GCE AS MARKING SCHEME

SUMMER 2024

AS
GEOGRAPHY - COMPONENT 1
B110U10-1

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About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

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GCE AS GEOGRAPHY COMPONENT 1: CHANGING LANDSCAPES

SUMMER 2024 MARK SCHEME

Guidance for Examiners Positive marking

It should be remembered that learners are writing under examination conditions and credit should be given for what the learner writes, as opposed to adopting an approach of penalising him / her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.
The mark scheme for this component includes both point-based mark schemes and banded mark schemes.

Point-based mark schemes

For questions that are objective or points-based the mark scheme should be applied precisely. Marks should be awarded as indicated and no further subdivision should be made. Each creditworthy response should be ticked in red ink. Annotations must reflect the mark awarded for the question. The targeted assessment objective (AO) is also indicated.

Banded mark schemes

For questions with mark bands the mark scheme is in two parts.
The first part is advice on the indicative content that suggests the range of concepts, processes, scales and environments that may be included in the learner's answers. These can be used to assess the quality of the learner's response. This is followed by an assessment grid advising on bands and the associated marks that should be given in responses that demonstrate the qualities needed in the three AOs, AO1, AO2 and AO3, relevant to this component. The targeted AO(s) are also indicated, for example AO2.1c.
Banded mark schemes are divided so that each band has a relevant descriptor. The descriptor for the band provides a description of the performance level for that band. Each band contains marks. Examiners should first read and annotate a learner's answer to pick out the evidence that is being assessed in that question. Once the annotation is complete, the mark scheme can be applied. This is done as a two-stage process.

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Assessment Objective	Strands	Elements
AO1 Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change, at a variety of scales.	N/A	This AO is a single element.
AO2 Apply knowledge and understanding in different contexts to interpret, analyse and evaluate geographical information and issues.	N/A	1a - Apply knowledge and understanding in different contexts to analyse geographical information and issues.
		1b - Apply knowledge and understanding in different contexts to interpret geographical information and issues.
		1c - Apply knowledge and understanding in different contexts to evaluate geographical information and issues
AO3 Use a variety of relevant quantitative, qualitative and fieldwork skills to: • investigate geographical questions and issues • interpret, analyse and evaluate data and evidence • construct arguments and draw conclusions.	1 - investigate geographical questions and issues	N/A
	2 - interpret, analyse and evaluate data and evidence	
	3 - construct arguments and draw conclusions	

Banded mark schemes Stage 1 – Deciding on the band

Beginning at the lowest band, examiners should look at the learner's answer and check whether it matches the descriptor for that band. Examiners should look at the descriptor for that band and see if it matches the qualities shown in the learner's answer. If the descriptor at the lowest band is satisfied, examiners should move up to the next band and repeat this process for each band until the descriptor matches the answer.

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If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the learner's response should be used to decide on the mark within the band. For instance if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

Banded mark schemes Stage 2 – Deciding on the mark

Once the band has been decided, examiners can then assign a mark. During standardising (marking conference), the qualities of each mark band will be discussed in detail. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

When marking, examiners can use these examples to decide whether a learner's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Indicative content is not exhaustive, and any other valid points must be credited. In order to reach the highest bands of the mark scheme a learner need not cover all of the points mentioned in the indicative content but must meet the requirements of the highest mark band. Where a response is not creditworthy, that is contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

The mark scheme reflects the layout of the examination paper. Mark questions 1 and 2 or 3 and 4 in Section A, all questions in Section B and all questions in Section C. If the candidate has responded to all questions in Section A, mark all these responses. Award the higher marks attained; further, possible rubric infringements will be discussed at the marking conference.

Be prepared to reward answers that give **valid and creditworthy** responses, especially if these do not fully reflect the 'indicative content' of the mark scheme.

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Section A: Coastal or Glacial Landscapes Either: Coastal Landscapes

1. (a) Use **Figure 1 to** describe links between different parts of the coastal system. Content: 1.1.1	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					5		**5**

Indicative content

In a coastal system, inputs, stores, transfers, and outputs are intricately linked, creating a dynamic and interconnected environment.

- **Inputs:** Inputs of sediment from land contribute to changes in coastal landforms through erosion and deposition processes. External factors, such as footpath erosion, precipitation, and cliff erosion, serve as inputs to the coastal system. These inputs influence the stores within the system, including beaches and landforms.
- **Transfers**: Transfers of water, driven by ocean currents and tides, lead to the movement of sediments along the coast. Sediment transfers are a crucial process shaping coastal landforms such as spits, offshore bars and tombolos.
- **Stores:** Land features, such as cliffs, beaches, and estuaries, act as stores that interact with water through processes like erosion, sedimentation, and deposition.
- **Outputs**: Changes in stores or transfers can create feedback loops. For instance, increased sedimentation may alter coastal landforms, influencing the pattern of sediment transfers and in turn altering the shape and size of landforms.
- **Human actions:** Changes in land use, such as urbanisation or deforestation, can alter the quantity and quality of inputs to the coastal system, influencing the stores and transfers. Coastal protection measures can reduce the amount of inputs into the system thus increasing erosion further down the coastline and altering the state of equilibrium.

Credit any other valid points.

Award the marks as follows:

Band	Marks	
3	**4-5**	Clear description and identification of links between different parts of the coastal system. A confident grasp and understanding is shown and well- applied to the resource.
2	**2-3**	Statements are beginning to make links between the different parts of the coastal system. Sound description linked to the resource.
1	**1**	Limited description of links between different parts of the coastal system. Limited use of the resource as a source of data.
	0	No valid comment.

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1. (b) Examine the role that waves play in the formation of beach profiles. Content: 1.1.2, 1.1.3 & 1.1.7	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	7			3			**10**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks.

AO1
Content encompasses knowledge and understanding of the links between different types of wave and beach profiles. Expect candidates to discuss two different types of waves – constructive and destructive.

- Candidates may refer to different wave types and their impact on beach profiles e.g. **constructive** waves have bigger swash than backwash and thus sediment is accumulated giving a gentle beach profile, **destructive** waves have larger backwash and remove more material and thus produce steeper profiles.
- There may be links to **seasonal occurrence** of different wave types and comment on the removal of sediment in winter storms that narrows a beach and vice versa. Some candidates may comment on the production of storm beaches by storm waves that throw large grain sediment to the top of a beach and do not remove it.
- Reference to the overall gradient of the beach, the width of a beach, small scale variations in the profile such as berms and ridge and runnel, seasonal variations in profile or short-term changes in profile in response to storm events.
- **Other factors** that influence beach profiles such as sediment sizes. Shingle beaches typically have a steep gradient (over 10˚) because the waves easily flow through the coarse, porous surface of the beach, decreasing the effect of backwash erosion and causing the formation of a steep profile. Sandy beaches are typically flatter (>5˚) and wider as the smaller particles are evenly distributed and water takes longer to percolate down into the sand, so more sand is removed with the backwash. Linked to this is the geology of the cliff which may influence the size of sediment on a beach and thus its profile. Some candidates may comment on how **human intervention** may influence the profile of a beach by dredging offshore and allowing more destructive waves to become more active or, alternatively, beach nourishment may widen a beach.

AO2
Candidates should demonstrate an application of knowledge and understanding through the examination of the role that waves play in the formation of beach profiles. Responses may include an examination of:

- The relative importance of different wave strength in the formation of beach profiles.
- The extent to which the role of wave strength can vary over time and in different places.
- The extent to which other factors may influence wave strength (e.g. human intervention, geology) and subsequently the beach profile.
- The relative importance of the changing roles over different timescales e.g. seasonal variations in wave power may change a beach profile throughout the year.
- The relative importance of natural and human factors.

Marking guidance

Some responses may use annotated diagrams which should be credited. Credit any relevant case study location. Credit any other valid points.

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Award the marks as follows:		
Band	**AO1 (7 marks)** *Demonstrates knowledge and understanding of how waves influence the formation of beach profiles.*	**AO2.1c (3 marks)** *Applies knowledge and understanding to examine the role of waves in the formation of beach profiles.*
3	**5-7 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge and understanding of constructive and destructive waves. Demonstrates detailed and accurate knowledge and understanding of the links between wave strength and the beach profiles identified. Well annotated sketches / diagrams / maps may also be used and should be credited.	**3 marks** Applies knowledge and understanding to produce a thorough and coherent examination that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent examination of the role of constructive and destructive waves in the formation of one or more beach profiles.
2	**3-4 marks** Demonstrates accurate knowledge and understanding through the use of appropriate and well-developed examples. Demonstrates accurate knowledge and understanding of waves. Demonstrates accurate knowledge and understanding of the links between waves and the beach profiles identified. Sketches / diagrams / maps may also be used and should be credited.	**2 marks** Applies knowledge and understanding to produce a coherent but partial examination that is supported by some evidence. Applies knowledge and understanding to produce a coherent but partial examination of the role of waves in the formation of beach profiles.
1	**1-2 marks** Demonstrates limited knowledge and understanding through a limited number of undeveloped examples. Demonstrates limited knowledge and understanding of waves. Demonstrates limited knowledge and understanding of the links between waves and the beach profiles identified. Basic sketches / diagrams / maps may be used and can be credited.	**1 mark** Applies knowledge and understanding to produce an examination with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited examination of the role of waves in the formation of beach profiles.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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2. (a) Use **Figure 2** to analyse the global pattern of tidal ranges. Skills: 3.2	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					5		**5**

Indicative content

There are patterns that can be identified but spatial awareness is needed for band 3, i.e. an overall sense of significant global variation in tidal ranges experienced on different coastlines.

- The map evidence suggests that the overall pattern of tidal range is generally micro-tidal with a range of less than 2 m. The next most common tidal range is the meso-tidal range, whilst macro-tidal ranges of over 4 m are the least common.
- Micro-tidal and meso-tidal ranges extend over the longest continuous sections of coastline, for example along the northern edge of North America and Greenland and around the east coast of Greenland. Then similarly along much of the northern edge of Russia.
- Almost all areas of tidal ranges in excess of 4 m extend over relatively short stretches of coast and are all bordered by other short stretches of coasts with ranges between 2 and 4m. For example, the equatorial coast in South America and small stretches of the north and east coast of Australia.
- One of the most extensive areas of larger tidal ranges, over 4m extends around the British Isles. This is significantly higher than the tidal range within the Mediterranean Sea.

Credit any other valid points.

Award the marks as follows:		
Band	**Marks**	
3	**4-5**	Clear analysis of global pattern of tidal ranges. Consistent and accurate use of the resource as a source of data to support the analysis. Not all areas of the map need to be described to reach this band.
2	**2-3**	Partial analysis of patterns e.g. of larger and smaller ranges or a clear description of either. Partial use of the resource as source of data to support the analysis.
1	**1**	Simple statements of varying validity. Limited use of the map as a source of data.
	0	No valid comment.

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2. (b) Discuss the view that biotic processes play the most significant role in the formation of **either** mangroves **or** coral reefs. Content: 1.1.6	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	7			8			**15**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks.

AO1
Content encompasses knowledge and understanding of the processes involved in the formation of either mangroves or coral reefs. Both mangroves and coral reefs are influenced by a combination of abiotic (non-living) and biotic (living) factors. Biotic processes include plants, animals, climate change and microbes; important abiotic factors include the amount of sunlight in the ecosystem, the amount of oxygen and nutrients dissolved in the water, proximity to land, depth, and temperature.

Mangroves:
Root Systems and Sediment Accumulation: Mangrove trees have unique adaptations to thrive in saltwater environments. Their complex root systems trap and accumulate sediments, promoting soil stability and the establishment of new vegetation. This process is fundamental to the expansion and formation of mangroves.
Decomposition and Nutrient Cycling: Biotic processes, particularly microbial decomposition of organic matter, contribute to nutrient cycling in mangroves. Decomposition releases essential nutrients into the soil, fostering a nutrient-rich environment that supports the growth of mangrove vegetation. This biotic interaction is vital for the overall health and sustainability of mangrove ecosystems.

Coral Reefs:
Coral Growth and Reef Building: Coral reefs are primarily formed through the biotic processes of coral polyps. These tiny organisms secrete calcium carbonate skeletons, and over time, these skeletons accumulate, forming the intricate structures of coral reefs. The continuous growth and reproduction of coral colonies are essential for the expansion and maintenance of coral reefs.
Symbiotic Relationships: Coral reefs thrive through symbiotic relationships, particularly with zooxanthellae, photosynthetic algae living within coral tissues. This mutualistic association enhances coral resilience, as zooxanthellae provide corals with nutrients and contribute to the vibrant colours seen in the formation of healthy coral reefs. The formation of coral reefs is deeply interconnected with the well-being of the diverse organisms that inhabit them.

Responses are likely to be supported by specific examples, e.g. shrimp farming (Indonesia), conservation of the Great Barrier Reef. Credit also knowledge and understanding of **abiotic factors** influencing the formation of mangroves or coral reefs.

AO2
Content encompasses the application of knowledge and understanding to evaluate the relative importance of biotic processes in the formation of the chosen landform. Approaches may include a discussion of:

- How biological components contribute substantially to the structure, resilience, and functionality of mangroves and coral reefs.
- The relative importance of abiotic factors e.g. the importance of sunlight as one of the most important abiotic factors. Candidates may also identify how depth may be a more significant factor, and the importance of sufficient light for regular photosynthetic activity. Most marine life inhabits this zone in mangroves and coral reefs.
- The impact of economic activity on the coastline and human intervention in damaging (or restoring) the formation of either mangroves or coral reefs e.g. Bangladesh or GBR.
- How a range of abiotic and biotic processes over time are significant.

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Marking guidance

Those that score well will evaluate the interdependent nature of both biotic and abiotic processes in their chosen coastal environment. In band 3 (AO2) there will be a substantiated conclusion that links clearly to the question.

Credit any other valid points.

Award the marks as follows:

Band	AO1 (7 marks)	AO2.1c (8 marks)
	Demonstrates knowledge and understanding of the processes influencing the formation of mangroves or coral reefs.	*Applies knowledge and understanding to evaluate the extent to which biotic and abiotic processes play a significant role in the formation of mangroves or coral reefs.*
3	**6-7 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge and understanding of the impacts of biotic and abiotic processes at play. Well annotated sketches / diagrams / maps may also be used and should be credited.	**7-8 marks** Applies knowledge and understanding to produce a thorough and coherent discussion that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent discussion of the extent to which biotic and abiotic process influence the formation of mangroves or coral reefs. A substantiated conclusion will be evident.
2	**3-5 marks** Demonstrates accurate knowledge and understanding through the use of appropriate and developed examples. Demonstrates accurate knowledge and understanding of some of the impacts of biotic and abiotic processes and coastal processes. Sketches / diagrams / maps may also be used and should be credited.	**3-6 marks** Applies knowledge and understanding to produce a coherent but partial discussion that is supported by some evidence. Applies knowledge and understanding to produce a coherent but partial discussion of the extent to which abiotic and biotic processes influence the formation of mangroves or coral reefs.
1	**1-2 marks** Demonstrates limited knowledge and understanding through a limited number of underdeveloped examples. Demonstrates limited understanding of some of the impacts of processes on mangroves and coral reefs. Sketches /diagrams / maps may be used and can be credited.	**1-2 marks** Applies knowledge and understanding to produce a discussion with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited discussion of the extent to which abiotic and biotic processes influence the formation of mangroves or coral reefs.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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Or: Glaciated Landscapes

3. (a) Use **Figure 3** to describe links between different parts of the glacial system. Content: 1.2.1	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					5		**5**

Indicative content

A glacial system is a complex and interconnected system with inputs, stores, transfers, and outputs are intricately linked, that work together to form, move, and shape glaciers.

- **Inputs:** Inputs of snowfall accumulate over time, contributing to the growth of the glacier. This accumulation becomes part of the glacier's ice mass.
- **Transfers:** Accumulated snow undergoes internal deformation and transforms into glacial ice. This ice then flows downslope, creating movement (basal sliding) within the glacier.
- **Stores:** The flowing ice constitutes the dynamic store of the glacier's mass as it moves through its internal and basal deformation. Accumulated snow contributes to the growth of the glacier's ice mass. The melting of ice is a reduction in the glacier's ice mass, affecting the overall balance between accumulation and ablation.
- **Outputs:** Glacier meltwater generated from the accumulation becomes an output, either through surface melt or as runoff from the glacier. Meltwater generated from the glacier's ice mass is an output of the system.
- **Human actions:** Human activities can have significant impacts on glacial systems, contributing to changes in glacier behaviour, mass balance, and associated environmental consequences. For example climate change leading to a reduction and glacier retreat, pollution increasing the albedo effect etc.

Credit any other valid points.

Award the marks as follows:		
Band	**Marks**	
3	**4-5**	Clear description and identification of links between different parts of the glacial system. A confident grasp and understanding is shown and well-applied to the resource.
2	**2-3**	Statements are beginning to make links between the different parts of the glacial system. Sound description linked to the resource.
1	**1**	Limited description of links between different parts of the glacial system. Limited use of the resource as a source of data.
	0	No valid comment.

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3. (b) Examine the relative importance of frost weathering and mass movement in the formation of **one or more** periglacial landforms. Content: 1.2.7	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	7			3			**10**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks.

AO1
Candidates should encompass knowledge and understanding of frost weathering and mass movement and the role they play in the formation of periglacial landform(s). The specification identifies a range of periglacial landforms and divides them into those that are formed by ground ice, aeolian, water weathering and mass movement.
The content will depend upon the landform(s) chosen and may include:

- Knowledge and understanding of the frost weathering process.
- Knowledge and understanding of the characteristics of mass movement processes: solifluction/gelifluction, frost creep and rockfalls.
- Knowledge and understanding of how frost weathering and mass movement lead to the formation of periglacial landforms such as nivation hollows, blockfields and scree slopes, protalus ramparts, solifluction terraces and head deposits.
- Knowledge and understanding of other processes such as the action of wind and water, and the role of ground ice in the formation of periglacial landform(s).

AO2
Content encompasses the application of knowledge and understanding to examine the importance of frost weathering and mass movement in the development of periglacial landform(s). Answers may conclude that frost weathering and mass movement have a major part or variable influence on the development of the selected landform(s). Content may vary according to landform(s) selected but may include an examination of:

- The relative importance of frost weathering and mass movement and /or other factors which influence these processes.
- Inter-relationships between frost weathering and mass movement.
- Changes over geographical space in the development of periglacial landform(s)
- Changes over time in the nature of these processes e.g. varying marginal positions of the snowbank producing multiple ridges within a pro-talus rampart.

Marking guidance

Near the lower end, there will be limited examination of frost weathering and mass movement and how they influence the formation of one or more periglacial landforms. Some responses may use annotated diagrams which should be credited.

Credit any other valid points.

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Award the marks as follows:		
	AO1 (7 marks)	**AO2.1c (3 marks)**
Band	Demonstrates knowledge and understanding of the role of frost weathering and mass movement in the formation of one or more periglacial landforms.	Applies knowledge and understanding to examine the relative importance of frost weathering and mass movement in the formation of one or more periglacial landforms.
3	**5-7 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge and understanding role of frost weathering and mass movement in the formation of periglacial landforms. Well annotated sketches / diagrams / maps may also be used and should be credited.	**3 marks** Applies knowledge and understanding to produce a thorough and coherent assessment that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent examination of the role of frost weathering and mass movement in the formation of periglacial landforms.
2	**3-4 marks** Demonstrates accurate knowledge and understanding through the use of appropriate and well-developed examples. Demonstrates mostly accurate knowledge and understanding of the role of frost weathering and mass movement in the formation of periglacial landforms. Sketches / diagrams / maps may also be used and should be credited.	**2 marks** Applies knowledge and understanding to produce a coherent but partial assessment that is supported by some evidence. Applies knowledge and understanding to produce a coherent but partial examination of the role of frost weathering and mass movement in the formation of periglacial landforms.
1	**1-2 marks** Demonstrates limited knowledge and understanding through a limited number of undeveloped examples. Demonstrates limited knowledge and understanding of the role of frost weathering and mass movement in the formation of periglacial landforms. Basic sketches / diagrams / maps may be used and can be credited.	**1 mark** Applies knowledge and understanding to produce an assessment with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited examination of the role of frost weathering and mass movement in the formation of periglacial landforms.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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4. (a) Use **Figure 4** to analyse the pattern of ice thickness change. Skills 3.2	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					5		**5**

Indicative content

- The overall pattern is of loss, but the changes are uneven. The continent is gaining more ice in some areas, for example parts of North Antarctica, and losing it quickly in others e.g. parts of West and Central Antarctica as well as the Antarctic Peninsula.
- The image paints a picture of rapid loss (-3m) around the SW coast (shown in black on the map), far outweighing modest ice-mass gains (shown in light grey and white) farther east and north.
- Dark greys show large average rates of ice loss near the coasts (in excess of 1 or 2m per year), while pale grey and white show smaller rates of ice gain in the interior (Western Antarctica) and North coast (0-1m per year).
- SW and W coastline have experienced the greatest amount of change (small pocket in the SE at Wilkes Land).
- NE coastline has experienced less change than the SW.
- Inland areas have experienced the least amount of change.

Award the marks as follows:		
Band	**Marks**	
3	**4-5**	Clear description of the pattern of ice thickness change. Wide use of the resource as sources of data to support the analysis of the pattern. Not all features are needed to enter this band but there must be a reference to the overall pattern and time element.
2	**2-3**	Some identification of the pattern of ice thickness change with some use of data. Partial use of the resource as source of data to support the description.
1	**1**	Basic interpretation of the pattern of ice thickness change which makes limited use of data and evidence in support.
	0	No valid comment.

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4. (b) Discuss the view that human activity influences glacial landscapes more than physical processes. Content: 1.2.5, 1.2.6, 1.2.8, 1.2.9	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	7			8			**15**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks.

AO1
Content encompasses knowledge and understanding of the influence of human activity and physical processes in glaciated landscape systems.

Human activity includes:
- Resource extraction, such as the oil industry in Alaska.
- The removal of surface vegetation.
- Dam construction in glacial valleys results in trapping of sediment.
- Increases in energy levels below dams leads to higher rates of erosion in extreme conditions e.g. intense rainfall.
- Anthropogenic climate change and its impact on glacial retreat.

Physical processes include:
- The action of processes of glacial weathering, erosion, transportation and deposition on landscapes (past and present).
- Climate (temperature and precipitation) influencing geomorphic processes.
- Geology (lithology and structure) influencing rates of processes and supply of material.
- Latitude and altitude affecting climate and so, indirectly, processes.
- Relief and aspect affecting microclimate and so, indirectly, processes and glacier movement.

AO2
Content encompasses the application of knowledge and understanding to discuss the extent to which human activity influences glaciated landscape systems more than physical processes. Approaches may include a discussion of:
- The extent of the influence of human activity and physical processes and which candidates would consider greater in glaciated landscape systems.
- a consideration of whether the extent of the changes varies in different types of glaciated landscape systems.
- A consideration of the differences between landscape systems with different levels of human activity and different degrees of influence from physical processes.
- A consideration of the significance and/or range of the changes. For example the scale of past glacial processes that has generated today's glaciated landscapes that little human activity can influence on that scale e.g. North Wales or Lake District.
- Disturbance of systems in equilibrium and the resultant positive or negative feedback.
- Changes to processes, material and/or energy flows and the extent to which these are influenced by physical and human processes e.g. whether increased precipitation will affect energy flows in the landscape system as much as in dam construction.
- The significance of the changes to the landscape system as a whole by human activity and physical processes as well as on individual flows and stores e.g. physical factors constantly influence flows when often human activity is targeted at influencing these physical processes.

Marking guidance

In Band 3 (AO2) there will be a substantiated conclusion that links clearly to the question. Near the lower end, there will be limited evaluation. Credit any other valid points.

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Award the marks as follows:		
Band	**AO1 (7 marks)**	**AO2.1c (8 marks)**
	Demonstrates knowledge and understanding of the relationship between human activity and the physical processes influencing the glacial landscapes.	*Applies knowledge and understanding to evaluate the influence of human activity compared with physical processes on glacial landscapes.*
3	**6-7 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge and understanding of the *human activity and the physical processes influencing the glacial landscapes.* Well annotated sketches / diagrams / maps may also be used and should be credited.	**7-8 marks** Applies knowledge and understanding to produce a thorough and coherent discussion that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent discussion on whether human activity influences more or less significantly the glacial landscape than physical processes. A substantiated conclusion will be evident.
2	**3-5 marks** Demonstrates accurate knowledge and understanding through the use of appropriate and developed examples. Demonstrates accurate knowledge and understanding of some of the links between processes and human activity. Sketches / diagrams / maps may also be used and should be credited.	**3-6 marks** Applies knowledge and understanding to produce a coherent but partial analysis that is supported by some evidence. Applies knowledge and understanding to produce a coherent but partial discussion on whether human activity influences more or less significantly the glacial landscape than physical processes.
1	**1-2 marks** Demonstrates limited knowledge and understanding through a limited number of underdeveloped examples. Demonstrates limited understanding of the links between processes and human activity Sketches /diagrams / maps may be used and can be credited.	**1-2 mark** Applies knowledge and understanding to produce an analysis with limited coherence and support from some evidence. Applies knowledge and understanding to produce a limited analysis and discussion of whether human activity is a more significant influence on glacial landscapes than physical processes'
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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Section B: Tectonic Hazards

5. (a) (i) Name a suitable graphical technique to represent the number of deaths shown in **Figure 5**. Skills: 3.6, 3.7	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					1		**1**

Indicative content

Candidates will need to name one graphical technique that is suitable to present data on the number of deaths in **Figure 5**.

Graphical methods could include:

- Bar graphs to display rows or columns
- Pie charts
- Proportional circles
- Dial graph
- Scatter graph / Scatter plot.

Credit any other valid named technique.

5. (a) (ii) Justify your choice of graphical technique in **5** (a) (i). Skills: 3.6, 3.7	AO1	AO2.1	AO2.1	AO2.1	AO3		**Total**
					2		**2**

Indicative content

Candidates will need to justify one graphical technique that is suitable to present the data in Figure 5.

Justification:
One justification point with development will gain 2 marks.

E.g. A bar chart could be used. Using one bar for each country would make patterns clear and easy to identify the countries with the highest and lowest deaths.

Credit any other valid justification.

5. (a) (iii) Calculate the interquartile range for the number of deaths. Show your working. Skills: 2.10	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					3		**3**

Indicative content

Order the data highest to lowest: 426,300,63,32,31,5,3,1,0,0,0 (1)
Median = 5 (1)
Lower quartile = 0, Upper quartile = 63 (1)
IQR = 63-0 = 63 (1)

Award one mark only for just the correct answer where no workings are shown.

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5. (a) (iv) Outline one disadvantage of using the interquartile range when analysing the number of deaths shown in **Figure 5**. Skills: 2.10	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					3		**3**

Indicative content

The IQR shows the spread of data on either side of the median and does not use all the data on the number of deaths shown in Figure 5. As a result, the high incidence of deaths associated with Krakatoa (426) and Mount Merapi (300) are omitted from the calculation. The IQR therefore fails to show extreme values associated with some volcanic eruptions.

5. (a) (v) Name **one** other measure of dispersion that could be used to analyse the number of deaths other than the interquartile range. Skills: 2.10	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					1		**1**

Indicative content

Answer: The range (1) / Standard Deviation (1)

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6. (a) Use **Figure 6** to analyse the relationship between earthquake magnitude and deaths per earthquake. Skills: 3.6	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					5		**5**

Indicative Content

- In general, the number of deaths increases with increasing earthquake magnitude i.e. a positive correlation. Candidates may offer data in support e.g. Latur 1993 Magnitude >6 and deaths 10,000, Sumatra Magnitude 9 Deaths >200,000.
- The relationship is not a perfect positive correlation as there are significant anomalies. Notable negative anomalies with lower deaths than expected e.g. Alaska (1964) Magnitude >9 and c. 100 deaths.
- Credit ability to read logarithmic scale.

Marking guidance

Credit any other valid points.

Award the marks as follows:

Band	Marks	
3	**4-5**	Detailed analysis of the overall trend of the relationship. Clear links made to evidence from the resource and patterns. Accurate lifting of data from resource.
2	**2-3**	Some identification of the pattern of the relationship. Partial use of the resource as source of data and evidence to support the analysis.
1	**1**	Basic interpretation of the relationship which makes limited use of data and evidence in support.
	0	No valid comment.

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6. (b) Explain the characteristics of liquefaction that make it a hazard. Content: 1.3.5	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	6						**6**

Indicative content

- Liquefaction is a secondary impact of a seismic event (earthquake) caused by the initial shaking of the ground.
- Liquefaction generally occurs in saturated soils.
- As the ground shakes soils with a high water content lose their strength and original soil structure. and begin to behave like a fluid.
- The hazard is most significant in areas with sandy soils where the water table is close to the surface.
- In some cases water/'mud' rises through the soil surface and can flow down even gentle slopes potentially causing a localised flooding hazard.
- Where buildings are built directly on to the soil surface with shallow or no foundations they can lean, topple, sink or even collapse causing an obvious hazard for people living/working in or near them.
- If liquefaction occurs suddenly under communications networks, and other infrastructure, there can be sudden disruption/danger to life.

Marking guidance

Credit elaboration in relation to specific hazards, such as traffic accidents and disruption if roads collapse.

Credit any other valid points.

Award the marks as follows:		
Band	**Marks**	
3	**5-6**	Detailed knowledge and understanding of the processes involved. Detailed explanation of the link between liquefaction and hazard with strong use of specialist terminology.
2	**3-4**	Sound understanding is shown with some specialist terminology. Clear risks may be identified but lack development.
1	**1-2**	Partial statements made with limited understanding. Basic description of liquefaction.
	0	No valid comment.

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6. (c) Use **Figure 7** to describe the vulnerability of Napoli to tsunami flooding. Content 1.3.6, 1.3.7	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
					5		**5**

I**ndicative Content**

- Overall coastal and low-lying areas are at the greatest risk of flooding, e.g. Sebeto-Volla Plain (B4 and A5), Chiaia (A2)
- Overall the east side of the bay (Sebeto-Volla Plain) has a very high vulnerability along with Chiaia (approx. 2.5km of coastline) in the west of the Napoli Bay
- Greater risk generally along the coastline with a declining vulnerability inland
- Some areas are not at risk e.g. San Martino Hill (B2)
- Some areas a lower risk compared to the immediate east and west (B3)
- The industrial zone has a very high risk of flooding (A4 and B4)
- Low risk areas (north-inland) 0.5 km from the coastline (B3 and B4).

Marking guidance

Some candidates will drift into explanation, and this should not be credited**.** Credit any other valid points.

Award the marks as follows:		
Band	**Marks**	
3	**4-5**	Detailed description of the quantitative evidence provided. Wide use of the resource as a source of data to support the description of the pattern. Not all features are needed to enter this band but there must be reference to overall pattern.
2	**2-3**	Some identification of the pattern made with some use of data. Partial use of the resource to support the description. Some understanding of the data presented.
1	**1**	Partial statements made with limited understanding of the pattern of vulnerability. Limited use of the resource.
	0	No valid comment.

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7. (a) Examine the role that the type of volcanic eruption can play in contributing to volcanic hazards. Content: 1.3.2, 1.3.3, 1.3.4	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	10			5			**15**

Indicative content:

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks.

AO1

Candidates should demonstrate knowledge and understanding of hazards caused by **different types of eruption** (**explosive/effusive**) and the degree of violence/explosivity at a variety of scales and may include primary and secondary hazards. Associated risk to humans is measured by levels of disruption, number of deaths etc.

Primary

- **Lava flows**: Lava flows can destroy everything in their path but rarely cause injuries/fatalities. Basic (runny, basaltic): cover large distances/areas e.g. in Democratic Republic of Congo, whereas acidic (thick, rhyolitic) is slow moving. Basic lava flows potentially pose more threat to property than human life e.g. Kilauea covering 78km^2 and destroying 200 houses.
- **Pyroclastic flows**: high speed (100km/h) ash, rock and gases. Can destroy everything e.g. El Chichon volcano in Mexico 1982. Instant death through inhalation, 19 killed on Montserrat in 1994.
- **Tephra:** material ejected into the air ranging in size from ash (e.g. 2010, Iceland's Eyjafjallajökull which disrupted air travel; Mt Pinatubo 1991 resulting in a global cooling effect).
- **Volcanic gases:** Toxic gases, silent and invisible threat to humans (CO, CO2, and SO2), Lake Nyos, crater lake, Cameroon 1986 asphyxiation of 1700 people (CO2 emitted from a magma chamber then leaked from under the lake) and 140 asphyxiated after the Mt Merapi eruption.

Secondary

- **Lahars/mudflows:** Ash, soil rock fragments with meltwater caused by an eruption produce fast flowing (50km/h) 'liquid cement' that buries/destroys everything in its path (1984 Colombia, Nevado del Ruiz eruption, town Armero engulfed, 23,000 deaths) also Pinatubo in 1991.
- **Floods:** eruption beneath an ice field or glacier triggers rapid melting e.g. Iceland, floods called jökulhlaups. 1996 eruption of the Grimsvötn volcano caused a peak flow of 50,000 cubic metres /sec. Loss of life is rare as it can be predicted. Also occurred in 2010, when Iceland's Eyjafjallajökull erupted.
- **Landslides:** a common feature of volcano-related ground failure. They are particularly associated with eruptions of relatively high viscosity magma with a large content of dissolved gas. Expect discussion around volcanic landslides (gravity driven) and ground deformation (rising magma bulge).
- **Ocean location:** Tsunamis caused by violent eruption of island volcanoes. Waves at up to 600km/h reach coast and wave height dramatically increases transferring huge amounts of water and energy inland e.g. 1883 Krakatoa in Indonesia – about 36,000 drowned.

AO2

Content encompasses the application of knowledge and understanding to evaluate the role the type of volcanic eruption can play in contributing to volcanic hazards. Approaches could potentially include an examination of:

- How the impact, and therefore the risk, varies according to the type of eruption and subsequent hazards. Some lead to impacts at a wider spatial scale or those which have impacts in the longer-term.
- How, when combined with other physical factors, the impact, and therefore the risk, can be far greater with particular hazards e.g. deaths from lahars (high) compared with lava flows (usually low)

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- How some examples of eruptions point to primary hazards alone causing a higher risk e.g. gases – asphyxiation; ash disruption to air travel (e.g. Iceland 2010) and the subsequent impact on the global economy.
- How the impact of volcanic hazards depends on a range of physical factors such as the nature of the volcanic event combined with human factors such as population density, level of development, governance and the presence (or otherwise) of mitigation strategies.

Marking guidance

Credit any other valid points.

Award the marks as follows:

Band	AO1 (10 marks)	AO2.1c (5 marks)
	Demonstrates knowledge and understanding of the role the type of eruption can play in contributing to volcanic hazards.	*Applies knowledge and understanding to evaluate the significance of type of eruption and the role they play in contributing to volcanic hazards.*
3	**8-10 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge of type of eruption involved in contributing to hazards caused by volcanic eruptions. Well annotated sketches / diagrams / maps may also be used and should be credited.	**4-5 marks** Applies knowledge and understanding to produce a thorough and coherent examination that is supported by evidence and case study examples. Applies knowledge and understanding to produce a strong evaluation of how the type of eruption contributes to the nature of volcanic hazards.
2	**4-7 marks** Demonstrates accurate knowledge and understanding through the use of appropriate and developed examples. Demonstrates accurate knowledge and understanding of the type of eruption involved in contributing to hazards caused by volcanic eruptions. Sketches / diagrams / maps may also be used and should be credited.	**2-3 marks** Applies knowledge and understanding to produce a coherent but partial examination that is supported by some evidence. Applies knowledge and understanding to produce a partial evaluation of how the type of eruption contributes to the nature of volcanic hazards.
1	**1-3 marks** Demonstrates limited knowledge and understanding through a limited number of underdeveloped examples. Demonstrates limited understanding of type of eruption involved in contributing to hazards caused by volcanic eruptions. Sketches /diagrams / maps may be used and can be credited.	**1 mark** Applies knowledge and understanding to produce a limited examination with limited coherence and support from some evidence.
	0 marks Response not creditworthy or not attempted	**0 marks** Response not creditworthy or not attempted

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7. (b) Discuss the view that earthquakes only generate hazards at the local scale. Content: 1.3.1, 1.3.5, 1.3.6	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	7			7			**14**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks.

AO1

Content encompasses knowledge and understanding of how hazards that result from earthquake activity occur at a variety of scales.

- The connections between the processes operative at tectonic plate boundaries and causes of earthquake hazards.
- Hazards generated by earthquakes include ground shaking, liquefaction, landslides and tsunami and include aftershocks.
- The characteristics of earthquake activity: whether shallow or deep focus, its magnitude and geographical location.
- Credit impacts where linked to the physical hazard and expect candidates to compare hazards at a variety of scales.

AO2

Application of knowledge and understanding is used to evaluate whether earthquake activity results in hazards only at the local scale. Synthesis will be demonstrated by the drawing together of evidence to reach a rational conclusion. The evidence could include a discussion of:

- How certain examples of earthquake activity may result in hazards that are concentrated locally.
- How the scale of the hazard varies according to the nature of the hazard, liquefaction, ground shaking and landslides often have a greater impact at the local scale compared to tsunamis which can have an impact at a regional or global scale. For example liquefaction in the Kobe earthquake (1995) was largely restricted to the reclaimed land of the port and the Boxing Day earthquake (2004) and associated tsunami generated hazards which spread around the Indian Ocean (local v regional scale).
- How the magnitude of earthquake activity, with the assertion that the greater the magnitude the more widespread the hazards are likely to be.
- How earthquake activity results in hazards operating over different time scales, initially earthquake activity can have local impacts, but over time these may spread more widely, for example the Boxing Day earthquake (2004) and associated tsunami generated hazards which spread around the Indian Ocean and beyond with northeast Australia experiencing the impact 24 hours after the tsunami was generated.
- How the globalisation means that earthquake events are more likely to have widespread impacts than they did in the past.

Marking Guidance

For band 3 (AO2) candidates should sustain a clear discussion that is developed and convincing with detailed evaluation offering secure judgements. There will be a substantiated conclusion that links clearly to the question.

Credit any other valid points.

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Award the marks as follows:		
Band	**AO1 (7 marks)** *Demonstrates knowledge and understanding of the hazards generated by earthquakes at different scales.*	**AO2.1c (7 marks)** *Applies knowledge and understanding to evaluate whether earthquakes only generate hazards at the local scale.*
3	**5-7 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge of the impacts at different scales. Well annotated sketches / diagrams / maps may also be used and should be credited.	**5-7 marks** Applies knowledge and understanding to produce a thorough and coherent discussion that is supported by evidence. Applies knowledge and understanding to fully evaluate the severity of the impacts at different scales. A substantiated conclusion will be evident.
2	**3-4 marks** Demonstrates accurate knowledge and understanding through the use of appropriate and developed examples. Demonstrates partial knowledge of the impacts at different scales. Sketches / diagrams / maps may also be used and should be credited.	**3-4 marks** Applies knowledge and understanding to produce a coherent but partial discussion that is supported by some evidence. Applies knowledge and understanding to partially evaluate the severity of the impacts at different scales. .
1	**1-2 marks** Demonstrates limited knowledge and understanding through a limited number of underdeveloped examples. Demonstrates limited knowledge of the impacts at different scales. Sketches /diagrams / maps may be used and can be credited.	**1-2 marks** Applies knowledge and understanding to produce a limited evaluation with limited coherence and support from some evidence.
	0 marks Response not creditworthy or not attempted	**0 marks** Response not creditworthy or not attempted

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7. (c) 'Recovery from the impacts of a tectonic event mainly depends on the quality of governance'. To what extent do you agree? Content: 1.3.7, 1.3.8, 1.3.9	AO1	AO2.1a	AO2.1b	AO2.1c	AO3		**Total**
	10			10			**20**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks.

Expect candidates to compare **two or more** tectonic events which will produce a more analytical response. Expect a range of tectonic hazards, for example, earthquakes are much less predictable than either volcanoes or tsunamis, or candidates may approach this by developing 'scale' of hazard e.g. Richter, Mercalli, and VEI etc.

AO1
Content encompasses knowledge and understanding as to the importance of good governance as a factor in the recovery both at a global and local scale and over time.

- High quality governance can occur at a variety of scales from the local to regional (community council), national and to international (UN, NGOs).
- High quality governance is vital in managing the hazard before the event (e.g. drills in Japan, evacuation routes), during the hazard and in the recovery and rehabilitation following the event. It can direct, manage and coordinate in a non-corrupt way and identify the need for outside agency assistance.
- The need for high quality governance can be related to the nature of the hazard in terms of location and scale. The longer and more serious the hazard the greater the need for high quality governance. Localised hazards, some will argue, are more easily managed.
- Candidates may consider **other factors** such as the physical profile of the hazard and human factors such as the location of the hazard (accessibility, population density) the level of development as well as the type of governance. Knowledge and understanding of these other factors is creditworthy, but the focus of the response should be on quality of governance.

AO2
Content encompasses application of knowledge and understanding through an evaluation of the extent to which governance is the most important factor, at both scales, in the recovery phase after a tectonic hazard has occurred. Approaches may include an evaluation of:

- The relative importance of quality of governance and other factors such as the physical profile of the hazard (magnitude, speed of onset) and other geographical factors such as location, population density and level of development.
- The extent to which the quality of governance varies in importance in relation to recovery following different tectonic events.
- The extent to which government quality can change over time or vary across a country (spatial scale) in relation to recovery.

Marking guidance

For band 3 (AO2) candidates should sustain a clear analysis that is developed and convincing with detailed evaluation offering secure judgements. There will be a substantiated conclusion that links clearly to the question.

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Award the marks as follows:		
	AO1 (10 marks)	**AO2.1c (10 marks)**
Band	*Demonstrates knowledge and understanding of the recovery from the impacts of a tectonic event and the quality of governance of the location affected.*	*Applies knowledge and understanding to discuss the extent to which factors other than quality of governance affects recovery from the impacts of a tectonic event'*
3	**7-10 marks** Demonstrates detailed and accurate knowledge and understanding through the use of appropriate, accurate and well-developed examples. Demonstrates detailed and accurate knowledge and understanding of quality of governance and recovery from the impacts of a tectonic event' Well annotated sketches / diagrams / maps may also be used and should be credited.	**7-10 marks** Applies knowledge and understanding to produce a thorough and coherent discussion that is supported by evidence. Applies knowledge and understanding to produce a thorough and coherent discussion of the extent to which quality of governance is the most important factor in the recovery from the impacts of a tectonic event. A substantiated conclusion will be evident.
2	**4-6 marks** Demonstrates accurate knowledge and understanding through the use of appropriate and developed examples. Demonstrates partial knowledge and some understanding of quality of governance and recovery from the impacts of a tectonic event. Sketches / diagrams / maps may also be used and should be credited.	**4-6 marks** Applies knowledge and understanding to produce a coherent but partial discussion that is supported by some evidence. Applies knowledge and understanding to produce a partial discussion of the extent to which quality of governance is the most important factor in the recovery from the impacts of a tectonic event.
1	**1-3 marks** Demonstrates limited knowledge and understanding through a limited number of undeveloped examples. Demonstrates limited understanding of quality of governance and recovery from the impacts of a tectonic event. Basic sketches / diagrams / maps may be used and can be credited.	**1-3 mark** Applies knowledge and understanding to produce a discussion with limited coherence and support from some evidence. Applies limited knowledge and understanding to produce a partial discussion of the extent to which quality of governance is the most important factor in the recovery from the impacts of a tectonic event.
	0 marks Response not creditworthy or not attempted.	**0 marks** Response not creditworthy or not attempted.

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Section C: Challenges in the 21st Century

8. Assess the view that present day processes influence places more than processes operating in the past. Suggested focus: 1.1.7, 1.1.9, 1.2.8, 1.2.9, 1.3.1, 1.3.4, 1.3.6	AO1	AO2.1a	AO2.1b	AO2.1c	AO3.1	AO3.2	**Total**
				10			**10**

Indicative content

The indicative content is not prescriptive and candidates are not expected to cover all points for full marks. Credit other valid points not contained in the indicative content.

Within the answer to question 8, candidates may use Figures 8a, b, and c together with appropriate knowledge and understanding of the connections between different aspects of this area across the whole specification in order to develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.

Much will depend on how the candidate defines 'influence'. This could take several approaches e.g. economic change, social change, physical change, tectonic processes etc. or a combination of several factors.

Figure 8a: Coastline at Hemsby, Norfolk, England.

Candidates may reference the slowing of current marine processes due to human intervention and protection measures and identify the need due to past processes.
Examples from their own place studies of where physical processes have played a role in developing the place. For example the growth of a seaside town on the coast with hotels, gift shops and a pier. Interpretation of the photo to suggest how geology might have contributed to the character of the place e.g. tourism. Candidates could also argue that conditions in the past have allowed the sedimentary rocks to be laid down along with past climatic conditions.

Figure 8b: Glacier mining for gold at Kumtor Mine, Kyrgyzstan.

Candidates may reference glacial retreat and the associated human influences of climate change and mineral extraction. Tourism and past influences creating today's landscapes which enable tourism and therefore the associated protection measures may be explored. Many large valley glaciers in the world are retreating at historically unprecedented rates. Also in the Alps, where warming over the past decades has been more than twice as large as the global mean, all major glaciers have retreated over distances of several kilometres over the past hundred years. The Morteratsch Glacier, Pontresina, Switzerland, is a major touristic attraction. Candidates may also argue that past tectonic activity have been significant in creating the current day landscape e.g. Alps.

Figure 8c: Lava flows at Kilauea volcano, Hawaii.

Candidates are likely to reference past processes in shaping the physical landscape of tectonically active places and strongly influencing the current day economy and tourism industry. Hawaii's recent eruptions have attracted many tourists post Covid and candidates may discuss the relative impacts this has on the 'place'. Expect 2010 Iceland references too and how processes can disrupt not just one place but several (April eruption). Also the potential for the 2021 eruption to revitalise the flagging tourism industry (Covid impact). Candidates may also reference geothermal processes and how the place has utilised this for sustainable power.

Potential synoptic areas (a combination of points/depth of discussion required to enter band 3):

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- Change over time – loss/gain of identity and meaning
- Timescales – short- and long-term
- Scale – use of examples
- Future impacts/changes– Covid impact, coastal protection investment, growth/ decline in tourism.

Marking guidance

Accept any process and do not limit to stimulus included in the photographs provided. Candidates may use the resources, but it is not essential. They will look to discuss the possible social, environmental and economic changes at a variety of scales.

Award the marks as follows:

Band	Marks	AO2.1c (10 marks)
3	**7-10**	Applies knowledge and understanding from across the specification to produce a thorough and coherent evaluation that is supported by evidence. Well-developed synthesis of geographical ideas, concepts and issues from the resources provided and from across the specification and in different contexts, in order to make developed connections. Applies knowledge and understanding from across the specification to suggest how places have, and may, change in the future due to the influence of processes which are operating. Uses accurate and well-developed examples from across the specification.
2	**4-6**	Applies knowledge and understanding from across the specification to produce a coherent but partial evaluation that is supported by some evidence. Partial synthesis of geographical ideas, concepts and issues from the resources provided and from across the specification and in different contexts, in order to make partial connections. Applies knowledge and understanding from across the specification to partially suggest how places have, and may, change in the future due to the influence of processes which are operating. Uses mostly appropriate and developed examples from across the specification.
1	**1-3**	Applies knowledge and understanding from across the specification to produce an evaluation with limited coherence and support from some evidence. Limited synthesis of geographical ideas, concepts and issues from the resources provided and from across the specification and in different contexts, making limited connections. Limited application of knowledge and understanding from across the specification to suggest how places have, and may, change in the future due to the influence of processes which are operating. The response draws upon a limited number of underdeveloped examples from across the specification.
	0	Response not creditworthy or not attempted.

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