



# Mark Scheme (Results)

Autumn 2020

Pearson Edexcel GCE  
In Geography (2016)  
Paper 1: Dynamic Landscapes

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Publications Code 8GE0\_01\_2010\_MS

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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.

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>• B – Crustal Fracturing ❶.</li> </ul> <p>A and D are both secondary impacts of an earthquake C is the impact of a volcanic eruption.</p>	<b>(1)</b>

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 correctly calculating the number of aftershocks a further <b>1</b> mark for completing the calculation to work out the mean.</p> <ul style="list-style-type: none"> <li>• <math>40+50+24+23+7+12+6+6+3+23 = 194</math> ❶</li> <li>• Divided by 10 = 19.4 ❶</li> </ul>	<b>(2)</b>

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 change, and a further <b>2</b> marks for justifying the possible reason, for example:</p> <ul style="list-style-type: none"> <li>• After the initial earthquake people are more sensitive to more shaking ❶ because they are worried about further damage ❶ so they pick up on lower-magnitude events ❶</li> <li>• There was a high magnitude initial earthquake ❶ which created stress for the surrounding rock ❶ which is gradually released by the subsequent aftershocks ❶</li> <li>• The initial earthquake creates stress for many surrounding faults ❶ creating a cloud of / multiple aftershocks on day 2-3 ❶ but reducing as stress is released ❶</li> </ul>	<b>(3)</b>

	<ul style="list-style-type: none"> <li>• There are many people helping in rescue efforts ❶ so more people feel the aftershocks ❶ and can share them on different forms of social media ❶</li> <li>• Over days 2-9 people are evacuated from the area ❶ so less people feel the aftershocks ❶ and report them to local authorities ❶.</li> </ul> <p>Accept any other appropriate response based on figure 1.</p>	
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Question number	Explain two parts of the Pressure/Release Model. 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 explaining a part of the Pressure Release model and a further <b>1</b> mark for developing that explanation. For example:</p> <ul style="list-style-type: none"> <li>• Root causes are overarching political / power / economy ❶ which are the result of how power is distributed in society / determine how much the government is able to support / recognises the needs of different / marginalised groups of people in society ❶</li> <li>• Dynamic pressures create unsafe conditions in particular areas / particular times ❶ because there are more people / less training / less press freedom / rapid city growth / deforestation etc. ❶</li> <li>• Unsafe conditions are specific ways that people are vulnerable ❶ because of where buildings are build / unsafe hill slopes / informal settlements / lack of health and safety / poor education / poor infrastructure ❶ .</li> </ul> <p>Accept any other appropriate response.</p>	(4)

Question number	Explain why some tectonic hazards occur away from plate boundaries Answer
1(d)	<p style="text-align: center;"><b>AO1 (6 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><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> <ul style="list-style-type: none"> <li>• Seismic waves can travel great distances and sometimes trigger tectonic hazards away from the plate boundary, e.g. landslides or tsunami waves</li> <li>• The movement of tectonic plates introduce faults and weaknesses within the across the plate – leading to intra-plate earthquakes.</li> <li>• Intra-plate earthquakes occur within a plate and are relatively rare – however they are often not seismically monitored / buildings are not retrofitted, so the earthquake can cause more damage – e.g. Gujurat 2001</li> <li>• Intraplate volcanic eruptions happen because of mantle plumes which melt the overlying crust, so magma can extrude.</li> <li>• Frequent non-explosive eruptions of basaltic magma mean pressure and gas does not build up, resulting in large shield volcanoes with low viscosity lava because the lava spreads before cooling, e.g. Mauna Loa 2018</li> <li>• Successive oceanic volcanoes are formed and move away from a hotspot because tectonic plates move over the hotspot, which remains stationary - forming volcanic islands / chain of atolls / seamounts. These volcanic islands are vulnerable to landslides, either because of successive earthquakes and/or coastal erosion.</li> </ul>

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>

<b>Question number</b>	<b>Assess the view that tectonic disasters are affecting more people in the world, but causing fewer deaths than in the past.</b> <b>Answer</b>
<b>1(e)</b>	<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. 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>• Tectonic disasters are defined as different from natural hazards, and include volcanic eruptions, earthquakes and tsunamis, as well as landslides and in multiple hazard zones, linked to hydrometeorological hazards that are happening at the same time.</li> <li>• Disasters are the by-product of both the event, vulnerability, and a community's threshold for resilience.</li> <li>• Disaster might reflect social and economic impacts</li> <li>• Disaster impacts is raised by unequal access to education, housing, healthcare and income opportunities, as a poor governance and other geographical factors (population density, isolation, accessibility and degree of urbanisation)</li> <li>• Tectonic mega-disasters have regional or global significance because of their economic and human impacts.</li> </ul>

Question number	<p><b>Assess the view that tectonic disasters are affecting more people in the world, but causing fewer deaths than in the past.</b></p> <p><b>Answer</b></p>
	<p><b>AO2</b></p> <p>Disasters are affecting more people –</p> <ul style="list-style-type: none"> <li>• Increased numbers of affected people may be linked with population growth (examples from Philippines likely) and density. Migration to urban areas, particularly megacities as a result of TNC investment and living in risky locations (flood plains, river banks, steep slopes). May link to increase in vulnerability and risk equation.</li> <li>• Also, as a result of rising affluence ('more to lose') in NICs / BRICs/ middle-income nations. Growth in value of possessions (electronics) and more have insurance so more is reported.</li> <li>• Some credit may be given for climate change suggestions, e.g. drought / typhoons which are likely to affect more people (e.g. links with more intense hurricanes)</li> </ul> <p>Disasters are causing fewer deaths –</p> <ul style="list-style-type: none"> <li>• Fewer deaths linked to improved prediction, disaster response and post-event reconstruction (e.g. aseismic design of buildings).</li> <li>• Also low cost strategies like Red Cross evacuation sites for flood risk locations e.g. Bangladesh or drills in Japan (1st Sept annually)</li> <li>• Credit reference to detail about warning systems e.g. Hurricane and tsunami warning systems in Pacific</li> <li>• Capacity to cope increasing (e.g. Emergency kits and drills). Credit use of Risk Equation if appropriately explained. Growth in social media and texting means communications improve even to the poor. Issue of complacency however limits effectiveness (e.g. volcanoes like Mayon, Philippines)</li> </ul> <p>Good answers will use a range of examples of different hazards with detail to illustrate. Examples of recent hurricanes and floods may demonstrate both these trends most effectively. Also, the Japan Tohoku earthquake which also resulted in a tsunami which caused more deaths, than the earthquake itself.</p> <p>Some answers may question the trends and note that there have been high death rates in the last decade (e.g. Haiti earthquake 2010, South Asian earthquake and tsunami Boxing Day 2004).</p> <p>Judgements will be based around whether economic growth mean more people are affected than in the past but might also mean less deaths (social impacts). Other candidates might consider that other factors contribute to the reasons why more people are more vulnerable to tectonic hazards and are therefore affected whilst overall, final judgement might comment on the extent to which developing countries have developed their economy well</p>

<b>Question number</b>	<b>Assess the view that tectonic disasters are affecting more people in the world, but causing fewer deaths than in the past.</b> <b>Answer</b>
	enough to reduce / start reducing social loss, whilst at the same time, people migrate into more vulnerable areas, e.g. megacities.

<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 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> </ul>

	<ul style="list-style-type: none"> <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>
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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 correct definition of cryosphere:</p> <ul style="list-style-type: none"> <li>• The frozen water part of the Earth surface systems ❶</li> <li>• Ice on the ocean / land ❶.</li> </ul> <p>Allow any other reasonable response.</p>	(1)

Question number	Answer	Mark
2 (b) (i)	<p style="text-align: center;"><b>AO3 (1 marks)</b></p> <p>Allow <b>1</b> mark for correctly calculating the t-test statistic.</p> <ul style="list-style-type: none"> <li>• Calculating the t-test statistic  <math>3.5/0.8 = 4.4</math> ❶</li> </ul>	(1)

Question number	Answer	Mark
2 (b) (ii)	<p style="text-align: center;"><b>AO3 (1 marks)</b></p> <p><b>1</b> mark for the correctly selected significance level.</p> <ul style="list-style-type: none"> <li>• Significance level = 0.001 ❶.</li> </ul>	(1)

Question number	Answer	Mark
2(b)(iii)	<p style="text-align: center;"><b>AO1 (2 marks)/AO2 (1 mark)</b></p> <p>Award <b>1</b> mark for suggesting a reason for the changes with a further <b>2</b> extension marks to explain why that change means glaciers change size:</p> <ul style="list-style-type: none"> <li>• Climate change has occurred <b>1</b> so ablation is faster than accumulation <b>1</b> so the glacier surface area has melted a lot <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 way that glacial landscapes provide economically valuable features and a further mark expansion explaining why this value exists, up to a maximum <b>2</b> marks each. For example:</p> <ul style="list-style-type: none"> <li>• Farming is possible in the bottom of the valley <b>1</b> because deposited glacial materials / alluvium is very fertile <b>1</b></li> <li>• Mining is possible as ice melts <b>1</b> revealing high valuable deposits of oil / gas metals / minerals <b>1</b></li> <li>• Hydro-electric power is possible in the narrow/deep valleys <b>1</b> because faster flowing meltwater drives turbines <b>1</b></li> <li>• Tourism is increasingly possible all over the valley floors and sides <b>1</b> because of the unique scenery created by glacial processes <b>1</b>.</li> </ul> <p>Accept any other reasonable response.</p>	<b>(4)</b>

Question number	Using a named example, explain how periglacial landforms produce a distinctive landscape. Answer
2(d)	<p style="text-align: center;"><b>AO1 (6 marks)</b></p> <p><b>Marking instructions</b> 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> 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>• Ice wedges – cold temperatures in winter form cracks in the ground; the active layer melts in warmer months and water flows into the cracks and then freezes on contact with the permafrost. Ice wedges might go onto created beaded channels for periglacial streams, where the flowing water caused the ice wedges to melt, producing pools.</li> <li>• Patterned ground is the by-product of ice-wedge processes; frost forming in unsorted glacial till sorts surface debris, bringing finer material to the surface and leaving coarser fragments around the edges – these shapes could include stripes/steps/circles/polygons and nets</li> <li>• Pingos are ice-cored hills with curved tops – a lake fills in with sediment with surrounding permafrost squeezing water into the sediment. Freezing generates pressure to concentrate the water upwards, resulting in a mass of ice at the core of the pingo.</li> <li>• Loess is material deposited by wind that has removed material from river/lake beds in summer months.</li> <li>• Distinctive means unique features of the chosen named landscape, which might include tundra environments of northern Russia and northern Canada.</li> </ul> <p>Allow other reasonable explanations. If no example named, the answer is unlikely to go out of level 2. Likely examples might include the Chiltern Hills</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>

<b>Question number</b>	<b>Assess the importance of the ablation for the rate of glacier movement. Answer</b>
<b>2(e)</b>	<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. 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>• Ablation is one part of glacial mass balance, together with accumulation. Positive and negative feedback also play a role here.</li> <li>• The process of ablation included melting, calving, evaporation and avalanches.</li> <li>• Rate of glacier movement is controlled by altitude, slope, lithology, size of glacier as well as variations in glacial mass balance.</li> <li>• Glaciers are in a state of dynamic equilibrium with the slope angle – so glaciers are always moving towards the snout/margins.</li> <li>• Glacier movement covers a range of processes – basal slip, regelation creep and internal deformation.</li> </ul> <p><b>AO2</b></p>

Question number	Assess the importance of the ablation for the rate of glacier movement. Answer
	<ul style="list-style-type: none"> <li>• <b>Ablation is important for glacial movement in warmer</b> (summer months) because the glacial budget becomes negative (ice is melting) and the snout of the glacier begins to retreat</li> <li>• Glaciers fundamentally move downhill because of gravity, however in wet-based glaciers there is more rapid ablation in summer, and glacier ice must move downslope more rapidly to maintain equilibrium with the slope angle.</li> <li>• In warm-based glaciers, meltwater acts a lubricant to reduce friction between the glacier and the bedrock/debris - this slippage can be up to 75% of a glacier's movement. However, it is latitude and altitude that determines if glaciers are warm- or cold-based, rather than ablation per se.</li> <li>• Ablation is the main cause of meltwater runoff, sublimation avalanching and windblown snow. In some cases, it might be responsible for iceberg formation.</li> <li>• <b>Ablation is not the most important factor that affects glacial movement per se</b> – altitude determine the temperatures and precipitation inputs for a glacier, which in turns affects accumulation and ablation and mass balance overall.</li> <li>• The type of bedrock determines the strength and consolidation of the rock, and whether glaciers deform sediment and in turn help the glacier move, e.g. Iceland glaciers</li> <li>• enhanced basal creep helps basal ice deform around irregularities on the bedrock surface – however, basal creep does require some ice melt to flow around the obstacle</li> <li>• Regelation creep (slip) is the result of basal ice deforming under pressure, in turn causing melting as pressure is higher up-glacier.</li> <li>• Cold-based glaciers have to move because of internal deformation – intergranular (individual ice crystals deforming) and laminar flow (layers).</li> <li>• Slope gradient determines the rate of internal deformation, particularly in the zone of accumulation.</li> </ul> <p><b>Ablation</b> is also important for the formation of other glacial processes and landforms – e.g. fluvio-glacial landforms (kames/eskers/kame terraces, as well as proglacial features (sandurs, pro-glacial lakes, meltwater channels, and kettle holes).</p> <p>Judgements might be based around whether ablation is the more important factors affected glacier movement. Some candidates might note that other factors are more important and indeed determine the amount of</p>

<b>Question number</b>	<b>Assess the importance of the ablation for the rate of glacier movement.</b>
<b>Answer</b>	ablation. Most are likely to judge that other factors are more important, however without ablation, most glaciers would experience a far slower rate of movement.

<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 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> </ul>

	<ul style="list-style-type: none"> <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>
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Question number	Answer	Mark
3(a)(i)	<p style="text-align: center;"><b>A03 (1 mark)</b></p> <p style="text-align: center;">Award <b>1</b> mark for the correctly identified type of landscape.</p> <ul style="list-style-type: none"> <li>• A – Upland Relict ❶.</li> </ul> <p>C is incorrect because the landscape is not active. A is incorrect because the landscape is not active, or a lowland. B is incorrect because the landscape is upland, not lowland.</p>	(1)

Question number	Answer	Mark
3(a)(ii)	<p style="text-align: center;"><b>A03 (1 mark)</b></p> <p style="text-align: center;">Award <b>1 mark</b> for a correctly identified landform.</p> <ul style="list-style-type: none"> <li>• Corrie / Cirque / Lake / Glacial lake ❶.</li> </ul> <p>Accept any other reasonable response.</p>	(1)

Question number	Answer	Mark
3(a)(iii)	<p style="text-align: center;"><b>AO3 (3 marks)</b></p> <p>Award <b>3 marks</b> for sensible descriptions about the varying angle of terrain.</p> <ul style="list-style-type: none"> <li>• There is a gentle and rounded wall close to the lake ❶ flat corrie lake ❶ surrounded by a steep and straightened backwall ❶</li> </ul> <p>Accept any other reasonable response.</p>	(3)

Question number	Answer	Mark
3(a)(iv)	<p style="text-align: center;"><b>AO3 (4 marks)</b></p> <p>Award <b>1 mark</b> for identifying a decision that would have been made, and a <b>further 1 mark</b> for justification of why it is important for conducting fieldwork in this environment.</p> <ul style="list-style-type: none"> <li>• How many corries / landforms to measure ❶ because they might be located too far apart / be too many to measure all the backwalls within the time allocated / weather conditions might limit access to some corries ❶</li> <li>• Whether there is sufficiently good road/path access ❶ to make the corries accessible safely ❶</li> <li>• Whether any rockfalls or landslides might be possible ❶ which would limit access to the landforms being measured ❶.</li> </ul> <p>Accept any other appropriate response.</p>	(4)

Question number	Assess the effectiveness of the techniques you used to present and analyse your fieldwork data. Answer
3(b)	<p style="text-align: center;"><b>AO3 (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><b>Indicative content guidance</b></p> <p>Content depends on students' choice of research question. Presentation and analysis could include some the following:</p> <ul style="list-style-type: none"> <li>• GIS may form both aspects of presentation and analysis, depending on the nature of the software and its application, e.g. Google Earth (Visualisation) vs ArcGIS Online (analysis).</li> <li>• The efficacy of data presentation aids aspects of interpretation and meaning in the results; poor selection of presentation methods can mislead or skew the message from the data / information.</li> <li>• Appropriate data analysis should be used as a tool(s) to help take meaning from the data, including measures of validity and reliability – for example statistical tests might be appropriate if graphical analysis is inconclusive.</li> <li>• This can include quantitative and qualitative techniques. Analysis can include both qualitative (e.g. coding, photo annotation) as well as more usual statistical measures: modes, means, medians, interquartile ranges etc.</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>	
Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-3	<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>
Level 2	4-6	<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>
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<b>Question number</b>	<b>Evaluate the view that the risks from tectonic activity in Villarrica National Park outweigh those from glacial processes.</b> <b>Answer</b>
<b>4</b>	<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. 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>Volcanic tectonic hazards include lava flows, pyroclastic flows, ash falls, gas eruptions and secondary hazards such as lahars.</li> <li>Glacial environment in Villarrica is high altitude, with accumulation and ablation affected by ash which absorbs solar radiation. Over the long-term, the glaciers are shrinking.</li> <li>Threats to glaciers because of climate change include avalanches and potential glacial outburst floods, whilst threats to glacial landscapes come from leisure and tourism and might result in soil erosion.</li> <li>Risk is being managed through a range of strategies that follow the hazard management cycle.</li> <li></li> </ul> <p><b>AO2</b></p>

Question number	<p><b>Evaluate the view that the risks from tectonic activity in Villarrica National Park outweigh those from glacial processes.</b></p> <p><b>Answer</b></p>
	<ul style="list-style-type: none"> <li>• <b>Tectonic hazards outweigh the glacial threats</b> because of the relatively high frequency of eruptions compared to glacial threats. Villarrica is a volcano on a destructive plate boundary so is likely to be a composite volcano which erupts infrequently but perhaps explosively, which in the past has caused significant number of deaths (Figure 4b)</li> <li>• The threats from volcanic eruptions cover a larger area, and would be difficult to manage because response infrastructure might well be compromised (Figure 4b), whilst those in from glacial hazards are more localised.</li> <li>• A greater range of management strategies employed for tectonic hazards suggests that Park Authorities believe that they are the greater threat, however, there are suggestions of hazard fatigue, and response to volcano evacuations were very calm; suggesting the general public do not share the same sense of danger (Figure 4a, 4c)</li> <li>• Glacial threats seem to be less severe than tectonics, warranting the development of ski resort on the mountain slopes, however this was closed in 2016 following avalanche events (Figure 4b, 4c)</li> <li>• <b>Glacial threats outweigh the tectonic hazards</b> because the most recent volcanic eruption itself resulted in no deaths, however the resulting mudslide caused infrastructure damage (Figure 4b) and the time taken for clean-up is significant, combined with similar events across the Rockies (Figure 4a)</li> <li>• Glacial melt processes are more long-term with increasing rates of surface loss. However, one of the causes of this loss is ash from volcanic eruptions. (Figure 4b)</li> <li>• Long-term melting of ice could disrupt the ski industry, representing economic risk, so whilst the danger caused by tectonic activity is more immediate, it is short-term; the damage to tourism is irrecoverable</li> <li>• The range of management strategies for tectonic hazards is much broader and includes better access to technology than those for glacial – the latter limited to preventing access to the park (Figure 4a)</li> </ul> <p><b>Tectonic hazards lead to glacial threats because</b></p> <ul style="list-style-type: none"> <li>• Ash/debris mix with glacial meltwater to make lahars which take advantage of river valleys,</li> <li>• Ash from the volcano is change the glacial mass balance on the sides of the volcano</li> <li>• However glacial threats do not trigger or cause tectonic hazards.</li> </ul>

<b>Question number</b>	<b>Evaluate the view that the risks from tectonic activity in Villarrica National Park outweigh those from glacial processes.</b> <b>Answer</b>
	Judgements and conclusions might be based around whether tectonics hazards are a more serious threat to the tourist industry surrounding Villarrica. Ultimately, the tectonic hazards are more serious and higher frequency, however the management strategies are more effective. More recent loss of life and disruption to life has come from glacial hazards. Most are likely to conclude that the tectonics pose the bigger threat, if indeed the better managed.

<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 connections/relationships to produce a full and coherent interpretation that is supported by evidence. (AO2)</li> <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>

<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
<b>5(a)</b>	<p style="text-align: center;"><b>AO1 (1 mark)</b></p> <p>Award <b>1</b> mark for a correct definition of eustatic:</p> <ul style="list-style-type: none"> <li>• Global (sea-level change) ❶</li> <li>• Sea-level change caused by ice formation / melting, thermal change) ❶</li> </ul> <p>Accept any other reasonable response.</p>	<b>(1)</b>

Question number	Answer	Mark
5(b)(i)	<p style="text-align: center;"><b>AO3 (2 marks)</b></p> <p>Allow <b>1</b> mark for correctly calculating the t-test statistic.</p> <ul style="list-style-type: none"> <li>Calculating the t-test statistic  <math>13/3.4 = 3.8</math> ❶</li> </ul>	<b>(1)</b>

Question number	Answer	Mark
5(b)(ii)	<p style="text-align: center;"><b>AO3 (2 marks)</b></p> <p>Allow <b>1</b> mark for the correctly selected significance level.</p> <ul style="list-style-type: none"> <li>Significance level = 0.01 ❶</li> </ul> <p>(NB - not 0.001)</p>	<b>(1)</b>

Question number	Answer	Mark
5 (b)(iii)	<p style="text-align: center;"><b>AO1 (2 marks)/AO2 (1 mark)</b></p> <p>Award <b>1</b> mark for suggesting a reason for the differences with a further <b>2</b> extension marks to explain that means stones are different size:</p> <ul style="list-style-type: none"> <li>Storm waves ❶ carry larger material further / are the only waves strong enough ❶ to deposit larger material at the back of the beach ❶</li> <li>Longshore drift transports more pebbles on the nearshore ❶ because they are likely to be in more contact with waves / exposed to marine processes ❶ causing more sorting / eroding them more / leaving small pebbles ❶.</li> </ul> <p>Accept any other appropriate response.</p>	<b>(3)</b>

Question number	Answer	Mark
5(c)	<p style="text-align: center;"><b>AO1 (4 marks)</b></p> <p>For each reason, award <b>1</b> mark for identifying a way that coastal recession is significant and a further mark expansion explaining who/why this is significant for, up to a maximum <b>2</b> marks each. For example:</p> <ul style="list-style-type: none"> <li>• Housing can be threatened / undermined by erosion <b>1</b> creating insurance problems for homeowners / homelessness <b>1</b></li> <li>• Businesses / tourism can be threatened / undermined by erosion / reliant on stakeholders who have moved out <b>1</b> and must fund the cost of relocation <b>1</b></li> <li>• Agricultural land / scenic landscapes can be threatened / undermined <b>1</b> forcing farmers / business owners to pay to relocate crops / animals / buildings <b>1</b></li> <li>• Infrastructure can be destroyed / threatened / undermined <b>1</b> cutting off access for rural communities / raising council taxes to pay for repairs <b>1</b></li> </ul> <p>Accept any other reasonable responses</p>	<b>(4)</b>

Question number	Using a named example, explain the sediment cell concept.	
	Answer	
5(d)	<p style="text-align: center;"><b>AO1 (6 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><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> <ul style="list-style-type: none"> <li>• Sediment cells are stretches of coastline where the movement of material is mainly self-contained.</li> <li>• Material becomes part of a sediment cell through coastal erosion processes, e.g. attrition, hydraulic action, abrasion and corrosion.</li> <li>• Coastal transport processes transport material along the coastline either because of littoral drift, or currents, or the wind (saltation).</li> <li>• Large natural barriers might prevent the transfer of sediment – e.g. the Thames Estuary, or Llyn Peninsula in Wales - with sediment deposited</li> </ul>	

	<p>on land in the form of beaches, or offshore stores and submarine canyons</p> <ul style="list-style-type: none"> <li>• The combination of processes and other factors will result in the named example either having a closed or open sediment cell system.</li> <li>• Sediment cells are often closed systems – in the named example, sediment might not be transported from one cell to another. Although tidal currents might cause material to be lost (an open system).</li> <li>• Coastal erosion, e.g. of named cliff faces / headlands, produces sediment, and other sediment enters the cell from rivers, lagoons or offshore transport from other sediment cells.</li> <li>• If no example named, the answer is unlikely to go out of level 2.</li> </ul> <p>Accept any other reasonable response. Likely examples might include along the Flamborough Head coastline, or within Start Bay, or Christchurch Bay (leading to Hurst Spirt).</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 importance of subaerial processes in contributing to the rate of coastal recession. 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. Responses that demonstrate <b>only</b> AO1 without any AO2 should be awarded marks as follows:</p>

Question number	<b>Assess the importance of subaerial processes in contributing to the rate of coastal recession.</b> <b>Answer</b>
	<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>• Subaerial processes include weathering, mass movement and rock-breakdown processes.</li> <li>• Coastal recession can refer to rapid coastal retreat and could be caused by both physical (geological and marine) factors but also human actions (dredging or coastal management).</li> <li>• The rate of recession is measured on both short- and long-term scales, e.g. wind direction, tides, seasons, weather systems and storm occurrence – suggesting different processes make different contributions.</li> <li>•</li> </ul> <p><b>AO2</b></p> <ul style="list-style-type: none"> <li>• <b>Subaerial processes are important</b> because weathering causes rock to breakdown and the cliff/rock structure to be substantially weakened. However, this still requires the material to be taken away and deposited elsewhere, e.g. on the beach</li> <li>• Subaerial processes can operate in all marine and atmospheric conditions, but the rate of breakdown is determined by those same factors, e.g. mechanical weathering is more likely in wet/cold environments (e.g. freeze-thaw) whilst biological is more important in wet/warm environments.</li> <li>• Subaerial processes can slow the rate of recession as slumped/collapsed material is deposited at the base of a cliff and can absorb wave energy for some time.</li> <li>• Mass movement is a significant aspect of coastal retreat – e.g. Southerndown cliff slumping results in the recession of the cliff-top. However, this tends to be associated with storm-events and/or high-tide.</li> <li>• <b>Subaerial processes are not the only important factor</b> because rates of recession tend to be higher because of the combination of weather systems, storm, tides, season – e.g. UK Winter storms.</li> </ul>

Question number	Assess the importance of subaerial processes in contributing to the rate of coastal recession. Answer	
	<ul style="list-style-type: none"> <li>• There are other factors that influence the rate of recession, e.g. rock type, rock structure. However, subaerial processes can, over time reduce rock strength and allow the sea to exploit rock structure.</li> <li>• Tectonics plays a large role in shaping the rate of coastal recession, e.g. faulting, folding exposes different types of rock layers to the sea. Equally this accelerates the exposure of rock to weathering agents, and can accelerate the process of mass movement (e.g. seaward/landward dip)</li> <li>• Tectonic movement can also cause isostatic sea-level change as a result of uplift/lowering as a result of tectonic movement or isostatic adjustment. or sea level rise/fall – for example. uplift can limit recession as sea no longer reaches cliff etc</li> <li>• <b>Subaerial processes are responsible for other characteristics of coastline besides coastal recession</b>, e.g. on emergent coastlines, they can result in unique landscapes (e.g. salt-crystallisation in Eaglehawk Neck in Tasmania) – where proximity to the sea is an important factor determining which sub-aerial processes are at work.</li> </ul> <p>Judgements might be based around whether subaerial processes significantly affect the rate of cliff recession. They are likely to other factors are more important but that sub-aerial processes are always operating in combination with e.g. tectonics / climate. Some candidates might note that subaerial processes are long-term ways to exploit exposed cliff faces, but that recession of any coastline is a unique combination of factors – where subaerial processes might indeed play a significant role.</p>	
Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–4	<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</li> </ul>

Question number	Assess the importance of subaerial processes in contributing to the rate of coastal recession. Answer	
		about the significance of few factors, leading to an argument is unbalanced or lacks coherence. (AO2)
<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 (1 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>• A- Rocky and Concordant ❶</li> </ul> <p>B is incorrect because there is a long cliff face, suggesting a concordant coast</p> <p>C + D are incorrect because the cliff face suggests it is a rocky coast.</p>	(1)

Question number	Answer	Mark
6(a)(ii)	<p style="text-align: center;"><b>AO3 (1 mark)</b></p> <p style="text-align: center;">Award <b>1 mark</b> for a correctly identified landform.</p> <ul style="list-style-type: none"> <li>• Cliff ❶</li> <li>• Wave cut platform ❶</li> <li>• Wave cut notch ❶</li> <li>• Cave ❶</li> <li>• Headland (steep sided) ❶</li> <li>• Beach ❶</li> <li>• Bay ❶</li> </ul> <p>Accept any other reasonable response.</p>	(1)

Question number	Answer	Mark
6(a)(iii)	<p style="text-align: center;"><b>AO3 (4 marks)</b></p> <p style="text-align: center;">Award <b>3 marks</b> for sensible descriptions about the varying angle of terrain.</p> <ul style="list-style-type: none"> <li>• There is a wide and flat wave-cut platform ❶ in front of the cliff, which is a steep slope ❶ at the end of relatively higher but flat land ❶.</li> </ul>	(3)

Question number	Answer	Mark
	Accept any other reasonable response.	

Question number	Answer	Mark
6(a)(iv)	<p style="text-align: center;"><b>AO3 (4 marks)</b></p> <p>Award <b>1</b> mark for identifying a decision that would have been made, and a <b>further 1 mark</b> for justification of why it needed to be made.</p> <ul style="list-style-type: none"> <li>• How many locations along the cliff to measure ❶ because they might be located too far apart / be too many to measure all the backwalls within the time allocated / tide-times ❶.</li> <li>• What time to start/finish data collection by ❶ because high-tide might trap / limit access ❶.</li> <li>• Whether there is sufficiently good road/path access ❶ to make the wave-cut platform accessible safely ❶.</li> <li>• Whether any rockfalls or landslides might be possible ❶ which would limit access to the landforms being measured ❶.</li> </ul> <p>Accept any other appropriate response.</p>	(4)

Question number	Assess the effectiveness of the techniques you used to present and analyse your fieldwork data. Answer
6(b)	<p style="text-align: center;"><b>AO3 (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. Content depends on students' choice of research question. Presentation and analysis could include some the following:</p>

	<ul style="list-style-type: none"> <li>• GIS may form both aspects of presentation and analysis, depending on the nature of the software and its application, e.g. Google Earth (Visualisation) vs ArcGIS Online (analysis).</li> <li>• The efficacy of data presentation aids aspects of interpretation and meaning in the results; poor selection of presentation methods can mislead or skew the message from the data / information.</li> <li>• Appropriate data analysis should be used as a tool(s) to help take meaning from the data, including measures of validity and reliability - for example statistical tests might be appropriate if graphical analysis is inconclusive.</li> <li>• This can include quantitative and qualitative techniques. Analysis can include both qualitative (e.g. coding, photo annotation) as well as more usual statistical measures: modes, means, medians, interquartile ranges etc.</li> </ul> <p>All judgements are likely to be partial and tentative given the limited range of primary sources used.</p> <p style="text-align: center;">Do not accept fieldwork contexts for Regenerating Places and Diverse Places.</p>
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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>

Level	Mark	Descriptor
Level 3	7-9	<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 view that the risks from tectonic activity in Bali outweigh those from coastal process. 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. 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>Volcanic tectonic hazards include lava flows, pyroclastic flows, ash falls, gas eruptions and secondary hazards such as lahars.</li> <li>Destructive plate boundaries have subduction zones, which can cause sub-marine earthquakes that often lead to ground shaking, liquefaction and landslides and sometimes tsunamis.</li> <li>Coastal environment in Bali is subject to flooding because of global sea level rise, low-lying, tropical cyclones and has seen some dramatic short-term impacts. Climate change creates further uncertainty.</li> </ul>

Question number	<p><b>Evaluate the view that the risks from tectonic activity in Bali outweigh those from coastal process.</b></p> <p><b>Answer</b></p>
	<ul style="list-style-type: none"> <li>• Risk in Bali focuses on economic losses (housing, tourism and infrastructure), as well as social losses (relocation, loss of livelihood for local groups, and amenity value of the beautiful sandy coastline).</li> <li>• Risk is being managed through a range of strategies that follow the hazard management cycle.</li> </ul> <p><b>AO2</b></p> <p><b>Tectonic hazards outweigh the coastal risks because</b></p> <ul style="list-style-type: none"> <li>• the scale of the impact of the Mt Agung eruption in 2017, which had substantial economic disruption, together with landslides in Songam village – where lives were lost.</li> <li>• The areal extent of the volcanic eruption seems to be far wider, including not just the 10km evacuation zone, However, the coastal impacts on villages, while localised, are likely to be spread around the whole island.</li> <li>• There seems to have been more investment into managing the tectonic hazards – better technology used for computing modelling, and involvement of the government in searching for survivors in Songam (Fig 7a, 7b). However, the government has also started to take strong steps to tackle the problems of coastal erosion (Fig 7a), but these are untested.</li> <li>• Mt Agung is one of two major volcanoes on Bali (the other is Mt. Batur) – both are on a destructive plate boundary so are likely to be a composite volcano which erupts infrequently but perhaps explosively, which in the past has caused significant number of deaths (Introduction)</li> <li>• The tsunami warning sign (Fig 7c) is a reminder that Bali is vulnerable to other hazards that would cause particular damage to dense coastal infrastructure, particularly that found in the south of the island, closest to the plate boundary (Fig 7b). However Bali, by its very nature as an island, is therefore more vulnerable to some coastal threats, and the tsunami early warning system does not seem to be maintained – equally removed of coastal sediment creates further risk to villages.</li> <li>• Tectonic hazard management seems to only focus on preparedness and response, with little evidence of attention paid to other phases of the hazard management cycle – either first two stages are very effective, or little is being done to limit the potential risk from an eruption in the future (little mitigation). Fig. 7c suggests government response for local people continues to be less effective.</li> </ul> <p><b>Coastal risks outweigh the tectonic risks because</b></p> <ul style="list-style-type: none"> <li>• The range, type and scale of management for coastal risks is substantially smaller – some might note there is no evidence of Integrated Coastal Zone Management. And whilst tectonic management is more targeted, Fig. 7, the risk is more focussed spatially, and in time.</li> </ul>

Question number	Evaluate the view that the risks from tectonic activity in Bali outweigh those from coastal process. Answer	
	<ul style="list-style-type: none"> <li>• Long-term change seems to be continuing, if not increasingly, along the coast, with particular damage to coastal infrastructure from storm surges and tidal surges – there is little evidence of management strategies to tackle these threats (Fig. 7a).</li> <li>• The risks to the coastline potentially cause catastrophic long-term harm to the island’s economy, dependent on beach tourism in the central south (Fig 4c) – also where the biggest threats seem to be from long-term climate change.</li> </ul> <p><b>Tectonic hazards lead to coastal threats because</b></p> <ul style="list-style-type: none"> <li>• EQ can trigger tsunami events and could trigger landslides that might happen on the coast. Volcanoes and EQ could combine with tropical cyclones to create mega-disasters.</li> <li>• However, it is very unlikely that coastal threats will trigger tectonic events.</li> </ul> <p>Judgements and conclusions might be based around whether tectonic hazards are a more serious threat to the tourist industry on Bali. Ultimately, the tectonic hazards have a higher social and economic impact, but the long-term danger from coastal change is growing and increasing significant. Both threats are poorly managed from the perspective of island residents, with significantly more management of tectonic events. Most are likely to conclude that the tectonics pose the bigger threat but equally are the better managed.</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>

Question number	Evaluate the view that the risks from tectonic activity in Bali outweigh those from coastal process. Answer	
<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 connections/relationships to produce a full and coherent interpretation that is supported by evidence. (AO2)</li> <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> </ul>

<b>Question number</b>	<b>Evaluate the view that the risks from tectonic activity in Bali outweigh those from coastal process.</b>	
	<b>Answer</b>	<ul style="list-style-type: none"><li>• Argument comprehensively and meaningfully synthesises geographical ideas from across the course of study throughout the response. (AO2)</li></ul>

