Qualification Accredited

OCR
Oxford Cambridge and RSA

A LEVEL

Exemplar Candidate Work

GEOGRAPHY

H481
For first teaching in 2016

H481/01 Summer 2019 examination series

Version 1

Contents

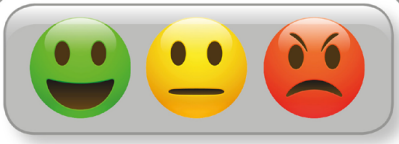
Would you prefer a Word version?

Did you know that you can save this pdf as a Word file using Acrobat Professional?

Simply click on **File** > **Export to** and select **Microsoft Word**

(If you have opened this PDF in your browser you will need to save it first. Simply right click anywhere on the page and select ***Save as . . .*** to save the PDF. Then open the PDF in Acrobat Professional.)

If you do not have access to Acrobat Professional there are a number of **free** applications available that will also convert PDF to Word (search for *pdf to word* converter).



We value your feedback

We'd like to know your view on the resources we produce. By clicking on the icon above you will help us to ensure that our resources work for you.

Introduction

These exemplar answers have been chosen from the summer 2019 examination series.

OCR is open to a wide variety of approaches and all answers are considered on their merits. These exemplars, therefore, should not be seen as the only way to answer questions but they do illustrate how the mark scheme has been applied.

Please always refer to the specification https://www.ocr.org.uk/Images/223012-specification-accredited-a-level-gce-geography-h481.pdf for full details of the assessment for this qualification. These exemplar answers should also be read in conjunction with the sample assessment materials and the June 2019 Examiners' report or Report to Centres available from Interchange https://interchange.ocr.org.uk/.

The question paper, mark scheme and any resource booklet(s) will be available on the OCR website from summer 2020. Until then, they are available on OCR Interchange (school exams officers will have a login for this and are able to set up teachers with specific logins – see the following link for further information http://www.ocr.org.uk/administration/support-and-tools/interchange/managing-user-accounts/).

It is important to note that approaches to question setting and marking will remain consistent. At the same time OCR reviews all its qualifications annually and may make small adjustments to improve the performance of its assessments. We will let you know of any substantive changes.

Question 1(a)

1 (a) Explain the role of flows of energy in the formation of a tombolo. **[8]**

Exemplar 1 — 8 marks

1	a.	Tombolos are landforms of deposition formed when sediment extends from the mainland and is connected to an offshore island. An example of a tombolo is ~~Chesil Beach~~ in Dorset where the Isle of Portland is connected to the mainland by Chesil Beach. There are two theories ~~for~~ of how Chesil beach was formed. One is by longshore drift. ~~The~~ Wind is an input / flow of energy to the coastal system and the ~~prevailing~~ westerly winds caused the waves to approach the coastline at an angle, distributing sediment onto the beach. Backwash then pulls against the ~~beach~~ coastline and causes sediment to be transported back into the ocean perpendicular to the direction of the coastline. The action of the wind and waves causes the movement of material from west to east ~~by~~ by longshore drift. Whilst normally this would form a spit, ~~here~~ due to the change in direction of coastline, ~~then~~ an offshore island is encountered, thus forming a tombolo. In this way there energy flows due to tides, current and by the action of the constructive waves and the prevailing wind. Another theory as to how the tombolo at Chesil beach is formed is between 12000 - 6000 BP, there was a period of sea level rise, called the Flandrian Transgression where ~~sea~~ level rose by 120 m. As ~~the~~ sea level rose ~~[illegible]~~ it brought with it a large amounts of sediment. At 6000 BP when sea levels stabilised, sediment was deposited ~~by~~ forming many of the UK's depositional landforms today. ~~At~~ At Chesil Beach, this formed a tombolo. In this way, the flow of energy is in the form of sea level rise due to energy provided by the sun, causing glaciers to melt and wave energy to depose

material - It is believed that at Chesil beach, the tombolo was formed due to rises in sea level as the sediment size gets smaller from east to west where as it would get larger if it were formed due to longshore drift due to attrition

Examiner commentary

Throughout this answer the candidate continuously comes back to this idea of energy and links is clearly to how a tombolo is formed. The candidate specifies certain types of energy such as kinetic and thermal and is able to discuss the role they plan in the tombolo formation. Furthermore they demonstrate comprehensive knowledge and understanding by showing that there is more than one way in which a tombolo is formed; and again link both of these to energy. This candidate is able to demonstrate their points further with reference to a specific example and whilst this was not required, it may (as in this case) provide the full context for this answer.

Exemplar 2 3 marks

1 a. A tombolo is a narrow beach that connects an offshore island to the mainland. Sediment (sand, shingle) can be moved by longshore drift to form the tombolo. Strong prevailing winds provide energy to the waves causing currents to form, these high energy currents carry material in the water before depositing the material when the wave loses energy. If the prevailing wind is continuous, sediment deposition will exceed rates of sediment removal therefore a long narrow beach would begin to form.

Behind the tombolo (once formed) is sheltered, and you commonly have the formation of lagoons and salt marshes occurring, this is because water and sediment remain still as the tombolo blocks any prevailing winds so currents and waves can not form.

Examiner commentary

This question required candidates to link the flows of energy to the formation of a tombolo. All too often candidates neglected the aspect of energy and instead gave a generic description of how a tombolo formed. Those that made some reference to energy such as in this example, were able to reach Level 2 as there was some link between flows of energy and the landform. This may have been a link between energy and the process of longshore drift or between a reduction in energy and deposition for example. However, in order to achieve higher marks, candidates needed to explore different types of energy and consider the part they played in a tombolo's formation. For example, it was possible to discuss a range of ideas including thermal, wave and wind energy to demonstrate a comprehensive understanding of how this landform is created. Furthermore, some candidates showed a well-developed understanding by discussing different ways that a tombolo formed by using the example of Chesil Beach; however, again it was the link between the formation and energy that enabled Level 3 to be awarded.

Question 2(a)

2 (a) Explain the role of flows of energy in the formation of an erratic. **[8]**

Exemplar 1 2 marks

2	a	Erratics are large boulders that have been irregularly deposited by a glacier. The most influential energy flow in the formation of an erratic is deposition. Debris is carried by a glacier through ~~transportation~~ meltwater streams and the glacier itself through the process of transportation. When meltwater streams face a loss of power, they deposit debris with the heaviest being deposited first. ~~The~~ Sometimes this means that debris may be deposited irregularly.

Examiner commentary

The majority of candidates were able to describe what an erratic was and give some explanation of its formation. However, the crux of the question was about the role of energy and as can be seen in this response this was lacking. At times candidates implied they were referring to energy such as when discussing deposition, however, this needed to be far more explicit. This candidate could have referred to aspects such as the role of thermal, gravitational potential or kinetic energy when discussing the formation of the erratic. Candidates should be encouraged to consider how energy can feed into the process from the start right through until the end; in this case, this would be discussing how the boulders originated, then were moved and finally deposited. Each stage in the erratic's formation can then be linked to energy. Those that responded in this sequential manner with constant links to energy were able to achieve the highest marks.

Question 1(b)(i)

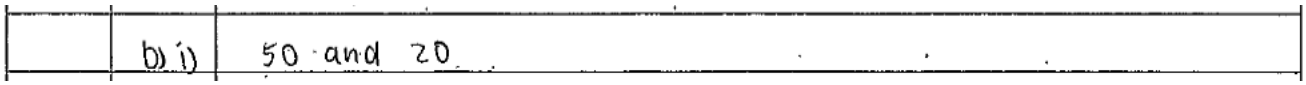
(b) Study **Table 1**, which shows inputs and outputs of sediment for a beach in Cornwall, UK, during 2017.

		Summer	Winter
Input (m^3)	Cliff erosion	43	100
	Fluvial deposition	50	20
	Beach nourishment	50	0
Output (m^3)	Marine erosion	20	69
	Longshore drift	93	130

Table 1 Inputs and outputs of sediment for a beach in Cornwall, UK, during 2017

(i) Find the mode(s) of the data set shown in **Table 1**. **[2]**

Exemplar 1 2 marks



Examiner commentary

This question required candidates to state the mode from the data set. Acknowledgement was given that candidates may interpret the data set in a different manner and thus a range of marks was possible (this was the same for 2(b)(i) and 3(b)(i)). The majority of candidates understood the mode referred to the most common number and were awarded both marks by simply writing the numbers; nothing else was required.

Question 1(b)(ii)

(ii) Calculate the sediment budget for each season shown in **Table 1**.
You must show your working. **[2]**

Exemplar 1 2 marks

ii) summer : input → 43+50+50 = 143 m³ ~~output → 100+20+0 = 120m³~~
~~sediment budget = 143+120 = 23m³~~
winter output → 20+93 = 113 m³
sediment budget = 143 - 113 = 30m³

winter : input → 100+20+0 = 120m³ output → 69+130 = 199m³
sediment budget = 120 - 199 = -79m³

Examiner commentary

The majority of candidates (and the corresponding questions of 2(b)(ii) and 3(b)(ii)) were able to complete the calculation correctly as shown in this response. Occasionally candidates made errors with simple addition or with negative signs and therefore they should be encouraged to double check their working.

Question 1(b)(iii)

(iii) State whether each season was in a surplus, deficit or equilibrium state. **[2]**

Exemplar 1 2 marks

iii) In summer there was a surplus and in winter there is a deficit.

Examiner commentary

The majority of candidates achieved full marks on this question (and for the corresponding questions 2(b((iii) and 3(b)(iii)). There was a good understanding that a positive figure represented a surplus and a negative figure a deficit. A number of candidates incorrectly believed the answer to be equilibrium when they deemed the number in part ii to be small.

Question 1(c)

(c) Study **Fig. 1**, Isle of Skye, Scotland, UK; an area that has experienced climate change.

With reference to **Fig. 1**, explain the role of **one** geomorphic process in forming landform **A**. **[3]**

Exemplar 1 3 marks

1	C	The landform in figure 1 is a relict cliff.
		One geomaphic process important in forming landform
		A is ~~Sub~~ subaerial weathering. Freeze thaw
		~~occurs as~~ is a type of biological weathering
		that occurs on the relict cliff when the seas
		spray causes ~~salt~~ water partides to enter cracks or lines
		of weakness. When ~~salt crystallises it forms crystals~~ the water freezes it expands
		~~and expands~~, causing the rock (which appears
		to be hard rock) to fracture and weaken furtre,
		causing the cliff to retreat and also weaken
		it to and cause it to collapse. The cliff face
		could also be vulnerable to chemical weathering
		such as oxidation whereby the minerals in the
		rock react with the air causing further weakening
		and possible retreat and collapse.

Examiner commentary

This question required candidates to explain the role of one geomorphic process in the formation of the landform shown. As with this response, many candidates wrote about more than one process and it is important that candidates remember that it is their first process that will be marked. Those candidates that took a step by step approach to explaining the role of the process were able to easily access full marks on this question. In this response, this was through identifying that water enters cracks or lines of weakness in the rocks, it then freezes and expands, and this then causes the rock to weaken further and collapse. Candidates were not awarded marks for simply naming the process and this alone does not explain the formation of the landform. It is important to note that a number of candidates did not understand the term 'geomorphic process' and as a result their answer was not credit-worthy.

Question 1(d)

(d)* 'Geology is the most significant influence on coastal landscapes.' To what extent do you agree with this statement? **[16]**

Exemplar 1 AO1 8 marks, AO2 8 marks, Total 16 marks

d) There are various factors that can influence the coastal landscapes, including geology, wave, wind and even human activities.

In high energy coastlines such as the Gower Peninsula in South Wales, geology can play a big role. The gower peninsula is mainly consist of limestones, which is a hard rock that is not susceptible to erosion. The nature of the coastline means that most landforms formed due to faults and joints within the limestone rocks. The wave hitting the cliff comes all the way across the Atlantic ocean (3000 miles) and exerts a force of 11000 kg/m² on the surface, this means that the waves would erode the cliff through the joints and the faults and create features such as geos, blowholes, headlands and bays. On the North side of the gower where the cliff lies parallel to the coastline; it forms a concordant coastline; and on the south where the cliff lies perpendicular of the coastline, it creates a discordant coastline. On the south of the Gower Peninsula lies the Great Tor, a headland with vertical strata, which means when the wave erodes the bottom of the cliff, the rock at the top would fall straight into the ocean because of the angle of the strata, creating a very steep cliff face. Other than structure, the lithology of the coastline also plays a role. As said before, the Gower Peninsula is a limestone mainly comprises of limestone; which means that it is highly susceptible to chemical weathering. Chemical weathering occurs when rainwater contains dissolved CO_2 falls on rock that contains carbon, and it will erode the

carbon by producing carbonic acid. This resulted in the cover being highly susceptible to chemical weathering and the top of the cliff has lots of blow holes that is joined with a cliff. Biological weathering can also occur because of the organic acids produced by the dead organic vegetation that grew on top of the cliff surface.

However, in a low energy coastline, geology became less important of a factor. For example, in the Mississippi delta located at the gulf of Mexico, other factors could have a much larger influence. Mississippi delta is a 3780 km long delta from Minnesota till the gulf of Mexico, it is a low energy coastline where large amount of sediments are deposited. However human has influenced the coastal landscapes by doing various activities. Firstly, the sediments deposited at the Mississippi delta has decreased from 400 million tonnes a year to 150 million tonnes a year due to upstream dams and channel engineering, this resulted in less fluvial transportation of sediments and less deposition occuring at the delta lobe, and due to climate change, sea level has risen and increased the rate of erosion, which means the delta lobe is decreasing in size by 20m each year. Also, the Mississippi is constantly used for shipping purposes, the ships deeply penetrates the delta and nearby wetlands, causing an incursion of saltwater in freshwater systems. This destroyed vegetation such as mangrove and the wetland is no longer a buffer zone for protecting the coastline. Up till now, Louisiana has lost over 1.2 million km^2 of land due to the destroy of wetlands. Moreover, human build levees and dams has reduced sediment supply by 70%, the levees cuts the tie between the river and the delta, which means sediments are no longer being deposited at the delta lobe but instead it is lost far into the gulf of Mexico. Other than human, time can also play a huge role in shaping the coastline, the

natural delta cycle occurs on a 1000-2000 years cycle which means eventually a new delta lobe will form. Time also effects climate change, the 2005 hurricane Katrina destroyed over 200000 acres of land in the Mississippi within 72 hours, half of the Chandeleur barrier island was destroyed.

To conclude, geology can play a big role in shaping the coastline, but it depends on the nature of the coastline. If it is a high energy coastline then geology does play a big role; However, if it is low energy, then human's influence and time will play a bigger part.

Examiner commentary

There were two elements to this question; an understanding of the influence (role) of geology on coastal landscapes, as well as an analysis and evaluation of its significance. In most instances this resulted in candidates comparing its role to that of other factors and this approach enabled many to write a logical argument. To achieve Level 3 candidates needed to show comprehensive knowledge and understanding of the role of geology as demonstrated in this exemplar through the discussion of the rock structure and its chemical composition. The use of a case study is well integrated and allows the candidate to apply the points they are making to the impact on that specific coastline. The candidate then goes on to evaluate the significance of geology by comparing different case study examples. This comparison allowed the candidate to fully examine in which instances geology is most important and in which instances there are more significant factors. Both breadth and depth responses from candidates were able to reach full marks, this answer shows a comprehensive level of knowledge and understanding.

Exemplar 2 AO1 2 marks, AO2 2 marks, Total 4 marks

1 d Plan:

causes slumping

soft clay rock — Geology — hard rock takes a long time to get eroded

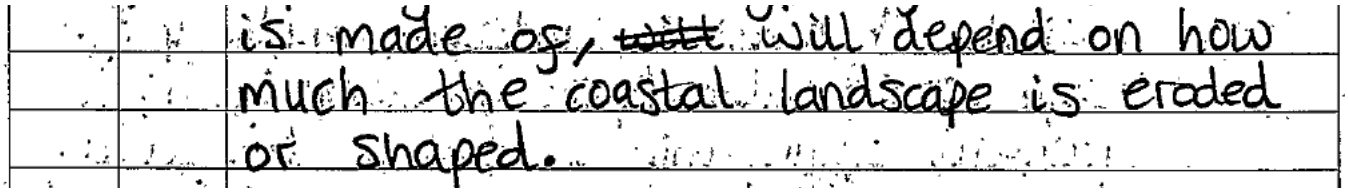
easily erodes less permeable

Geology is the study of rocks. Coastal landscapes can be made up of many different kinds of rocks, from soft rock to hard rock. The geology of a coastline can have a significant influence on ~~the~~ it's landscape.

Geology aggects the rate at which coastal landscapes are eroded or weathered. If a cliff is mainly made up of a soft rock like clay, it can easily get eroded by destructive waves ~~are~~ or weathered by winds. A coastal landscape made up of clay would also begin to slump if high rainfall occurs, this is due to the fact that the soft clay absorbes the rainwater and becomes too heavy to maintain it's position. Also, if the coast is made of more hard rock than soft, it is less permeable and takes longer to erode. This means that the coastal landscapes will only slighty change over time.

However, human activity ~~also~~ has also made a significant influence on coastal landscapes. This is shown in both Pakiri, New Zealand and Sandbanks, Dorset. Mangawhai to Pakiri has been unintentionally influenced by human activity due to sand mining which is causing high levels of erosion. In Sandbanks, human activity is intentionally influencing the coastal landscape because humans are building groynes to protect the coastline and cliffs from eroding, as it would cause buildings and hotels to get destroyed if the cliff collapsed by erosion.

In conclusion, I agree to some extent that geology is the most significant influence on coastal landscapes because depending on what type of rock the coast



Examiner commentary

For this question candidates needed to demonstrate their understanding of the role of geology, however, disappointingly many answers did not reach beyond the notion of hard/soft rock and the creation of bays/headlands as shown in this response. All too often candidates did not consider the influence of variables such as the rock strata, rock permeability or rock porosity. Whilst coverage of all of these was not necessary for the top level, it was expected that candidates would be able to discuss one or more with a higher level of detail.

Question 2(d)

(d)* 'Geology is the most significant influence on glaciated landscapes.' To what extent do you agree with this statement? **[16]**

Exemplar 1 AO1 5 marks, AO2 6 marks, Total = 11marks

An extract of the answer has been used here. A full copy of the answer is available in the appendix.

Glaciated landscapes are areas where a glacier used to or still occupies. Their landscapes are largely shaped by erosional and depositional features formed as the glacier flowed through the area. There are several factors which affect the extent to which glaciers shaped there landscapes, which include the geology of the area, climate, relief and the amount of ice. There landscapes can also be influenced by human activity as well as physical processes.

The geology of the area largely influences the glaciated landscape, and the erosional and depositional features produced. If the ground

Examiner commentary

In this response the influence of geology is discussed on The Lake District, which was a common case study referred to by candidates. The candidate's level of knowledge and understanding whilst thorough, could at times have been developed further. By taking a 'breadth' approach they demonstrate the comprehensive application and analysis by comparing geology to climate, relief, human activity, and the size of the glacier; however, this resulted in some ideas lacking the detail required for Level 3 for AO1. The candidate would have benefitted from further expanding on the role of geology and explain further the importance of rock structure and chemical composition.

Question 4(a)(i)

4 (a) Study **Fig. 4**, a climate graph for Yakutsk, northern Russia.

(i) With reference to **Fig. 4**, suggest how variations in temperature influence the size of **one** store in the carbon cycle. **[4]**

Exemplar 1 — 4 marks

4	a).ii)	In the summer, the temperature rose to about 20°C and rainfall was at its maximum of 40mm, this would encourage plants' growth which means more photosynthesis would occur, this would increase the size of the biosphere as a store. Increase in temperature and rainfall would also increase decomposition, which means biosphere's store would also increase. However in winter where temperature falls to below -40°C, there would be no plants growth which means the size of biosphere as a carbon store decrease

Examiner commentary

This question required candidates to discuss the influence of temperature on one carbon store such as the biosphere or atmosphere. As demonstrated in this response, the candidate needed to link the temperature to the change in the size of the store and as only one store was required they then needed to develop those ideas. For example this candidate develops the idea of increasing temperatures causing plant growth to the increase in photosynthesis and thus the growth of the store. They go on to link temperature to decomposition and again connect this to the size of the biosphere thus continuing to focus on this one store.

Exemplar 2 — 4 marks

4	a.i	Figure 4 shows that in normern Russia temperatures are sub-zero for 7 monms of the year. This would therefore influence the carbon stored within the cryosphere, as at sub-zero temperatures carbon will be locked up in permafrost, and the ice in glaciers, as decomposition rates will be slow and the carbon within the ice won't be accessible to micro organisms. When temperatures rise above zero from may to septrember the ice and permafrost will melt slightly

in the active layer which will decrease the store of carbon in the cryosphere as decomposers are more active and release carbon ~~the~~ into the atmosphere via respiration.

Examiner commentary

This candidate makes a clear link between temperature and the size of the cryosphere with their initial comment that carbon will be 'locked up'. They go on to make three further development points that link to decomposition. Although the question asks for only one store, it was perfectly acceptable for candidates to refer to another in their development points. For example, explaining that the size of the carbon store in the cryosphere will decrease and thus carbon will be released into the atmosphere. Although not present in this response, a number of candidates wrote directly opposite points and these could not be double-credited.

Question 4(a)(ii)

(ii) Explain **three** limitations of such climate graphs in representing the climatic conditions of a location. **[3]**

Exemplar 1 3 marks

4 aii It doesn't show the variation of rainfall of the different days in each month so you can't see the dispersion clearly. It also only shows a few climatic characteristics of an area, doesn't show you every climatic aspect (it only shows temperature and rainfall but for example, it

4 aii doesn't show the areas humidity). ~~The temperature~~ ~~State~~ This data only shows and represents one yearly cycle however, you can't say if the climate will change every year for this location as there's lack of information.

Examiner commentary

This question required candidates to explain 3 limitations climate graphs such as Fig. 4. A range of answers was considered acceptable and the most common ones are shown in this response; unable to see the variation within the month, the graph only covers 2 variables, and some reference to the data being only a year. Candidates must remember to write their limitations clearly and not spend too much time explaining each in depth.

Question 4(b)

(b) Examine the significance of short term changes to the flows and stores in the water cycle. **[10]**

Exemplar 1 — 5 marks

4 b

Short term changes are seasonal or diurnal. Diurnal changes to the water cycle occur as at night stomata close due to ~~&~~ no sunlight ~~beig~~ being present, therefore no transpiration occurs at night. This means water is stored in the biosphere rather than being released into the atmosphere and stored there. Whereas in the day sunlight is caused ~~*~~ more evapotranspiration so more water is stored in the atmosphere.

Seasonal changes occur ~~peeeee~~ monthly as during winter months temperatures often fall so water may be stored more in the cryosphere as more precipitation may occur as snow. Also evapotranspiration rates are slowed as temperatures drop. Whereas in summer evapotranspiration rates increase, more water might be stored in lakes and so store in atmosphere will also ~~else~~ increase. In Autumn when precipitation levels are often highest, run off will increase as well as river discharge which may increase risks of flooding.

This shows that seasonal short term changes are more significant as it impacts the water cycle for a longer period of time. Whereas diurnal changes only happen over night.

Examiner commentary

As with most responses, this candidate discusses seasonal and diurnal changes. Both of these are well explained in relation to the water cycle by discussing a variety of inputs, outputs, stores and processes. Whilst the majority of candidates were able to discuss one or both of these short term changes, demonstrating an understanding of these changes was only part of the question. Candidates were also required to examine the significance of the short term changes and unfortunately as shown in this answer, this is something candidates often neglected to include thus limiting their answer to Level 2 at best. It is imperative that candidates address the command words of the question in order to be able to access all the marks available.

Exemplar 2 10 marks

b) ~~shorterm~~ short term changes can be on daily and seasonal changes. Firstly on daily changes, in the ~~day~~ day time the sun and rise in temperature results in more evapotranspiration, which leads to more cloud cover and increase in rainfall. This is very significant in the rainforest where in the afternoon when sunshine is the strongest and ground is the hottest, it causes water vapour to rise and form cumulimus clouds by convection. This would then results in convectional rainfall later on in the day. In this case the exchange between each store of the water cycle is extremely fast and the speed of flows is also very fast. Seasonally wise plays bigger part in the tundra, the tundra in the summer receives 24/7 sunlight, this increases the thawing of permafrost, which increases the amount of surface run-off. There would also be millions of small ponds and lakes formed on the permafrost which will eventually travel to the ~~the~~ river. This means there is decrease in the size of cryosphere and increase in the size of hydrosphere and atmosphere as a water store. The increase in sunlight would also increase evaporation and precipitation, which causes the variation of ~~temp~~ precipitation from 50 to 350 mm through out the year. The increase in plant growth would also increase biosphere as a store and increase in transpiration. In the rainforest there is no seasonality, so the annual precipitation is always above 2500 mm.

Long term changes such as glacials and inter-glacials

can also effect the store of water cycle. In the Riss glacial that happened over 187000 years ago, sealevel decreased by 100 m and temperature dropped by 7°C, this means that there was a significant ~~decrease~~ change in size of water stores from hydrosplere to cryosphere. 1/3 of the Earth's surface was also covered in ice which means biosplere was minimal as well. The decrease in temperature means flows such as evapotranspiration and precipitation and was also not significant. During inter-glacials like now days, ice sheets cover decline significantly and water flows from cryosplere to both hydrosplere and biosplere. Rate of flows in form of evapo-transpiration & precipitation also increase.

Examiner commentary

This candidate demonstrates not only a comprehensive knowledge and understanding of the short term changes with reference to seasonal and diurnal changes, but also addresses the command words of the question. Through making reference to different areas of the world, the candidate is able to examine the significance of the changes.

Question 4(c)

(c)* 'Reducing emissions is the most effective global management strategy to protect the carbon cycle as a regulator of the Earth's climate.' How far do you agree with this statement? **[16]**

Exemplar 1 AO1 8 marks, AO2 8 marks, Total = 16 marks

c) The ~~global~~ carbon cycle can be managed by various strategies, including wetland restoration, afforestation, carbon caps & storage, reducing emissions and so on.

Reducing emissions have been a management strategy since 1995, the implementation of the Kyoto protocol, 195 countries signed the agreement to reduce its own emissions and try to reduce enhanced greenhouse effect. This was expired in 2012. It was replaced by the Paris Agreement which is going to be implemented in 2020, it aims to reduce global carbon emissions by 60% from the 2010 level and temperature increase below 2°C. Each country can set their own targets which ~~makes~~ made this effective because each country can do their best by adapting to their own problem. However, many countries cared more about their economic growth and didn't meet their target or didn't even ratify the agreement, this includes countries such as China, India, USA and Australia. This means that big emission countries are not reducing their emissions but producing more, which is not effective.

Another strategy is to restore wetlands, wetland covers 9% of the global surface and it is 35% of terrestrial carbon pool. By restoring wetlands, it can sequest large amount of carbon from the atmosphere. In Canada, 70% of its wetlands was destroyed in the 1900s, but they are planning to restore 112 ha of ~~co~~ wetlands, which can sequest 324000 T of carbon from the atmosphere each year. In the UK, 400 ha ~~has~~ has already been restored which was is supported by the UK government, and 500

ha is planned to be restored by 2020.

Carbon capture and storage is also a strategy for protecting the carbon cycle. CCS ~~means~~ works in a way that the oil and gas factory seperates the CO_2 from the other gases and the compress it through a pipeline to a offshore platform, it is then pumped underground in the porous rocks where it can be stored for a long time. In the USA, 40% of their energy consumption is from oil and gas, and if CCS is used, ~~the~~ USA can reduce the emissions by up to 80-90%. In the UK the Peterhead project is going on in ~~the~~ Northern Scotland to try out CCS. However, it is very expensive that it costs £1 billion for the peterhead project, and it requires specific rock geology. Also, 20% of the energy in the factory is used to seperate the CO_2.

A less costly option would be afforestation. In China, afforestation programme started in 1978, the Chinese government aims to restore 400,000 km^2 of fast-growing forest such as poplar and birch by 2050. This would sequest a lot of carbon from the atmosphere as trees are active carbon sink. The Brazil government aims to restore 125,000 km^2 of forest by 2050, and 44% of Amazon is already protected, so deforestation won't occur. The UNREDD scheme helps a lot of LIDCs to turn their forest into monetary value, which provides them incentives to stop deforestation and start ~~protection~~ protecting their forest. Agriculture is also changed by zero tillage (reduce ploughing), integrated farming (agriculture in forests next to trees), livestock management which increases standard of animal feed and produce less methane. Arable farming & cattle ranching together increase the productivity by five fold.

To conclude, I ~~believe~~ belief that the most effective strategy is to use a strategy that is most suitable to the country. CCS would work for ACs but less costly option such as afforestation would be more effective for LIDCs & EDCs.

Examiner commentary

This question required candidates to demonstrate knowledge and understanding of the strategies used to reduce emissions, as well as applying this to analyse and evaluate the most effective strategy. This response is clearly structured and the candidate begins by outlining how emissions can be reduced. As with the majority of candidates this included reference to the Kyoto and Paris agreements, however, this response was awarded highly due to the level of detail included. Alongside this, the candidate is able to discuss alternative strategies in a similar level of detail drawing on case study examples to explain how and where they work. Once again a breadth or depth style of response was acceptable and in some cases (as shown here) candidates managed to do both. Alongside this comprehensive knowledge and understanding of the strategies, the candidate evaluates each strategy in order to reach a conclusion about whether they support the statement. Evaluation can be both positive and negative and the use of the examples allow the candidate to demonstrate well developed ideas rather than more basic remarks such as 'it is cheap'. The well-structured nature of this response alongside strong evidence of their knowledge and understanding, as well as analysis and evaluation throughout this answer enabled the candidate to achieve all the marks available for the question.

Exemplar 2 AO1 4 marks, AO2 5 marks, Total = 9 marks

4 c Reducing emissions ⇒ cap & trade
⇒ international agreements
⇒ reforestation & afforestation
⇒ restoration of wetlands.

Due to ~~global warming~~ climate change and global warming, the flows and stores of carbon have completely shifted, to the point where the atmosphere is a huge CO_2 sink, which needs to be reversed. Although strategies to reduce emissions such as cap and trade and international agreements are incredibly useful, in my opinion, it is afforestation that is the most important and effective management strategy to protect the carbon cycle.

Firstly, reducing emissions using international agreements can be a great solution to global warming, since it is an international problem that requires global intervention and commitment to

'reducing CO_2 emissions. The Paris Agreement was signed at the 2015 climate change conference, and this was signed by many countries globally, particularly developed countries, who have agreed to limit their CO_2 emissions. The agreement is set to ~~take~~ be put into action in 2020, with a goal to reducing overall emissions by 2050 by 60%. However, whilst a decrease in emissions into the atmosphere would be very helpful, to reduce global temperatures ~~etc~~ and restore equilibrium - it was very controversial, with some of the World's largest ~~exp~~ emitters of CO_2 - notably India and China not signing the agreement.

Inversely, for me, afforestation is essentially the most effective and immediately impactful way to reduce carbon emissions. It involves re-planting trees on 80 year cycles, which will go to the root of climate changes problem: the lack of trees and plants still around to use photosynthesis to fix the CO_2 in the atmosphere. Reforestation projects can be carried out in almost anywhere in the world, and do not rely on huge international agreements, but instead increase the capacity for the earth to store carbon and not release as much carbon to the atmosphere.

Therefore, in conclusion, reforestation and afforestation are better global strategies to

Examiner commentary

In this response the candidate makes a comparison between international agreements and afforestation which is a perfectly valid approach. For the first Assessment Objective (AO1), the candidate displays a thorough rather than comprehensive level of knowledge and understanding. Whilst the candidate has given some examples of international agreements, on the whole the response requires further place-specific examples regarding each strategy to access higher than Level 2. The candidate demonstrates analysis and evaluation through not only evaluating each approach individually but also through comparing them. Further discussion is needed in order to reach Level 3 and using specific examples of where approaches have and haven't worked would be one way of doing so. Furthermore the candidate could expand further the idea of time and scale to evaluate each initiative.

Exemplar 3 AO1 8 marks, AO2 8 marks, Total = 16 marks

An extract of the answer has been used here. A full copy of the answer is available in the appendix.

4 c Reducing emissions is an effective way to ~~manage~~ regulate the global carbon cycle. However other ways could also be adopted such as wetland restoration and changing agricultural practises.

Reducing emissions is a global management plan to protect the carbon cycle. For example the Paris Agreement which was set up in 2015 aims to reduce CO_2 emissions by 60% of 2010 levels by 2050. This would be very effective if carried out by everyone. However china ~~as~~ and USA have both not agreed to this, which makes the reduction much harder to achieve, as they are two of the biggest polluters of carbon into the atmosphere. Also the reductions aren't legally binding, which means many countries may not abide by the rules, making it even less effective. On the other hand if this was carried out properly it could majorly reduce CO_2 emissions as humans emit 30 billion tonnes of carbon per year.

On the other hand other practises could be used. For example wetlands, which are carbon sinks, hold 35% of the terestrial carbon which means wetland & restoration could have a significant

impact on reducing CO_2 in the atmosphere. In Canada's prairie provinces 70% of their wetlands were destroyed due to growing populations.

Now 112,000 ha has been targeted for wetland restoration to hopefully capture 350,000 tonnes of carbon per year. If this was therefore adopted on a larger scale and in more countries, then it could significantly reduce CO_2 levels in the atmosphere.

As well as this a change to agricultural practises could help to reduce emmissions, as carbon dioxide released by livestock farming is 100 million tonnes/year, which is a significant addition to CO_2 in the amosphere. Therefore using practises such as giving livestock food which releases less CH_4 and control could help. Also using less heavy machinery, which compacts soil and can increase erosion, could help as decomposers release the CO_2 from soil into the atmosphere. Also using poly culture whereby plants/crops are planted with trees intergrated to reduce soil erosion and therefore limit the CO_2 released into the atmosphere. However this is all less effective if it occurs on a local scale rather than global, as the emissions from humans are so high, only reductions can only be made if management is global.

Examiner commentary

As with many responses this candidate begins their answer in a logical manner by first discussing reducing emissions by global management strategies such as the Paris Agreement. Their paragraph about this strategy is comprehensive and contains specific details to support their example. The candidate is then able to evaluate the strategy by considering why it would be the most effective strategy but also why it has not been wholly successful. In order to develop this analysis and evaluation further the candidate then discusses a range of other strategies including wetland restoration and agricultural practices. Once more they demonstrate comprehensive knowledge and understanding of the strategies before giving an evaluation of their use with reference to scale and through comparisons with other strategies they have previously written about. This well-structured and focused response thus enables the candidate to achieve full marks.

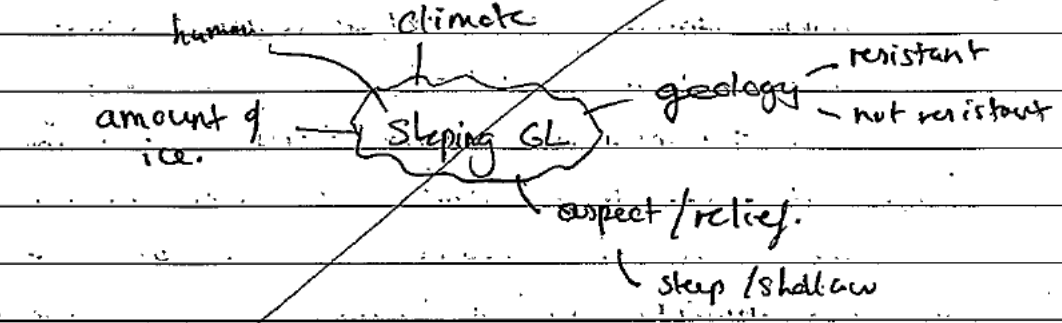
Appendix

Below are the complete answers from the extracts included in this resource.

Question 2(d), AO1 5 marks, AO2 6 marks, Total = 11marks

d) Plan :

Glaciated landscape → one shaped by glacier
↳ erosional and depositional landform



- Lake District. → valley → dramatic landscape
- Laurentide ice sheet → less dramatic.
↳ grand Dixere

Glaciated landscapes are areas where a glacier used to or still occupies. Their landscapes are largely shaped by erosional and depositional features formed as the glacier flowed through the area. There are several factors which affect the extent to which glaciers shaped there landscapes, which include the geology of the area, climate, relief and the amount of ice. There landscapes can also be influenced by human activity as well as physical processes.

The geology of the area largely influences the glaciated landscape, and the erosional and depositional features produced. If the ground

beneath the glacier is made up of resistant rocks, such as the Burrowdale Volcanics in the centre of the Lake District, then glacial activity is unlikely to change the landscape drastically. In the Lake District, this group of very resistant rock is what forms the mountainous region with the highest peaks. On the other hand, less resistant rock such as clay is much less resistant and so the glacier has a bigger impact in eroding this material, producing big dramatic features such as U-shaped valleys. If more material is eroded, the glacier has more debris to carry out further erosion or for depositional landforms such as the drumlin fields seen spanning Otter Tail and Todd counties in Minnesota following the effects of the Laurentide ice sheet.

The relief of the land also affects the impact glaciers have on their environment. A steep relief will result in greater movement of ice due to gravity. This is likely to cause more erosion on the landscape, than if the land was flat and the glacier frozen to the ground, where it may only move 1-2 m per year. This will further impact upon the formation of landforms such as roche moutonnées as the glacier is able to pluck faster and further.

Furthermore, the size of a glacier will also have an influence on shaping its landscape. If a glacier has a very large mass, then the weight of the glacier will be huge on the underlying ground. This is likely to have far more erosional

power when it moves compared to a glacier whose mass is relatively small. A large mass will result in largescale erosion, increased movement speed and more dramatic features.

The climate of the area is also significant in the shaping of the landscape. Areas which experience warmer temperatures, perhaps high altitude warm-based glaciers in the summer months will experience greater meltwater, resulting in greater lubrication of the glacier, and thus more movement, carving out its landscape. If a glacier is in retreat however, deposition occurs, leaving behind moraines, mounds of till, which would shape the landscape.

Firstly, human activity in currently active glaciated Landscapes, such as at the Grand Dixence scheme in Switzerland further influences the landscape. The Damn collects meltwater from glacier above it, however material carried in this water gets trapped behind the dam.

When water is released, it no longer carries material, and thus has more energy and power to erode the rivers channel deeper and wider. This is an impact of human activity in influencing the landscape.

Glaciated Landscapes are not only influenced by one factor, but a combination. Human activity is important as it changes the appearance of the landscape to that dotted with infrastructure. However, I do

I agree that the main factor which is the most significant in influencing glaciated landscapes is the geology of the area as it influences the amount of erosion which occurs and amount of debris available for depositional landforms. Glaciated Landscapes are dynamic however and constantly changing and it will be interesting to see how climate change caused by humans will influence these landscapes in the future.

Question 4(c), AO1 8 marks, AO2 8 marks, Total = 16 marks

4 c Reducing emissions is an effective way to ~~manage~~ regulate the global carbon cycle. However other ways could also be adopted such as wetland restoration and changing agricultural practises.

Reducing emissions is a global management plan to protect the carbon cycle. For example the Paris Agreement which was set up in 2015 aims to reduce CO_2 emissions by 60% of 2010 levels by 2050. This would be very effective if carried out by everyone. However China ~~AC~~ and USA have both not agreed to this, which makes the reduction much harder to achieve, as they are two of the biggest polluters of carbon into the atmosphere. Also the reductions aren't legally binding, which means many countries may not abide by the rules, making it even less effective. On the other hand if this was carried out properly it could majorly reduce CO_2 emissions as humans emit 30 billion tonnes of carbon per year.

On the other hand other practises could be used. For example wetlands, which are carbon sinks, hold 35% of the teresmial carbon which means wetland restoration could have a significant impact on reducing CO_2 in the atmosphere. In canada's pairie provinces 70% of their wetlands were destroyed due to growing populations.

Now 112,000 ha has been targeted for wetland restoration to hopefully capture 350,000 tonnes of carbon per year. If this was therefore adopted on a larger scale and in more countries, then it could significantly reduce CO_2 levels in the atmosphere.

As well as this a change to agricultural practises could help to reduce emmissions, as carbon dioxide released by livestock farming is 100 million tonnes/year, which is a significant addition to CO_2 in the atmosphere. Therefore using practises such as giving livestock food which releases less CH_4 and control could help. Also using less heavy machinery, which compacts soil and can increase erosion, could help as decomposers release the CO_2 from soil into the atmosphere. Also using poly culture whereby plants/crops are planted with trees intergrated to reduce soil erosion and therefore limit the CO_2 released into the atmosphere. However this is all less effective if it occurs on a local scale rather than global, as the emissions from humans are so high, only reductions can only be made if management is global.

Cap and trade is another global management strategy to limit CO_2 emissions, as companies

and buisnesses are limited to a certain amount of CO_2 emissions. If the limit is exceeded then the buisness either pays a fine or recieves carbon offsets ~~which~~ whereby they need to plant trees or undergo a strategy to reduce CO_2 emissions.

Overall reducing CO_2 emissions is the most effective global management strategy to protect the carbon cycle as a regulator of earth's climate. As reducing CO_2 emissions into the atmosphere, reduces greenhouse gases and therefore ~~climate~~ global warming can be reduced. However if the management isn't global then emissions ~~may~~ not will unlikely be reduced as CO_2 emissions are so high.

Did you know?

OCR Resources: *the small print*

OCR's resources are provided to support the delivery of OCR qualifications, but in no way constitute an endorsed teaching method that is required by OCR. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources. We update our resources on a regular basis, so please check the OCR website to ensure you have the most up to date version.

Our documents are updated over time. Whilst every effort is made to check all documents, there may be contradictions between published support and the specification, therefore please use the information on the latest specification at all times. Where changes are made to specifications these will be indicated within the document, there will be a new version number indicated, and a summary of the changes. If you do notice a discrepancy between the specification and a resource please contact us at: resources.feedback@ocr.org.uk.

OCR acknowledges the use of the following content: N/A

Whether you already offer OCR qualifications, are new to OCR, or are considering switching from your current provider/awarding organisation, you can request more information by completing the Expression of Interest form which can be found here: www.ocr.org.uk/expression-of-interest

Please get in touch if you want to discuss the accessibility of resources we offer to support delivery of our qualifications: resources.feedback@ocr.org.uk

Looking for a resource?

There is now a quick and easy search tool to help find **free** resources for your qualification:

www.ocr.org.uk/i-want-to/find-resources/

Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our **Customer Support Centre**.

General qualifications
Telephone 01223 553998
Facsimile 01223 552627
Email general.qualifications@ocr.org.uk

www.ocr.org.uk

Cambridge Assessment

CERTIFIED ISO 9001 UKAS MANAGEMENT SYSTEMS 001