coastal retreat.<br>Answer  |
|-----------------|---|
| 5(e)            | <p style="text-align: center;"><b>AO1 (3 marks)/AO2 (9 marks)</b></p> <p><b>Marking instructions</b></p> <p>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p>Responses that demonstrate <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks.</li> </ul> <p><b>Indicative content guidance</b></p> <p>The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Social risks include the need for relocation, loss of livelihood, amenity value</li> <li>• Economic risks include the damage to housing, businesses, agricultural land, infrastructure</li> <li>• Coastal retreat is the ongoing move backwards of the coastline, mainly the cliff profiles, or loss of beaches, either through high impact short-term events, or long-term change. It could also refer to the inevitable retreat of communities faced with long-term sea-level rise in low-lying environments</li> <li>• Increasing rates means changes to coastal erosion processes (e.g. mass movement, undercutting by waves) or deposition (marine transgression and beach rollover).</li> <li>• Coastal retreat can be countered by coastal management.</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Climate change is likely to cause increased storm waves, which undermine cliffs / remove beaches or sand dunes. On the other hand, risk is a human factor, reflected by increased coastalisation in picturesque locations (e.g. Pacifica, California). Dense coastal development increases social and economic risk.</li> <li>• Taking action to reduce economic or social loss from coastal erosion can result in change downdrift, which in turn create new forms of economic or social loss (e.g. Happisburgh)</li> <li>• Decisions about coastal management has the potential to create further social risk, e.g. conflicts between stakeholders; equally not making decisions clearly results in social loss because of coastal flooding / damage.</li> <li>• Sometimes stakeholders make the decision to sacrifice land (managed retreat) to create new habitats or maximises the economic gain, e.g. Medmerry,</li> </ul> |

| Question number | Assess the social and economic risks of rapid coastal retreat.<br>Answer  |
|-----------------|---|
|                 | <ul style="list-style-type: none"> <li>• The extent of social risk can influence the types of players that are involved in coastal management, e.g. NGOs might be more appropriate. However, the viability / funding often depends on the extent of economic loss to justify the spending of council funding. Therefore, social loss might be less important.</li> </ul> <p>Judgements might be based around whether social and economic risks to coastal landscapes can be significantly reduced. They are likely to conclude that SMPs and ICZM are helpful ways to consider the perspective of many stakeholders. Some candidates might note that that effective design of these plans depends on an understanding of physical processes and sediment cells. Most are likely to judge that complexity makes it hard to reduce risk, but that successful implementation also includes an understanding of sediment cells – but might also note there might be positive or negative feedback that can result in unexpected outcomes from management.</p> |

| Level          | Mark        | Descriptor   |
|----------------|-------------|--|
|                | 0           | No rewardable material.  |
| <b>Level 1</b> | <b>1–4</b>  | <ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas, making limited logical connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce an interpretation with limited relevance and/or support. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to make unsupported or generic judgements about the significance of few factors, leading to an argument is unbalanced or lacks coherence. (AO2)</li> </ul>                       |
| <b>Level 2</b> | <b>5–8</b>  | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas logically, making some relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a partial but coherent interpretation that is mostly relevant and supported by evidence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to make judgements about the significance of some factors, to produce an argument that may be unbalanced or partially coherent. (AO2)</li> </ul> |
| <b>Level 3</b> | <b>9–12</b> | <ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas logically, making relevant connections/relationships. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce a full and coherent interpretation that is relevant and supported by evidence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to make supported judgements about the significance of factors throughout the response, leading to a balanced and coherent argument. (AO2)</li> </ul>                                      |

| Question number | Answer   | Mark |
|-----------------|--|------|
| 6(a)(i)         | <p style="text-align: center;"><b>AO3 (2 marks)</b></p> <p style="text-align: center;">Award <b>1</b> mark for each identified impact</p> <ul style="list-style-type: none"> <li>• In total, greater vegetation cover ❶</li> <li>• There is more even vegetation coverage ❶</li> <li>• Less people are going off the footpath ❶</li> <li>• The width of the footpath is narrower / there is more vegetation on either side of the footpath ❶</li> <li>• Vegetation has recovered on the sides of the path ❶</li> <li>• There is now only one clear / wider / safer / singularly defined footpath ❶</li> <li>• There is very little change in the centre of the footpath ❶</li> </ul> <p>• Accept any other reasonable response</p> | (2)  |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 6(a)(ii)        | <p style="text-align: center;"><b>AO3 (2 marks)</b></p> <p style="text-align: center;">Award <b>1 mark</b> for a valid reason and <b>1 additional</b> mark for justification based on the data.</p> <ul style="list-style-type: none"> <li>• It reduces the damage / trampling from walkers ❶ because it directs the walkers to specific areas ❶</li> <li>• Allows vegetation to regrow ❶ which can act as a stabilisation to the sandy landscape ❶</li> <li>• The habitat can recover ❶ so there is possibly greater species richness / biodiversity ❶</li> <li>• Helps reduce the risk to walkers ❶ so that they don't slip on uneven terrain / collapse of the sand dune / exposed to insects or animals ❶</li> <li>• The habitats / environment needs to be conserved ❶ for future use / generations ❶</li> <li>• It encourages walkers towards existing footpath ❶ allowing plant species to recover ❶</li> <li>• Reduces blow out risk ❶ which causes long-term damage / destabilisation to habitats / dune ecosystem ❶</li> </ul> <p>Accept any other reasonable response.</p> | (2)  |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 6(a)(iii)       | <p style="text-align: center;"><b>AO3 (1 marks)</b></p> <p style="text-align: center;">Award <b>1 mark</b> for a valid qualitative method.</p> <ul style="list-style-type: none"> <li>• Photographs ❶</li> <li>• Field sketches ❶</li> <li>• Annotated maps ❶</li> <li>• Written descriptions / fieldwork diary ❶</li> </ul> <p>Accept any other reasonable response.</p> <p>Do not accept interviews and questionnaires, unless clearly linked to the fieldwork situation.</p> | (1)  |

| Question number | Answer  | Mark |
|-----------------|---|------|
| 6(a)(iv)        | <p style="text-align: center;"><b>AO3 (4 marks)</b></p> <p>Award <b>1 mark</b> for identifying why a statistical technique is used and upto a further <b>3 marks</b> for justification of why it aids the investigation.</p> <ul style="list-style-type: none"> <li>• Allows them to test a null/positive hypothesis that management has been successful or not / Whether the management scheme should be judged successful or not ❶</li> <li>• E.g. Spearman's Rank / T-Test / Mann-Whitney ❶</li> <li>• allows them to confirm a suspicion / judge the strength of the relationship between distance and erosion / that there is a difference between unmanaged and managed section ❶</li> <li>• Because a strong negative relationship / strong statistical significance / correlation / would suggest people walking from the car park causes erosion / strong difference would show people have trampled less ❶</li> </ul> <p>Accept any other appropriate response – noting that students may show how the data from this situation could be manipulated in order to apply tests other than Spearman's Rank (e.g. <math>\chi^2</math>)</p> <p>Not naming a technique does not prevent candidates being awarded marks for creditable ideas if what they write is in the context of a statistical technique or testing the strength of the relationship.</p> <p>Do not accept standard deviation.</p> | (4)  |

| Question number | Assess the accuracy and reliability of the primary data that you collected as part of your geographical investigation.<br>Answer   |
|-----------------|--|
| 6(b)            | <p style="text-align: center;"><b>AO3 (9 marks)</b></p> <p><b>Marking instructions</b><br/>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.<br/>No marks for stating research question, but this should be used as the context for the answer.</p> <p><b>Indicative content guidance</b><br/>Content depends on students' choice of enquiry question and the research sources used.<br/>Primary data might include:</p> <ul style="list-style-type: none"> <li>• Fieldwork techniques</li> <li>• Sampling strategies</li> <li>• Technology used to collect data more efficiently and accurately</li> </ul> <p>Assessment of reliability/accuracy might include the following:</p> <ul style="list-style-type: none"> <li>• Fieldwork / data collection techniques should be clearly outlined with some supportive detail about their accuracy and reliability</li> <li>• Links between fieldwork techniques and the resulting geographical enquiry question should be clear</li> <li>• Accuracy refers to the absence of errors in the final data. This could arise from instrumental error in the form of calibration, user error in terms of making the same quantifiable mistake each time (i.e. repeatable but imprecise), the degree of precisions of measurements (number of decimal points), and whether the correct variable was actually being measured (e.g. which part of the beach profile was being measured). For example, an iPad clinometer app might be more accurate than using an actual clinometer.</li> <li>• Reliability refers to the likelihood that a repeated pieces of data collection would yield the same result. This might be because of sampling strategies (systematic / random / stratified) or the timing of the measurements (e.g. are measurements being made in summer vs. winter when the number of tourists might naturally expect to be different).</li> </ul> <p>All judgements are likely to be partial and tentative given the limited range of primary sources used.<br/>Do not accept fieldwork contexts for Regenerating Places and Diverse Places.</p> |

| Level          | Mark       | Descriptor   |
|----------------|------------|--|
|                | 0          | No rewardable material.  |
| <b>Level 1</b> | <b>1–3</b> | <ul style="list-style-type: none"> <li>Shows evidence that fieldwork investigation skills used may not have been fully appropriate or effective for the investigation of the geographical questions/issue. (AO3)</li> <li>Considers the fieldwork investigation process/data/evidence, with limited relevant connections and/or judgements. (AO3)</li> <li>Argument about the investigation is simplistic and/or generic. (AO3)</li> </ul>   |
| <b>Level 2</b> | <b>4–6</b> | <ul style="list-style-type: none"> <li>Shows evidence that fieldwork investigation skills used were largely appropriate and effective for the investigation of the geographical questions/issue. (AO3)</li> <li>Critically considers the fieldwork investigation process/data/evidence in order to make some relevant connections and valid judgements. (AO3)</li> <li>Argument about the investigation may have unbalanced consideration of factors, but is mostly coherent. (AO3)</li> </ul>                       |
| <b>Level 3</b> | <b>7–9</b> | <ul style="list-style-type: none"> <li>Shows evidence that fieldwork investigation skills used were appropriate and effective for the investigation of the geographical questions/issue. (AO3)</li> <li>Critically considers the fieldwork investigation process/data/evidence in order to make relevant connections and judgements that are supported by evidence. (AO3)</li> <li>Argument about the investigation includes balanced consideration of factors and is fully developed and coherent. (AO3)</li> </ul> |

| Question number | Evaluate the importance of tectonic and marine processes in creating distinctive coastal landscapes in New Zealand.<br>Answer   |
|-----------------|---|
| 7               | <p style="text-align: center;"><b>AO1 (4 marks)/AO2 (12 marks)</b></p> <p><b>Marking instructions</b></p> <p>Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below.</p> <p>Responses that demonstrate <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p> <ul style="list-style-type: none"> <li>• Level 1 AO1 performance: 1 mark</li> <li>• Level 2 AO1 performance: 2 marks</li> <li>• Level 3 AO1 performance: 3 marks</li> <li>• Level 4 AO1 performance: 4 marks</li> </ul> <p><b>Indicative content guidance</b></p> <p>The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:</p> <p><b>AO1</b></p> <ul style="list-style-type: none"> <li>• Destructive plate boundaries have caused fold mountains to form.</li> <li>• Tectonic movement can cause long-term isostatic uplift (raised beaches)</li> <li>• Coastal recession is affected by geological and marine factors, including tides and currents</li> <li>• Weathering processes (mechanical, chemical, biological) influence rates of recession and expose underlying geology.</li> <li>• Erosion processes help create distinctive landforms (e.g. cave-arch-stack-stump)</li> <li>• Mass movement is important on coastlines with complex geology – and creates distinctive landforms (e.g. terraced cliff profiles).</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• Tectonic processes are responsible for the formation of New Zealand (uplift of mountains); however erosion processes have exposed underlying rock, which creates distinctive landforms, such as Punakaiki Rocks.</li> <li>• Tectonic processes have caused the sudden uplift of the raised beach at Turakirae Head beach, but the unique landforms on the beach (fossil cliffs) are also the product of mass movement.</li> <li>• Tectonic processes can trigger mass movement (e.g. Turakirae Head), however the build-up and release of stress and tension is also the by-product of sub-aerial rock breakdown processes and coastal erosion (e.g. e.g. Cook Strait)</li> <li>• Tectonic processes are less important away from plate boundaries, e.g. Punakaiki Rocks, where sub-aerial processes and wave attack results in material being transported/eroded away (Fig. 7b), however tectonics are more important nearer boundaries (e.g. Turakirae Head)</li> <li>• The erosion of cliffs over time in the Cook Strait and Turakirae Head could potentially result in fewer unique landforms. However tectonic uplift helps</li> </ul> |

| Question number | <p><b>Evaluate the importance of tectonic and marine processes in creating distinctive coastal landscapes in New Zealand.</b></p> <p><b>Answer</b></p>  |
|-----------------|---|
|                 | <p>expose new land for coastal erosion to occur, and creates unique 'geodiversity' (Fig. 7b)</p> <ul style="list-style-type: none"> <li>• Distinctive landforms are often caused by geomorphological processes, but the agents of that change could also be water (particularly tidal currents), which is the by-product of the restricted flow of water through the Cook Strait, as well as strong winds causing subaerial (weathering) processes.</li> <li>• Tectonic uplift occurs over a long time period and high spatial area; however, the longest geomorphological process identified is the formation of limestone and formation of Cook Strait and these are unrelated to tectonic activity;</li> </ul> <p>Judgements and conclusions might be based around whether tectonics ultimately are responsible for the formation of coastlines like the Cook Strait but not at coastlines like Punakaiki, where coastal erosion processes are more important. However some candidates might note that the interaction between these processes is the reason for the distinctive result of coastlines like Turakirae. Most are likely to conclude that the tectonics created a situation in the past where coastal erosion processes now dominate.</p> |

| Level          | Mark         | Descriptor  |
|----------------|--------------|---|
|                | <b>0</b>     | No rewardable material.   |
| <b>Level 1</b> | <b>1–4</b>   | <ul style="list-style-type: none"> <li>• Demonstrates isolated elements of geographical knowledge and understanding, some of which may be inaccurate or irrelevant. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas, making limited and rarely logical connections/relationships, to produce an interpretation with limited relevance and/or support. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to produce an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO2)</li> <li>• Limited synthesis of geographical ideas from across the course of study. (AO2)</li> </ul>   |
| <b>Level 2</b> | <b>5–8</b>   | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is occasionally relevant and may include some inaccuracies. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas with limited but logical connections/relationships to produce a partial interpretation that is supported by some evidence but has limited coherence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to come to a conclusion, partially supported by an unbalanced argument with limited coherence. (AO2)</li> <li>• Argument partially synthesises some geographical ideas from across the course of study, but lacks meaningful connections. (AO2)</li> </ul> |
| <b>Level 3</b> | <b>9–12</b>  | <ul style="list-style-type: none"> <li>• Demonstrates geographical knowledge and understanding, which is mostly relevant and accurate. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find some logical and relevant connections/relationships to produce a partial but coherent interpretation that is supported by some evidence. (AO2)</li> <li>• Applies knowledge and understanding of geographical information/ideas to come to a conclusion, largely supported by an argument that may be unbalanced or partially coherent. (AO2)</li> <li>• Argument synthesises some geographical ideas from across the course of study, making some meaningful connections. (AO2)</li> </ul>                               |
| <b>Level 4</b> | <b>13–16</b> | <ul style="list-style-type: none"> <li>• Demonstrates accurate and relevant geographical knowledge and understanding throughout. (AO1)</li> <li>• Applies knowledge and understanding of geographical information/ideas to find fully logical and relevant</li> </ul>   |

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|  |  | <p>connections/relationships to produce a full and coherent interpretation that is supported by evidence. (AO2)</p> <ul style="list-style-type: none"><li>• Applies knowledge and understanding of geographical information/ideas to come to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO2)</li><li>• Argument comprehensively and meaningfully synthesises geographical ideas from across the course of study throughout the response. (AO2)</li></ul> |
|--|--|--|