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# AS GEOGRAPHY

PAPER 1 PHYSICAL GEOGRAPHY AND PEOPLE AND THE ENVIRONMENT

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Mark scheme

Sample assessment material

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V1.0

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from [aqa.org.uk](http://aqa.org.uk)

## Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

### Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

### Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Qu	Part	Marking guidance	Total marks
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**Section A****Question 1 Water and carbon cycles**

01	1	<p><b>Which sentence describes one impact of climate change upon global precipitation rates?</b></p> <p>B</p>	<p>1</p> <p><b>AO1=1</b></p>
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01	2	<p><b>To what does the carbon budget refer?</b></p> <p>B</p>	<p>1</p> <p><b>AO1=1</b></p>
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01	3	<p><b>Outline potential impacts of farming practices upon the water cycle.</b></p> <p><u>Mark scheme</u></p> <p>Allow 1 mark for each valid point with additional marks for developed points.</p> <p>A variety of farming practices can affect/interrupt the natural water cycle, eg:</p> <ul style="list-style-type: none"> <li>• Irrigation techniques can divert water from rivers, lowering the local river levels (1).</li> <li>• Soil compaction by farming practices increases surface runoff upsetting the dynamic equilibrium of the river system (1).</li> <li>• Deforestation for farming purposes created a variety of issues including: less interception; lower consumption of rainfall by tree roots. This all exacerbates the flood risk by increasing water entering the river system. (1 + 1 for developed point).</li> </ul>	<p>3</p> <p><b>AO1=3</b></p>
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<p>01</p>	<p>4</p>	<p><b>Complete Figure 1 by adding the data shown in Figure 2 below and then analyse the impact of the rainfall upon the discharge.</b></p> <p><u>Mark scheme</u></p> <p>1 mark for two accurate plots for discharge. 1 mark for accurate plot of rainfall.</p> <div data-bbox="343 571 1173 1131"> </div> <p><u>Analysis</u></p> <p>Allow 1 mark for each valid point with additional marks for developed points.</p> <ul style="list-style-type: none"> <li>• The second storm is smaller (in terms of total rainfall) but has a more immediate impact on the discharge (1).</li> <li>• This is evidenced by the lag time to peak discharge – though this is slightly longer, the discharge peak is much higher (1).</li> <li>• This suggests that the impact of the antecedent rainfall from the first storm has filled up stores leading to rapid surface runoff (1).</li> <li>• The speed of return to normal base flow levels appears to be faster following the second storm (1).</li> </ul>	<p>6</p> <p><b>AO3=6</b></p>
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<p>01</p>	<p>5</p>	<p><b>Evaluate the view that human activity is having a greater impact than natural factors on the water cycle.</b></p> <p><b>AO1</b> – Knowledge and understanding of a range of human activities impacting upon the water cycle. Knowledge and understanding of natural factors which affect the dynamic equilibrium.</p> <p><b>AO2</b> – Application of knowledge and understanding to evaluate the relative impact of both human factors and natural variation, where</p>	<p>9</p> <p><b>AO1=4</b> <b>AO2=5</b></p>
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	<p>they inter-relate, and where one influences/exacerbates the other.</p> <p><u>Mark scheme</u></p> <p><b>Level 3 (7 – 9 marks)</b></p> <p><b>AO1</b> – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.</p> <p><b>AO2</b> – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Evaluation is detailed and well supported with appropriate evidence.</p> <p><b>Level 2 (4 – 6 marks)</b></p> <p><b>AO1</b> – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.</p> <p><b>AO2</b> – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Evaluation is evident and supported with clear and appropriate evidence.</p> <p><b>Level 1 (1 – 3 marks)</b></p> <p><b>AO1</b> – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy.</p> <p><b>AO2</b> – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Evaluation is basic and supported with limited appropriate evidence.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Systems concepts and their application to the water cycle inputs – outputs, energy, stores/components, flows/transfers, positive/negative feedback, dynamic equilibrium. This basic understanding of stores and transfers should underpin the response.</li> <li>• Global distribution and size of major stores of water – lithosphere, hydrosphere, cryosphere and atmosphere. These are the four global stores of water. Expect to see reference to human activity and natural processes impacting upon some or all of these stores.</li> <li>• Processes driving change in the magnitude of these stores over time and space, including flows and transfers: evaporation, condensation, cloud formation, causes of precipitation and cryospheric processes at hill slope, drainage</li> </ul>	
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		<p>basin and global scales with reference to varying timescales involved. These are the natural flows and transfers impacting upon the size of the major stores.</p> <ul style="list-style-type: none"> <li>•</li> <li>• Changes in the water cycle over time to include natural variation including storm events, seasonal changes and human impact including farming practices, land use change and water abstraction. This element provides the basis of the evaluation.</li> <li>• The key role of the carbon and water stores and cycles in supporting life on Earth with particular reference to climate. The relationship between the water cycle and carbon cycle in the atmosphere. The role of feedbacks within and between cycles and their link to climate change and implications for life on Earth. This element of the specification applies where the students reference global warming as a major impact of human activity impacting upon the water cycle.</li> </ul> <p>AO2</p> <ul style="list-style-type: none"> <li>• Evaluation – The water cycle is a natural cycle of water between land, ice, oceans and the atmosphere. The cycle is affected by natural events such as droughts and periods of heavy rainfall leading to floods.. It is also affected by human activities. The best responses will note that it is the combination of natural variation and human activity which causes the greatest impacts upon dynamic equilibrium.</li> <li>• Evaluation – There any number of storms events to which students can refer. They may consider diverse and/or connected issues such as el Niño, tropical storms or droughts in the intertropical convergence zone. Whatever the approach it should be acknowledged that it is the natural variation which upsets the dynamic equilibrium. Some may/will go further and consider the impact of the natural variation upon the water cycle, particularly where there is a comparison between human activity and natural variation.</li> <li>• Evaluation – Human factors are potentially wide and varied. Consideration of industrial, agricultural, forestry and construction processes are likely to dominate. Some may make the link between human activity, global warming and resultant changes to the water cycle. This is a legitimate connection between human activity and natural variation.</li> <li>• Evaluation – The best responses will see the connection between human activity and how this can work in conjunction with natural variation to have exacerbated impacts upon the dynamic equilibrium. For example, a storm in a drainage basin will have much greater impacts where deforestation has occurred, or where substantial development exits. These combine to cause significant flooding in drainage basins.</li> </ul>	
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01	6	<p><b>To what extent do you agree that human activity is responsible for permanent changes to the carbon cycle in tropical rainforests?</b></p> <p><b>AO1</b> – Knowledge and understanding of the impact of human activity in rainforests.</p> <p><b>AO2</b> – Application of knowledge and understanding to analyse and evaluate the impact of this human activity and the extent to which change is permanent and that human activity is responsible.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Factors driving change in the magnitude of carbon stores over time and space, including flows and transfers at plant, sere and continental scales. Photosynthesis, respiration, decomposition, combustion, weathering. This element is a fundamental underpinning to the question. Responses need to show an awareness that the natural cycle of carbon is susceptible to change by human activity.</li> <li>• Changes in the carbon cycle over time, to include natural variation and human impact (including fuel extraction and burning, farming practices, deforestation, land use changes). This range of human activity is not exhaustive. The material should be used to show how the carbon cycle can be disrupted by a range of human activity.</li> <li>• The carbon budget and the impact of the carbon cycle upon land, ocean and atmosphere, including global climate.</li> <li>• The key role of the carbon cycle in supporting life on Earth with particular reference to climate. The role of feedbacks within the carbon cycle and its link to climate change and implications for life on Earth. There is where responses can begin to engage with the concept of permanent change.</li> <li>• Human interventions in the carbon cycle designed to influence carbon transfers and mitigate the impacts of climate change. This element allows responses to challenge the statement in the question. These attempts at mitigation offer a counterbalance against the notion of permanent change.</li> <li>• Case study of a tropical rainforest setting to illustrate and analyse key themes in the carbon cycle and its relationship to environmental change and human activity.</li> </ul> <p>AO2</p> <ul style="list-style-type: none"> <li>• Evaluation – The human activity is not really the focus of the question. It is the impact of the human activity and the extent to which this is causing permanent change</li> <li>• Analysis – The human activities are likely to cover issues</li> </ul>	<p>20</p> <p><b>AO1=10</b> <b>AO2=10</b></p>
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		<p>associated with the exploitation of tropical rainforests. Expect to see deforestation for wood, land clearance, transport and settlement. Mining is also likely to feature as an activity causing potentially permanent change to the carbon cycle.</p> <ul style="list-style-type: none"> <li>• Analysis and evaluation – In terms of expanding upon the ‘permanent’ change, expect to see reference to the impact of deforestation on the nutrient cycle in rainforests. Once trees are removed in large numbers the carbon cycle is interrupted. Leaf litter is no longer returned to the ground for decomposition. The humus layer is left exposed to soil erosion as the canopy no longer exists. This further weakens the soil structure due to rainsplash impact. Eroded soil is less capable of sustaining new plant growth once exposed. This process of rainforest desertification can lead to significant damage to carbon cycle. Some may link this to an ensuing lack of convection rainfall, caused by a lack of transpiration. Provided this is clearly linked to the associated difficulties in maintaining a healthy carbon cycle, this is an appropriate approach.</li> <li>• Evaluation – In terms of the notion of permanence, some may argue that the cycle will always return to equilibrium once human activity recedes. It really depends upon the timescales in which the response is pitched. Others may argue that damage is permanent in the sense that, for the foreseeable future, some areas have experienced irreversible loss. Both approaches are valid provided there is clear rationale based upon preceding content.</li> </ul>	
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## Marking grid for Question 1.6

Level/ Mark Range	Criteria/Descriptor
<b>Level 4 (16–20 marks)</b>	<ul style="list-style-type: none"> <li>• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question. (AO2)</li> <li>• Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2).</li> <li>• Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1).</li> <li>• Full and accurate knowledge and understanding of key concepts and processes throughout (AO1).</li> <li>• Detailed awareness of scale and temporal change which is well integrated where appropriate (AO1).</li> </ul>
<b>Level 3 (11–15 marks)</b>	<ul style="list-style-type: none"> <li>• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Generally clear and relevant knowledge and understanding of place(s) and environments (AO1).</li> <li>• Generally clear and accurate knowledge and understanding of key concepts and processes (AO1).</li> <li>• Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).</li> </ul>
<b>Level 2 (6–10 marks)</b>	<ul style="list-style-type: none"> <li>• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1).</li> <li>• Some knowledge and understanding of key concepts, processes and interactions and change (AO1).</li> <li>• Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).</li> </ul>
<b>Level 1 (1–5 marks)</b>	<ul style="list-style-type: none"> <li>• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2).</li> <li>• Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Very limited relevant knowledge and understanding of place(s) and environments (AO1).</li> </ul>

	<ul style="list-style-type: none"> <li>Isolated knowledge and understanding of key concepts and processes.</li> <li>Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies. (AO1).</li> </ul>
<b>Level 0 (0 marks)</b>	<ul style="list-style-type: none"> <li>Nothing worthy of credit.</li> </ul>

**Question 2 Coastal systems and landscapes**

02	1	<b>Which process/activity can lead to isostatic sea level change?</b>  D	1  <b>AO1=1</b>
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02	2	<b>Where do salt marshes tend to develop?</b>  B	1  <b>AO1=1</b>
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02	3	<b>Outline the role of wind in affecting coastal energy.</b>  Allow one mark per valid point with additional credit for development.  <b>AO1</b> – Wind is responsible for the generation of waves as friction occurs at the surface of the water (1). Stronger winds blowing for a longer distance will generate bigger more powerful/destructive waves (d) (1). Wind also affects currents in terms of the direction that wind is blowing in (1). This has a direct bearing upon the potential for longshore drift depending upon the angle that the waves hit the coastline (1).	3  <b>AO1=3</b>
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02	4	<b>Using Figure 3 and Figure 4, assess the extent of the flood risk in the area shown.</b>  <b>AO3</b> – Clear use of <b>Figure 3</b> and <b>Figure 4</b> in interpreting and evaluating the extent of flood risk.  <u>Mark scheme</u>  <b>Level 2 (4 – 6 marks)</b>  <b>AO3</b> – Clear interpretation and evaluation of the quantitative and qualitative evidence provided, which makes appropriate use of data in support. Clear connection(s) between different aspects of the data and evidence.  <b>Level 1 (1 – 3 marks)</b>  <b>AO3</b> – Basic interpretation and evaluation of a geographical issue or question. Basic interpretation and evaluation of the quantitative and qualitative evidence provided, which makes limited use of data and evidence in support. Basic connection(s) between different aspects	6  <b>AO3=6</b>
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		<p>of the data and evidence.</p> <p><u>Notes for answers</u></p> <p>AO3</p> <ul style="list-style-type: none"> <li>• One issue is the scale of the area. The area at risk of flooding is extensive and affects both the estuary itself and the inland waterways. Expect to see assessment of the problems of trying to protect such a vast area. There should be reference to the map and the extent of the area at risk in the estuary itself but also areas to the north and west in particular.</li> <li>• Some may estimate the scale of the flood risk and relate this to the population data.</li> <li>• Some may note the fact that most of the area at risk is rural and reference to the table shows that relatively few are at high risk of flooding. Some may offer calculations within the data.</li> <li>• Another issue related to the extent of the flood risk is found in the settlements in the areas susceptible to flooding. Hull, Immingham and Grimsby may be referred to. Depending upon the scale of the flooding.</li> <li>• Another approach might be to suggest that whilst the areas at risk of flood are very widespread, the relative lack of urban areas suggest relatively low impact on most people living in the catchment. Data may be used to support eg almost 12 million living in the catchment but only 58,000 at high risk of flooding. This data hints at effective management of flooding.</li> <li>• Whatever the approach there must be clear use of both resources in supporting the assessment.</li> </ul>	
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02	5	<p><b>Assess the importance of different sources of energy in the creation of coastal landscapes.</b></p> <p><b>AO1</b> – Demonstrates knowledge and understanding of sources coastal energy. Knowledge and understanding of coastal landscape development.</p> <p><b>AO2</b> – Application of knowledge and understanding to analyse and evaluate how the energy available from different sources has a direct impact upon the emerging landscape.</p> <p><u>Mark scheme</u></p> <p><b>Level 3</b> (7 – 9 marks)</p> <p><b>AO1</b> – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.</p>	<p>9</p> <p><b>AO1=4</b> <b>AO2=5</b></p>
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	<p><b>AO2</b> – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Analysis and evaluation are detailed and well supported with appropriate evidence.</p> <p><b>Level 2</b> (4 – 6 marks)</p> <p><b>AO1</b> – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.</p> <p><b>AO2</b> – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Analysis and evaluation are evident and supported with clear and appropriate evidence.</p> <p><b>Level 1</b> (1 – 3 marks)</p> <p><b>AO1</b> – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy.</p> <p><b>AO2</b> – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis and evaluation are basic and supported with limited appropriate evidence.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Sources of energy in coastal environments: winds, waves (constructive and destructive), currents and tides. Low energy and high energy coasts.</li> <li>• Systems in physical geography: systems concepts and their application to the development of coastal landscapes – inputs, outputs, energy, stores/components, flows/transfers, positive/negative feedback, dynamic equilibrium. The concepts of landform and landscape and how related landforms combine to form characteristic landscapes.</li> <li>• Geomorphological processes: weathering, mass movement, erosion, transportation and deposition.</li> <li>• Origin and development of landforms and landscapes of coastal erosion: cliffs and wave cut platforms, cliff profile features including caves, arches and stacks; factors and processes in their development.</li> <li>• Origin and development of landforms and landscapes of coastal deposition. Beaches, simple and compound spits, tombolos, offshore bars, barrier beaches and islands and sand dunes; factors and processes in their development.</li> <li>• Named low and high energy coastlines are likely to support responses.</li> </ul>	
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		<p>AO2</p> <ul style="list-style-type: none"> <li>• Evaluation – For energy, responses will most likely refer to wind, waves, currents and tides and how these shape the coastline. The key is that responses assess the importance of the energy in the development of the coastal landscape of choice.</li> <li>• Analysis – High energy environments are characterised by strong winds and a large fetch, which generate strong currents and more destructive waves. These waves attack exposed coastlines, usually cliff lined, where the water is deep and the waves can attack unimpeded by shallow water. Expect to see reference to geos, arches, caves, stacks and stumps as characteristic landforms created in these environments. The assessment here should really note the importance of wind in this regard which in turn affects wave power.</li> <li>• Analysis – Some responses may assess the importance of constructive versus destructive waves and link this to the development of associated coastal landscapes. As long as the focus is on the importance of the energy source in the development of the landscape, this is a valid approach.</li> <li>• Analysis – Others may consider the direction of the prevailing wind in assessing importance of sources of energy. Provided other conditions exist at the coastline (such as shallow water and a sediment supply), this may be linked to the development of beaches and spits. Again the wind is the critical factor in the development of this landscape. These low energy environments are characterised by low wind speeds or calm conditions in sheltered environments. Waters tend to be shallow and constructive waves dominate. The swash is more powerful than backwash and sediments are pushed up the beaches in bays. Expect to see reference to beaches and bays. Some may link this to longshore drift and the formation of spits where local factors allow the formation of such features.</li> <li>• Analysis – Tides may also feature as an important energy supply. Responses may consider estuaries and the development of mud flats and salt marshes. Tides may also be linked to prevailing weather conditions and where low pressure and high tides coincide storm surges may cause significant erosion including cliff collapse. This line of reasoning would constitute a more sophisticated response.</li> <li>• Overall evaluation – as long as there is some clear direction provided from preceding content, assessment may consider any energy source as important. Wind should be a strong feature as this is the major driver.</li> </ul>	
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02	6	<p><b>‘Coastal flooding and erosion will become a more common occurrence over the coming decades.’</b></p> <p><b>To what extent do you agree with this view?</b></p> <p><b>AO1</b> – Knowledge and understanding of the causes of flooding and erosion. Awareness of both the natural factors and the human activities which exacerbate flooding and erosion. Knowledge and understanding of approaches to coastal management.</p> <p><b>AO2</b> – Applies knowledge to place and shows understanding of the future focus of the question. Analysis and evaluation of factors affecting coastal erosion and flooding going forward, most notably the impact of sea level change as well as decisions by coastal managers in determining whether (and what type of) intervention should occur. May see human activity and natural factors working in conjunction with each other. Should come to a view on ‘extent’.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Eustatic, isostatic and tectonic sea level change: major changes in sea level in the last 10,000 years. These changes in sea level relative to land should be considered in the context of the question. Whilst isostatic and tectonic may not feature strongly, eustatic should be feature in alternative possible futures.</li> <li>• Recent and predicted climatic change and potential impact on coasts.</li> <li>• The relationship between process, time, landforms and landscapes in coastal settings. This should focus upon the link between processes such as sea level change and its impact upon coastal landscapes. Erosion and flooding may also be considered in this context.</li> <li>• Origin and development of landforms and landscapes of coastal erosion. These must be referred to within the context of the question i.e. to what extent are these erosional features likely to develop further in the future.</li> <li>• Human intervention in coastal landscapes. Traditional approaches to coastal flood and erosion risk: hard and soft engineering. Sustainable approaches to coastal flood risk and coastal erosion management: shoreline management/integrated coastal zone management. This element should feature in balancing the assertion in the question. Management offers the opportunity to mitigate against the likelihood of increasing erosion and flooding.</li> <li>• Case study of a coastal landscape to illustrate and analyse how it presents risks and opportunities for human occupation and development and evaluate human responses of</li> </ul>	<p>20</p> <p><b>AO1=10</b> <b>AO2=10</b></p>
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		<p>resilience, mitigation and adaptation.</p> <p>AO2</p> <ul style="list-style-type: none"> <li>• Analysis and evaluation – Some will take a more physical approach by examining evidence in support of the statement, ie that coastal flooding and erosion are set to become increasing problems. Such approaches will consider issues associated with areas vulnerable to erosion and how this is being exacerbated by coastal management strategies, local geology and local geomorphology. Climate change is also likely to feature in such responses. Here candidates are likely to consider the impact of climate change on sea levels and associated expected changes to weather patterns. Many will argue that these combined issues will impact on both flooding and erosion.</li> <li>• Analysis and evaluation – Responses should consider coastal management as a way of mitigating the impact of erosion and managing flooding. For coastal management, expect to see reference to schemes which involve hard and/or soft engineering. Some may define such terms as part of a brief introduction. Hard engineering is likely to consider groynes, revetments, sea walls and rip rap. Soft engineering is likely to consider beach replenishment, vegetation planting and managed retreat. The distinction is in the way soft engineering attempts to manage flooding and erosion in a more natural and sustainable fashion, working with nature more effectively. Evaluation is likely to consider the effectiveness of the scheme and the cost. Some may evaluate soft versus hard engineering in relation to environmental impact. Managed retreat may also feature as an approach to address the challenges associated with alternative possible futures.</li> <li>• Overall evaluation – This evaluation may acknowledge that the coastline of many countries is likely to become more susceptible to erosion and flooding as a result of predicted sea level change. There may be acknowledgement that action can be taken but that this comes at considerable cost.</li> </ul>	
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**Marking Grid for Question 2.6**

<b>Level/ Mark Range</b>	<b>Criteria/Descriptor</b>
<b>Level 4 (16–20 marks)</b>	<ul style="list-style-type: none"> <li>• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question. (AO2)</li> <li>• Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2).</li> <li>• Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1).</li> <li>• Full and accurate knowledge and understanding of key concepts and processes throughout (AO1).</li> <li>• Detailed awareness of scale and temporal change which is well integrated where appropriate (AO1).</li> </ul>
<b>Level 3 (11–15 marks)</b>	<ul style="list-style-type: none"> <li>• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Generally clear and relevant knowledge and understanding of place(s) and environments (AO1).</li> <li>• Generally clear and accurate knowledge and understanding of key concepts and processes (AO1).</li> <li>• Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).</li> </ul>
<b>Level 2 (6–10 marks)</b>	<ul style="list-style-type: none"> <li>• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1).</li> <li>• Some knowledge and understanding of key concepts, processes and interactions and change (AO1).</li> <li>• Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).</li> </ul>
<b>Level 1 (1–5 marks)</b>	<ul style="list-style-type: none"> <li>• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2).</li> <li>• Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Very limited relevant knowledge and understanding of place(s) and environments (AO1).</li> </ul>

	<ul style="list-style-type: none"> <li>Isolated knowledge and understanding of key concepts and processes.</li> <li>Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies. (AO1).</li> </ul>
<b>Level 0 (0 marks)</b>	<ul style="list-style-type: none"> <li>Nothing worthy of credit.</li> </ul>

**Question 3      Glacial systems and landscapes**

03	1	<b>What is meant by internal deformation?</b>  B	1  <b>AO1=1</b>
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03	2	<b>What is the connection between glacial troughs and hanging valleys?</b>  A	1  <b>AO1=1</b>
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03	3	<b>Distinguish between ablation and accumulation.</b>  Allow 1 mark per valid point with additional marks for developed points (d). <ul style="list-style-type: none"> <li>In relation to valley glaciers, ablation refers to the melting of the ice as the snout reaches temperatures above 0 degrees centigrade (1).</li> <li>This usually occurs in summer months in lower altitudes (d) (1).</li> <li>Accumulation refers to the build-up of snow and ice in a valley glacier, usually at higher altitudes where temperatures are colder (1).</li> <li>When ablation rates exceed accumulation rates, the glacier retreats or shrinks in size and vice versa (1).</li> </ul> Accept the same approach for sheet glaciers.	3  <b>AO1=3</b>
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03	4	<b>With reference to Figure 5, interpret the evidence that this glacier is changing.</b>  <b>AO3</b> – Interpretation makes clear links between glacial retreat and evidence provided in <b>Figure 5</b> . Use and understanding of the map evidence are clear and accurate.  <u>Mark scheme</u>  <b>Level 2 (4 – 6 marks)</b> <b>AO3</b> – Clear interpretation of the quantitative evidence provided,	6  <b>AO3=6</b>
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		<p>which makes appropriate use of data in support. Clear connection(s) between different aspects of the data and evidence.</p> <p><b>Level 1 (1 – 3 marks)</b></p> <p><b>AO3</b> – Basic interpretation of the quantitative evidence provided, which makes limited use of data and evidence in support. Basic connection(s) between different aspects of the data and evidence.</p> <p><u>Notes for answers</u></p> <p>AO3</p> <ul style="list-style-type: none"> <li>• The evidence suggests that the glacier is clearly retreating.</li> <li>• Responses should note that the sandur (outwash plains) are a feature directly associated with the action of deposition from meltwater from a glacier in a state of ablation.</li> <li>• There are a number of meltwater channels emanating from the glacier which suggest it is releasing water. These are mainly found in the south west.</li> <li>• The biggest clue is the date given for key points in the retreat of the glacier. The earliest date appears to be 1990, after which date the glacier has continued to retreat to the last date of 2011.</li> <li>• The most rapid rate of retreat appears to be in the east.</li> <li>• The kame terraces provided further evidence of retreat and the action of meltwater.</li> <li>• Others may point to the marginal meltwater channels as evidence of retreat.</li> <li>• Some may use the scale as evidence of rate of retreat. In some years the rate appears to exceed 20 metres per year.</li> </ul>	
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03	5	<p><b>Analyse the links between climate, process and landform which lead to the formation of periglacial landscapes.</b></p> <p><b>AO1</b> – Knowledge and understanding of the climate, physical processes, environments and landforms where periglacial landscapes develop.</p> <p><b>AO2</b> – Analyses the links and interconnections between climate (and therefore geographical location), process and landforms which contributes to the development of the landscapes.</p> <p><u>Mark scheme</u></p> <p><b>Level 3 (7 – 9 marks)</b></p> <p><b>AO1</b> – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.</p> <p><b>AO2</b> – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of</p>	<p>9</p> <p><b>AO1=4</b> <b>AO2=5</b></p>
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	<p>study are fully developed with complete relevance. Analysis is detailed and well supported with appropriate evidence.</p> <p><b>Level 2</b> (4 – 6 marks)</p> <p><b>AO1</b> – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.</p> <p><b>AO2</b> – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Analysis is evident and supported with clear and appropriate evidence.</p> <p><b>Level 1</b> (1 – 3 marks)</p> <p><b>AO1</b> – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy.</p> <p><b>AO2</b> – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Analysis is basic and supported with limited appropriate evidence.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Periglacial features and processes: permafrost, active layer and mass movement.</li> <li>• Periglacial landforms: patterned ground, ice wedges, pingos, blockfields, solifluction, lobes, terracettes, thermokarst. Characteristic periglacial landscapes.</li> <li>• The relationship between process, time, landforms and landscapes in periglacial landscapes.</li> <li>• Periglacial environments are found in very cold climates, typically near glaciated regions. They are characterised by permanently frozen ground or permafrost. These environments have ground which is frozen for more than two years in a row. The periglacial environment is a cold climate, close to a glacial environment and is subject to intense cycles of freezing and thawing of the ground. Permafrost commonly occurs within periglacial environments.</li> </ul> <p>AO2</p> <ul style="list-style-type: none"> <li>• Analysis – There should be a clear sequence to the response. It is the climate which generates the processes in periglacial environments. In turn these processes develop the landforms which contribute to the landscape. In the sense, climate is the driver, most notably the seasonal variability in temperature.</li> <li>• There should be an awareness that processes that involve the</li> </ul>	
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		<p>freezing, thawing, and movement of water are considered to be periglacial whereas processes associated with the presence of perennially frozen ground are permafrost. Permafrost is therefore closely associated with the periglacial environment and usually permafrost processes take place within a periglacial environment.</p> <ul style="list-style-type: none"> <li>• Periglacial landscapes are characterised by the presence of large quantities of angular, fractured rock. The angular nature of these deposits suggests that the process responsible for the rock fracturing is freeze-thaw action of water (which is linked to seasonal temperature variation). These deposits indicate that the frost weathering process operates over and over again in repeated cycles of freeze-thaw. Repeated thawing allows further fracturing because water is able to fill newly developed cracks. The critical temperature for the development of frost-induced fracturing is believed to be between -4 °C and -15 °C.</li> <li>• Analysis – Expect climate and process (eg frost heave) to link to ice wedges and various periglacial landforms such as patterned ground and pingos.</li> <li>• Analysis – some may also consider the link between climate, the thawing ground, the active layer and the process of solifluction, which leads to the development of lobes.</li> <li>• The key is that there is a clear link between the climate, process and landforms in applying knowledge.</li> </ul>	
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03	6	<p><b>‘The negative impact of human activity on glacial landscapes will increase in future.’</b></p> <p><b>To what extent do you agree with this view?</b></p> <p><b>AO1</b> – Knowledge and understanding of the conditions in glaciated landscapes. Knowledge of measures is most likely to be related to management of human activity and managing glacial retreat. Knowledge and understanding of human responses to change.</p> <p><b>AO2</b> – Application of knowledge and understanding of the conditions in glaciated landscapes and how these create barriers to habitation/ occupation. Application also sees the link between the barriers to occupation and the management approaches. Should come to a view in relation to the question.</p> <p><u>Notes for answers:</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Ablation and accumulation – historical patterns of ice advance and retreat and alternative possible futures (depending upon</li> </ul>	<p>20</p> <p><b>AO1=10</b> <b>AO2=10</b></p>
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		<p>approach taken). Some may refer to increased likelihood of glacial retreat in upland valley glaciers as a result of the impact of human activity.</p> <ul style="list-style-type: none"> <li>• Warm and cold based glaciers: characteristics and development. This depends upon the use of supporting exemplification, but may feature according to geographical location.</li> <li>• Geomorphological processes – weathering: frost action, nivation; ice movement: internal deformation, rotational, compressional, extensional and basal sliding; erosion: plucking, abrasion; transportation and deposition. This element may feature in relation to the focus of the question i.e. that some of the detrimental processes may accelerate in a warmer climate, changing the landscapes in a negative fashion.</li> <li>• The global distribution of cold environments. Some links may be made to the differential impacts in different parts of the world, depending upon latitude, altitude and continentality.</li> <li>• Physical characteristics of cold environments. Climate, soils and vegetation (and their interaction). Some may consider the negative impact of human activity upon ecosystems in glacial environments.</li> <li>• Concept of environmental fragility. Human impacts on fragile cold environments over time and at a variety of scales. Recent and prospective impact of climate change.</li> <li>• Management of cold environments at present and in alternative possible futures. This element may feature in those responses which challenge the assertion in the question i.e. that management may mitigate against the negative impacts of human activity in glacial environments.</li> </ul> <p>Case study of a glaciated landscape to illustrate and analyse how it presents challenges and opportunities for human occupation and development and evaluate human responses of resilience, mitigation and adaptation.AO2</p> <p>Responses may consider upland landscapes which are currently affected by glaciation or previously glaciated. Either approach is legitimate and will affect the direction of the response.</p> <ul style="list-style-type: none"> <li>• Analysis – Expect to see reference to a range of human activities which have had a detrimental impact upon upland present or past glaciated landscapes.</li> <li>• There should be evaluation of the extent to which these activities are sustainable or are leading to decline in environmental quality. Human activities may include agricultural practice, tourism, transport, mining, electricity generation. For example some may refer to HEP schemes in upland glaciated valleys which have led to substantial flooding and loss of land.</li> <li>• Analysis – The impact of climate change is likely to feature as</li> </ul>	
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		<p>a major factor leading to ablation of valley glaciers. The associated issues of flooding and increased erosion are also likely to feature. This is likely to consider the impact of shorter winters, increased snowmelt, reduced accumulation in winter and so on. Others may consider management in the context of the knock on effects of climate change upon the tourist industry.</p> <ul style="list-style-type: none"> <li>• Evaluation – Management depends upon the choice of case study or supporting material. Responses may consider management of the impact of climate change and its impact upon currently glaciated areas. Others may consider much broader issues associated with the climate change agreements and the effectiveness of such initiatives on glaciated landscapes. Responses are likely to consider adaptations and modifications of human activity in response to a changing climate. There should also be an evaluation of the success or otherwise of the management of this human activity. Concepts of sustainability are again likely to feature. Evaluation is likely to consider both on-going challenges and opportunities in managing these environments.</li> </ul>	
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## Marking grid for Question 3.6

Level/ Mark Range	Criteria/Descriptor
<b>Level 4 (16–20 marks)</b>	<ul style="list-style-type: none"> <li>• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2).</li> <li>• Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1).</li> <li>• Full and accurate knowledge and understanding of key concepts and processes throughout (AO1).</li> <li>• Detailed awareness of scale and temporal change which is well integrated where appropriate (AO1).</li> </ul>
<b>Level 3 (11–15 marks)</b>	<ul style="list-style-type: none"> <li>• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Generally clear and relevant knowledge and understanding of place(s) and environments (AO1).</li> <li>• Generally clear and accurate knowledge and understanding of key concepts and processes (AO1).</li> <li>• Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).</li> </ul>
<b>Level 2 (6–10 marks)</b>	<ul style="list-style-type: none"> <li>• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1).</li> <li>• Some knowledge and understanding of key concepts, processes and interactions and change (AO1).</li> <li>• Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).</li> </ul>
<b>Level 1 (1–5 marks)</b>	<ul style="list-style-type: none"> <li>• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2).</li> <li>• Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Very limited relevant knowledge and understanding of place(s) and environments (AO1).</li> </ul>



	<ul style="list-style-type: none"> <li>Isolated knowledge and understanding of key concepts and processes.</li> <li>Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies. (AO1).</li> </ul>
<b>Level 0 (0 marks)</b>	<ul style="list-style-type: none"> <li>Nothing worthy of credit.</li> </ul>

**Section B**
**Question 4 Hazards**

04	1	<b>What is the distinction between primary and secondary impacts arising out of seismic events?</b>  C	1  <b>AO1=1</b>
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04	2	<b>In what conditions do tropical storms tend to develop?</b>  D	1  <b>AO1=1</b>
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04	3	<b>Outline the characteristics of one hazard associated with volcanic eruptions.</b>  <u>Notes for answers</u>  1 mark per valid point with additional marks for developed points (d). <ul style="list-style-type: none"> <li>Pyroclastic flows are created in the midst of a volcanic explosion (1).</li> <li>Plumes of hot gas, ash and dust are forced out of the glacier (up to 1100 °C, (1).</li> <li>The debris moves at very high speed (up to 450 mph) down the sides of the volcano under the force of gravity (1).</li> <li>The scale of the pyroclastic flow can be vast covering 1–10 km<sup>3</sup> (1).</li> <li>The intense heat, poisonous gasses and speed combine to create highly hazardous conditions (d) (1).</li> </ul>	3  <b>AO1=3</b>
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04	4	<b>Calculate the mean and interquartile range for the data set in Figure 6 and interpret your findings.</b>  <b>AO3 – Uses Figure 6 to accurately calculate the mean and interquartile. Interpretation shows clear understanding of the data.</b>	6  <b>AO3=6</b>
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Mark scheme

Mean –  $813,717 / 13 = 62,593.6$  (1 mark)

IQR:

Rank order

Rank	Fatalities
1	320 120
2	228 802
3	88 011
4	88 003
5	33 819
6	21 953
7	21 357
8	6 605
9	1 790
10	1 685
11	712
12	629
13	231

Note: Some may give lowest value as 1. This is acceptable.

UQ  $13 + 1 / 4 = 3.5$  rounded to the 4<sup>th</sup> value in the rank order (1 mark)

LQ  $(13 + 1) / 4 \times 3 = 10.5$  rounded to 11<sup>th</sup> value in the rank order (1 mark)

IQR = 88003 (UQ) – 712 = 87291 (1 mark)

Interpretation:

Max 2 marks

1 mark per valid point with additional marks for developed points.

There is an extremely wide variation in the number of annual fatalities (1). Even with the extremes removed from the IQR, there is still a very large range in the number of fatalities (87299) (d) (1). Some may calculate the mean within the IQR range 21990 – much lower with the extremes removed (1). This suggests that there is little reliability in using central tendency as a mechanism for analysing these data (1).

04	5	<p><b>Evaluate the impact that a tropical storm has had on the character of a place that you have studied and how the storm has affected people’s lived experience of this place after the storm.</b></p> <p><b>AO1</b> – Knowledge and understanding of the impact of tropical storms. Knowledge and understanding of the principles associated with understanding people’s lived experience of place.</p> <p><b>AO2</b> – Application of knowledge of impacts to evaluate the lived experience of the people and the impact upon the character of the place under investigation.</p> <p><u>Mark scheme</u></p> <p><b>Level 3</b> (7 – 9 marks)</p> <p><b>AO1</b> – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.</p> <p><b>AO2</b> – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Evaluation is detailed and well supported with appropriate evidence.</p> <p><b>Level 2</b> (4 – 6 marks)</p> <p><b>AO1</b> – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.</p> <p><b>AO2</b> – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Evaluation is evident and supported with clear and appropriate evidence.</p> <p><b>Level 1</b> (1 – 3 marks)</p> <p><b>AO1</b> – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy.</p> <p><b>AO2</b> – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Evaluation is basic and supported with limited appropriate evidence.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Forms of storm hazard: high winds, storm surges, coastal</li> </ul>	<p>9</p> <p><b>AO1=4</b> <b>AO2=5</b></p>
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		<p>flooding, river flooding and landslides.</p> <ul style="list-style-type: none"> <li>• Impacts of tropical storms: primary/secondary, environmental, social, economic, political.</li> <li>• Impacts and human responses as evidenced by two recent tropical storms in contrasting areas of the world.</li> <li>• The ways in which students' own lives and those of others are affected by continuity and change in the nature of place.</li> <li>• How places may be represented in a variety of different forms.</li> <li>• People's lived experience of the place in the past and at present.</li> </ul> <p>AO2</p> <p>Responses are expected to show an understanding of the impact of a tropical storm. There should be clear recognition of the learning from the changing places unit in assessing the impact of the storm and how this affected the peoples' lived experience and the character of the place. Reciting learned case study material does not constitute AO2. It is the integration of the place study ideas and concepts which allow access to AO2.</p> <ul style="list-style-type: none"> <li>• Evaluation – For example, hurricanes such as Katrina may feature in responses. There should be clear application of knowledge which shows how the impacts left their mark on the people and place. 1800 people died during the event. This caused considerable distress and emotional damage for the people. Many left the area, arguably changing the community character of the place for many parts of Louisiana. The floods exceeded 4 metres in height in some places. To this day, those communities remain uninhabitable, transforming the character of the place.</li> <li>• Evaluation – There was substantial criticism of the response at the Federal Government level. Top officials openly referred to issues associated with race which they felt impeded the response. Many families were forced into large public and commercial buildings such as the Louisiana Superdome. This also left a negative psychological impact on people and their lived experience. Conditions were poor and crime was evident. Many years later the psychological scars remain from this catastrophic event.</li> <li>• Evaluation – Some may consider the perception of the place and how this was represented in the media. This is a legitimate approach. The Superdome received considerable media attention as did criminal activity such as looting. Locals argued that there was simply no choice but to loot in the face such a poor response by the Federal Government.</li> <li>• Overall evaluation – Even today the majority of locals still do not feel that the area has recovered. This is supported by outward migration data, economic losses and community</li> </ul>	
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		<p>perception. This integration of this sort of place data would constitute a more sophisticated response. The character of the place and people's lived experience has suffered immeasurably.</p>	
04	6	<p><b>'The impact of seismic hazards is influenced by the level of development of the place affected.'</b></p> <p><b>To what extent do you agree with this view?</b></p> <p><b>AO1</b> – Knowledge and understanding of a range of seismic hazards. Knowledge of the cause of seismic hazards. Knowledge and understanding of development issues in hazard prone areas.</p> <p><b>AO2</b> – Application of knowledge and understanding to analyse and evaluate the extent to which level of development is a key determinant in the impact of seismic hazards.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Destructive, constructive and conservative plate margins. Characteristic processes: seismicity. This theoretical basis may be used to challenge the theme of the question i.e, that it is tectonic setting which determines scale and impact not economic development.</li> <li>• Hazard perception and its economic and cultural determinants. These factors also contribute to the impact and can be used to either support the assertion or challenge it. It really depends upon the approach taken and the support chosen.</li> <li>• Characteristic human responses – fatalism, prediction, adjustment/adaptation, mitigation, management, risk sharing – and their relationship to hazard incidence, intensity, magnitude, distribution and level of development.</li> <li>• The nature of seismicity and its relation to plate tectonics: forms of seismic hazard: earthquakes, shockwaves, tsunamis, liquefaction, landslides. Nature, forms and potential impacts of natural hazards. This element may be used to challenge the theme of the question.</li> <li>• Spatial distribution, randomness, magnitude, frequency, regularity, predictability of hazard events. Impacts: primary/secondary; environmental, social, economic, political.</li> <li>• Short and long-term responses; risk management designed to reduce the impacts of the hazard through preparedness, mitigation, prevention and adaptation. There are clear links to</li> </ul>	<p>20</p> <p><b>AO1=10</b> <b>AO2=10</b></p>

		<p>development with this element.</p> <ul style="list-style-type: none"> <li>• Impacts and human responses as evidenced by a recent seismic event.</li> </ul> <p>AO2</p> <ul style="list-style-type: none"> <li>• Evaluation – Responses are expected to show awareness of the impact of level of development upon the hazards associated with a seismic event.</li> <li>• Analysis – Recent seismic events show that level of development is clearly a factor determining the severity of impact. In Haiti, the 2010 earthquake caused terrible and severe impacts for the people of this poverty stricken island in the Caribbean. 3 500 000 people were affected by the quake; 200,000 people estimated to have died, 300 000+ people were injured. Over 188 383 houses were badly damaged and 105 000 were destroyed by the earthquake (293 383 in total), 1.5m people became homeless. There is no question that level of development was a factor. The poorly constructed building and infrastructure could not cope with the earthquake. People suffered in the immediate earthquake as buildings collapsed. However people also suffered greatly in the aftermath due to the lack of effective management and a lack of resources to cope with the devastation.</li> <li>• Analysis – Other seismic events, such that causing as the Japanese tsunami in 2011, reveal that level of development is not necessarily significant in understanding the impact of hazards. Japan has a highly developed economy yet the scale of the tsunami overwhelmed the substantial defences of Japan. A tsunami sea wall was already in place along with early warning systems. Despite this, over 20,000 people died.</li> <li>• Evaluation – More sophisticated responses may suggest that the death toll would probably have been much higher had those management strategies not been in place.</li> <li>• Analysis – Responses should go further to consider other factors in determining the scale of impact following a seismic event. Expect management strategies to feature and also some awareness of the physical nature of the hazard. Some earthquakes are so powerful that wherever they strike, major impacts will be felt. The Indian Ocean tsunami may be offered as an event which triggered wide ranging and severe impacts across many countries, not least due to the scale of the event at 9.1 on the Richter Scale.</li> <li>• Analysis – Others may consider local attitudes to hazards such as fatalism, which can have a bearing on the impact of the event. This is a valid approach.</li> <li>• Overall evaluation may acknowledge that level of development does generally impact on the severity of a</li> </ul>	
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		seismic event, but this is only part of the issue. The scale and existing management strategies will also play a part.	
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**Marking grid for Question 4.6**

<b>Level/ Mark Range</b>	<b>Criteria/Destructor</b>
<b>Level 4 (16–20 marks)</b>	<ul style="list-style-type: none"> <li>• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2).</li> <li>• Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1).</li> <li>• Full and accurate knowledge and understanding of key concepts and processes throughout (AO1).</li> <li>• Detailed awareness of scale and temporal change which is well integrated where appropriate (AO1).</li> </ul>
<b>Level 3 (11–15 marks)</b>	<ul style="list-style-type: none"> <li>• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Generally clear and relevant knowledge and understanding of place(s) and environments (AO1).</li> <li>• Generally clear and accurate knowledge and understanding of key concepts and processes (AO1).</li> <li>• Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).</li> </ul>
<b>Level 2 (6–10 marks)</b>	<ul style="list-style-type: none"> <li>• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1).</li> <li>• Some knowledge and understanding of key concepts, processes and interactions and change (AO1).</li> <li>• Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).</li> </ul>
<b>Level 1 (1–5 marks)</b>	<ul style="list-style-type: none"> <li>• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2).</li> <li>• Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Very limited relevant knowledge and understanding of place(s) and environments (AO1).</li> </ul>



	<ul style="list-style-type: none"> <li>Isolated knowledge and understanding of key concepts and processes.</li> <li>Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies. (AO1).</li> </ul>
<b>Level 0 (0 marks)</b>	<ul style="list-style-type: none"> <li>Nothing worthy of credit.</li> </ul>

**Question 5 Contemporary urban environments**

05	1	<b>Counter-urbanisation is:</b>  C	1  <b>AO1=1</b>
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05	2	<b>What is the urban heat island effect?</b>  D	1  <b>AO1=1</b>
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05	3	<b>Outline reasons for the emergence of megacities.</b>  <u>Notes for answers</u>  Allow 1 mark per valid point with additional marks for developed points (d). <ul style="list-style-type: none"> <li>The main driver is historical rural to urban migration – specifically to hub locations within areas of already large populations (1).</li> <li>These places have experienced population growth as the people moving in are workers or child bearing/reproductive age (d) (1).</li> <li>The subsequent drivers include: government policy further fuelling growth (eg in China - setting up of Special Enterprise Zones in the late 70s - Shenzhen) (1);</li> <li>Geographical location (port cities tend to grow rapidly where trade is also increasing (1).</li> </ul> Max 1 for generic statements re-urbanisation without clear link to megacities.	3  <b>AO1=3</b>
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05	4	<b>Using Figure 7, assess the extent to which there is a relationship between city size and percentage urban population.</b>  <b>AO3</b> – Use of <b>Figure 7</b> to support analysis, identify patterns and anomalies. Comes to a view in relation to the extent of the pattern.	6  <b>AO3=6</b>
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	<p><u>Mark scheme</u></p> <p><b>Level 2 (4 – 6 marks)</b></p> <p><b>AO3</b> – Clear interpretation, analysis and evaluation of the quantitative evidence provided, which makes appropriate use of data in support of overall assessment. Clear connection(s) between different aspects of the data and evidence.</p> <p><b>Level 1 (1 – 3 marks)</b></p> <p><b>AO3</b> – Basic interpretation, analysis and evaluation of the quantitative evidence provided, which makes limited use of data and evidence in support of overall assessment. Basic connection(s) between different aspects of the data and evidence.</p> <p><u>Notes for answers</u></p> <p>AO3</p> <ul style="list-style-type: none"> <li>• Most of the world’s population still have less than 80% living in urban areas. North and South America are highly urbanised as are parts of Europe and Australia. The rest of the world still has substantially less that this living in urban areas. All of these regions/countries have large cities with the exception of Australia which has high levels of urban population but no cities between 5 – 10 million.</li> <li>• The map does hide some important information on selected countries where there are large numbers of very large cities. Smaller countries become obscured by the display of information. This is part of a reasonable analysis.</li> <li>• Many cities with very large populations over 5 million are found in south-east Asia. There are anomalies such as those very large cities found on the west coast of Africa. However in south-east Asia percentage urbanisation is still relatively low (less than 60%).</li> <li>• Overall assessment – The picture is mixed. There is some evidence to suggest a correlation between the highest levels of urban population and the largest cities. Equally some may refer to it being hard to identify an overall pattern.</li> </ul>	
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05	5	<p><b>Evaluate the impact of migration on the character of a place that you have studied and people’s lived experience of that place.</b></p> <p><b>AO1</b> – Knowledge and understanding of the impact of migration. Knowledge and understanding of the principals associated with understanding people’s lived experience of place.</p> <p><b>AO2</b> – Application of knowledge and understanding to evaluate the impact of migration upon the character of a place and people’s lived experience of that place.</p> <p><u>Mark scheme</u></p> <p><b>Level 3 (7 – 9 marks)</b></p> <p><b>AO1</b> – Demonstrates detailed knowledge and understanding of concepts, processes, interactions and change. These underpin the response throughout.</p> <p><b>AO2</b> – Applies knowledge and understanding appropriately with detail. Connections and relationships between different aspects of study are fully developed with complete relevance. Evaluation is detailed and well supported with appropriate evidence.</p> <p><b>Level 2 (4 – 6 marks)</b></p> <p><b>AO1</b> – Demonstrates clear knowledge and understanding of concepts, processes, interactions and change. These are mostly relevant though there may be some minor inaccuracy.</p> <p><b>AO2</b> – Applies clear knowledge and understanding appropriately. Connections and relationships between different aspects of study are evident with some relevance. Evaluation is evident and supported with clear and appropriate evidence.</p> <p><b>Level 1 (1 – 3 marks)</b></p> <p><b>AO1</b> – Demonstrates basic knowledge and understanding of concepts, processes, interactions and change. This offers limited relevance with inaccuracy.</p> <p><b>AO2</b> – Applies limited knowledge and understanding. Connections and relationships between different aspects of study are basic with limited relevance. Evaluation is basic and supported with limited appropriate evidence.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• Issues associated with economic inequality, social segregation and cultural diversity in contrasting urban areas and the factors that influence them.</li> <li>• Patterns of economic and social well-being.</li> </ul>	<p>9</p> <p><b>AO1=4</b> <b>AO2=5</b></p>
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		<ul style="list-style-type: none"> <li>• How the demographic, socio-economic and cultural characteristics of places are shaped by shifting flows of people, resources, money and investment, and ideas at all scales from local to global.</li> </ul> <p>AO2</p> <ul style="list-style-type: none"> <li>• Evaluation – Expect to see reference to new influxes of migrants to an area. Some may refer to a British city experiencing relatively new influxes of eastern European migrants. These migrants tend to come to UK cities in search of work, settling in places of low value and ample housing stock. Some will argue negatively, asserting that immigration changes the character of such locations, often inner city areas. The evidence is unclear here. Some will argue that inward migration fills labour gaps and revitalises previously rundown inner city areas. New markets are created and new opportunities for employment. This position will assert that inward migration improves the character of a place by adding diversity and young employable workforce. Services spring up to cater for needs of the inward migrants including retail and recreational opportunities.</li> <li>• Evaluation – A significant issue for some consideration is the impact upon culture and language, particularly where the receiving community is not accustomed to such change. Some will argue that this creates significant tension. Schools catering for English as an additional language for students is an issue which may be explored as exemplification.</li> <li>• Evaluation – Perceptions in the media may also change, particular where issues emerge such as flashpoints between locals and new immigrants.</li> <li>• Overall evaluation – It is for the individual response to explore the issues associated with inward migration. Provided arguments are balanced and valid, any position is creditable.</li> </ul>	
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05	6	<p><b>‘There are more challenges than opportunities associated with improving environmental quality in urban areas.’</b></p> <p><b>To what extent do you agree with this view?</b></p> <p><b>AO1</b> – Knowledge and understanding of the factors affecting environmental quality in urban areas. Aware of a range of measures to improve environmental quality as well as the merits of each approach.</p> <p><b>AO2</b> – Application of knowledge in relation to challenges and opportunities. Evaluation should be explicit. Brings together different aspects of environmental quality. Analysis and evaluation shows awareness of the relative merits of each approach. There should be some explicit assessment of the ‘extent’ to which the statement is accepted.</p> <p><u>Notes for answers</u></p> <p>AO1</p> <ul style="list-style-type: none"> <li>• The impact of urban forms and processes on local climate and weather.</li> <li>• Urban temperatures: the urban heat island effect. Precipitation: frequency and intensity. Fogs and thunderstorms in urban environments.</li> <li>• Wind: the effects of urban structures and layout on wind speed, direction and frequency. Air quality: particulate and photo-chemical pollution.</li> <li>• Pollution reduction policies.</li> <li>• Issues associated with catchment management in urban areas. The development of sustainable urban drainage systems (SUDS).</li> <li>• Urban physical waste generation: sources of waste - industrial and commercial activity, personal consumption. Relation of waste components and waste streams to economic characteristics, lifestyles and attitudes. The environmental impacts of alternative approaches to waste disposal: unregulated, recycling, recovery, incineration, burial, submergence and trade.</li> <li>• Comparison of incineration and landfill approaches to waste disposal in relation to a specified urban area.</li> <li>• Environmental problems in contrasting urban areas: atmospheric pollution, water pollution and dereliction.</li> <li>• Strategies to manage these environmental problems.</li> <li>• Contemporary opportunities and challenges in developing more sustainable cities.</li> <li>• Strategies for developing more sustainable cities.</li> </ul>	<p>20</p> <p><b>AO1=10</b> <b>AO2=10</b></p>
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	<p>AO2</p> <p>Analysis – Expect to see references to a broad range of initiatives designed to improve environmental quality in cities and make these environments more sustainable than is presently the case:</p> <ul style="list-style-type: none"> <li>• Transport measures – cycle ways, greener fuels, urban transport systems such as trams.</li> <li>• Home fuel – switch to renewables or natural gas.</li> <li>• Construction – more energy efficient building design – solar power, K glass, etc.</li> <li>• Waste management – more recycling/less incineration/less landfill.</li> <li>• Urban conservation and green spaces – encouraging natural habitats to develop link to air quality must be evident.</li> <li>• Increased use of technology to monitor various environmental quality measures including air quality.</li> </ul> <p>Analysis – Expect to see case studies and other evidence in support. The level of detail and sense of place will be important in differentiating between candidates.</p> <p>Analysis – Challenges are likely to consider cost, public desire and political will as well as the general viability of measures to improve sustainability. Support is likely to include places where there has been significant success as well as on-going challenges.</p> <p>Analysis – The response should show an understanding of different aspects of environmental quality. Air, water and land are likely to feature, but some may also extend into the built environmental quality. This is a legitimate approach.</p> <p>Evaluation – There should be some explicit element which considers the question. For example some may conclude that currently urban living is not sustainable due the deterioration in living conditions for so many people and the unsustainable use of resources/increase of waste/emissions. These issues are causing considerable environmental degradation in urban areas. However there are opportunities which represent solutions to these issues but they came at considerable financial cost in many cases and do not necessarily operate at the required scale as things stand.</p>	
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**Marking grid for Question 5.6**

<b>Level/ Mark Range</b>	<b>Criteria/Descriptor</b>
<b>Level 4 (16–20 marks)</b>	<ul style="list-style-type: none"> <li>• Detailed evaluative conclusion that is rational and firmly based on knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Detailed, coherent and relevant analysis and evaluation in the application of knowledge and understanding throughout (AO2).</li> <li>• Full evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Detailed, highly relevant and appropriate knowledge and understanding of place(s) and environments used throughout (AO1).</li> <li>• Full and accurate knowledge and understanding of key concepts and processes throughout (AO1).</li> <li>• Detailed awareness of scale and temporal change which is well integrated where appropriate (AO1).</li> </ul>
<b>Level 3 (11–15 marks)</b>	<ul style="list-style-type: none"> <li>• Clear evaluative conclusion that is based on knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Generally clear, coherent and relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Generally clear evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Generally clear and relevant knowledge and understanding of place(s) and environments (AO1).</li> <li>• Generally clear and accurate knowledge and understanding of key concepts and processes (AO1).</li> <li>• Generally clear awareness of scale and temporal change which is integrated where appropriate (AO1).</li> </ul>
<b>Level 2 (6–10 marks)</b>	<ul style="list-style-type: none"> <li>• Some sense of an evaluative conclusion partially based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Some partially relevant analysis and evaluation in the application of knowledge and understanding (AO2).</li> <li>• Some evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Some relevant knowledge and understanding of place(s) and environments which is partially relevant (AO1).</li> <li>• Some knowledge and understanding of key concepts, processes and interactions and change (AO1).</li> <li>• Some awareness of scale and temporal change which is sometimes integrated where appropriate. There may be a few inaccuracies (AO1).</li> </ul>
<b>Level 1 (1–5 marks)</b>	<ul style="list-style-type: none"> <li>• Very limited and/or unsupported evaluative conclusion that is loosely based upon knowledge and understanding which is applied to the context of the question (AO2).</li> <li>• Very limited analysis and evaluation in the application of knowledge and understanding. This lacks clarity and coherence (AO2).</li> <li>• Very limited and rarely logical evidence of links between knowledge and understanding to the application of knowledge and understanding in different contexts (AO2).</li> <li>• Very limited relevant knowledge and understanding of place(s) and environments (AO1).</li> </ul>

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	<ul style="list-style-type: none"><li>• Isolated knowledge and understanding of key concepts and processes.</li><li>• Very limited awareness of scale and temporal change which is rarely integrated where appropriate. There may be a number of inaccuracies. (AO1).</li></ul>
<b>Level 0 (0 marks)</b>	<ul style="list-style-type: none"><li>• Nothing worthy of credit.</li></ul>



