



A Level Geography

7037/1: Physical geography

Report on the exam

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Summary

7037/1 followed an identical structure to previous papers. Students are well used to this approach, given the age of the specification. Whilst it remains a challenging paper, it differentiated well and those who prepared thoroughly had every chance to access the full range of marks. It was really pleasing to see a very equitable performance across the optional units of Section B and Section C. This meant that whatever the route through the paper, students had an equal chance of success.

Areas where students excelled

- Four-mark questions performed well, provided the students had the appropriate level of understanding of the specification content.
- Question **01.1** was well answered, with students generally having a really secure understanding the characteristics of the drainage basin.
- Question **01.2**, **04.2** and **06.2** were very accessible. Students coped with these graphically based questions, identifying patterns, manipulating data and picking out anomalies in support.
- Question **02.3** and **05.3** produced very strong responses, though novel situation questions are generally an area for improvement as they require students to think on their feet under the pressure of the exam, clearly quite a challenging task given the time available.
- The 9-mark AO1/AO2 questions in Section C produced similar outcomes, though question **06.4** was a little stronger more generally.
- Question **01.4** performed better than expected this year. The vast majority of students understood that deforestation was a major factor driving change in the magnitude of carbon stores. With some development, this factor alone produced generally clear answers.
- Question **04.4** produced a strong set of responses, once students were able to consider the impact of erosion on their chosen glaciated landscape
- Question **05.5** generally performed well once students understood the concept of human occupation and provided this was backed up with an appropriate case study of a multi hazardous environment.

Areas where students struggled

- Question **05.1** about island arc formation produced a very polarised set of responses. Too many confused arcs with chains which have very different theories around their formation.
- In general, analysis and interpretation of map evidence requires further development.
- Question **02.2** required students to analyse map data. Students needed to look at patterns, use supporting data, and identify anomalies. There were also opportunities to cross reference between the two maps, particularly in ascertaining the extent of correlation between rainfall and temperature.

- Some students found Question **03.2** on the coastal unit quite challenging. However, it was perhaps a little more simplistic than many realised. It showed three variables: different sea level change scenarios; no and maximum human response in the management of sea level changes and how these two variables affect potential impacts of sea level rise. Those that understood this information readily achieved the highest marks once they picked out patterns, anomalies and used some data in support.
- Question **03.3** did not really perform too well in novel situations. Students needed to assess the sustainability of different approaches to coastal management. It was much more simplistic than many realised. It did not require any detailed knowledge of the named approaches or case study recital. It was simply about showing understanding that some approaches (e.g. working with nature through soft engineering) are generally considered more sustainable than others (e.g. hard engineering). There was also some debate to be had around ideas of managed retreat in terms of its sustainability.
- Question **05.4** did not perform quite as well as **06.4** on the 9-mark Section C options. Students need to show understanding that whilst economic development can certainly help and provide advantages in tackling wildfire, there are many other natural and human factors which can affect outcomes from wildfire events. Case study support clearly helped but was not essential.
- Question **03.4** was very much a physical essay question. Too many brought in material which simply was not relevant to this question. The only real route to bringing in coastal management was through developing ideas of unintended consequences of management further down the coast e.g. by starving beaches of sediment and accelerating erosion elsewhere.

Point marked questions

4-mark questions are point marked. A mark may be awarded where a student makes a single relevant point and subsequent marks awarded (if applicable) where the student develops those points with additional knowledge.

Levels marked questions

6-mark, 9-mark and 20-mark questions are levels marked where the response is holistically marked against the assessment objectives, given a mid-level mark initially and then a fine tune mark awarded within that level.

Assessment Objectives (AOs)

AO1: Demonstrate knowledge and understanding of places, environments, concepts, processes, interactions and change, at a variety of scales (30-40%).

AO2: Apply knowledge and understanding in different contexts to interpret, analyse and evaluate geographical information and issues (30-40%).

AO3: Use a variety of relevant quantitative, qualitative and fieldwork skills to:

- investigate geographical questions and issues
- interpret, analyse and evaluate data and evidence
- construct arguments and draw conclusions (20-30%)

4-mark AO1 questions

These questions assess knowledge and understanding and require students to outline key processes, concepts, interaction and change.

Qualities seen in more successful responses

Question 01.1 (AO1) (4 marks) was generally well done by students. Examiners allowed a multitude of approaches including a more systems-based approach as well as outlining features and characteristics. It was pleasing to note just how many students made relevant points about these features. 'Max' is used when the student could score more marks but has reached the maximum available.

0 1 . 1 Outline characteristic features of a drainage basin. [4 marks]

Just enough once the word open appears. System on its own not enough

A drainage basin is an open system. ✓
It has key inputs such as precipitation, DP
that introduce water into the system. ✓
~~some~~ major ~~the~~ transfers include percolation,
where water moves downwards ~~into~~ ^{through} the soil, infiltration, *
interception and surface run-off. Many tributaries
may run and contribute to the main river. ✓
Stores include the biospheric stores, ^{such as vegetation} and water
Extra space sources such as lakes. Outputs where water
leaves the system includes evaporation and
transpiration from vegetation. One example of a
drainage basin is the river's catchment area.

* where water moves downwards into the soil

max

This response took a systems approach and scored rapidly.

4 marks

On question 05.1 (AO1) (4 marks), this response demonstrates a sound understanding of the processes in the formation of island arcs. Examples were often creditworthy on these question types, though in this case, the student had already achieved maximum marks.

0 5 . 1 Outline processes involved in the formation of island arcs.

[4 marks]

Along a destructive plate boundary, an oceanic plate will always subduct. As the subducting plate seeps into the mantle at an average speed of 6mm/yr, the subducting plate will melt. The mantle is around 3500°C of which mixing with the plate creates plutons. These plutons will rise to the crust and will breach through the crust. This is in the form of a volcano. As it is an oceanic plate, extra space Over time continuous sinking of the subducting plate will produce more plutons which will create greater volcanoes, and eventually islands over millions of years. Along the plate boundary multiple of these islands will form, creating an island arc. An example of an island arc are the Caribbean islands, like Montserrat and Antigua and Barbuda.

Question 5 continues on the next page

max

This answer demonstrates a clear understanding of processes in the formation of island arcs.

4 marks

Limitations of less successful responses

On **question 05.1 (AO1) (4 marks)**, too many confused arcs with chains. Even very strong geographers, such as this one, made this fundamental error and lost relatively easy marks. Responses needed to start with ideas around destructive plate margins colliding, followed by subduction.

05.1

Outline processes involved in the formation of island arcs.

[4 marks]

Island arcs, as seen ~~in~~ ⁱⁿ the islands of Hawaii are formed due to hotspots. ^(NC) As convection currents occur in the mantle, lava plumes may occur. This means that magma, heated by the core becomes less dense and rises. Where these plumes meet the crust, a hotspot occurs, ~~allowing the~~ allowing the formation of a shallow sided, shield volcano. ^{and convection currents}
Extra space Due to plate ~~mov~~ tectonic movement, the plates move, creating an arc of islands, with the youngest and most active island ~~are~~ closest to the hotspot. ^(NAQ)

Question 5 continues on the next page

Chains not arcs.

This answer confused arcs with chains.

0 marks

On **Question 03.1 (AO1) (4 marks)** understanding the sequence in the formation of such landforms is very important on these four-mark questions. The student should have started with a beach, the tidal range and an onshore wind, before moving on to dune stabilisation by vegetation.

03.1 Outline processes leading to the formation of sand dunes. [4 marks]

embryo dunes

They are formed when wind blows sand onto the cliff. This sand is colonised by beams and vegetation which stabilise the sand. They then trap more sand when wind blows ~~into~~ sand ^{its} onto the cliff due to ^{its} vegetation. When these dunes grow into them, they are called ancient dunes which are up to 10 m in height.

characteristic not process

Extra space

This student had only a vague understanding about the processes of sand dune formation.

2 marks

6-mark AO3 questions

These questions assess how students interpret, analyse and evaluate data, evidence and resources.

Qualities seen in more successful responses

In **Question 01.2 (AO3) (6 marks)** it's evident that students are now well used to working with data, interpreting map information and analysis using data to support. The key to success was in understanding that this was a compound, cumulative bar graph showing how global emissions are predicted to fall by 2030. There was plenty to analyse here including the identification of Turkey and Mexico as obvious anomalies. Whilst there is never any credit for applying knowledge, this question did allow students to note that generally richer more developing countries were forecast to make bigger contributions to the reduction in greenhouse gases. This was because such information was hinted at in the resources through reference to G20 and non-G20 countries.

Figure 1 is in the insert.

Figure 1 shows the projected cumulative changes in greenhouse gas emissions by selected countries and groups of countries from 2015 to 2030.

0 1 - 2 Analyse the data shown in Figure 1.

[6 marks]

Overall there is a general trend that greenhouse gas emissions from 2015 to 2030 will be reduced in all countries (from figure 1) with the exception of with the total reduction being 4400Mt CO₂e. However there is an anomaly as Mexico will increase ^{in emissions} during this period by around 50Mt CO₂e, and Turkey will not change.

The largest ^{decrease} change in greenhouse emissions by a single country is by the USA reducing emission by 800Mt CO₂e, which is 18.1% of the ^{world's} total reduction. However the smallest change decrease has been by India of around 50Mt CO₂e which is only 1.14% of the world's total reduction.

Question 1 continues on the next page

L2

Brief but pretty impressive.

This response is brief, but purposeful, picking out lots of key information showing a solid understanding of what the resource showed.

Level 2 (6 marks)

On **question 03.2 (A03) (6 marks)**, once students understood the three variables in the response it became relatively straightforward to access Level 2 and full marks. Even where there was minor misunderstanding, access to Level 2 was still possible.

Figure 5 is in the insert.

Figure 5 shows risk in the year 2100 under different sea level rise and human response scenarios in four types of coastal locations.

0 3 . 2 Analyse the information shown in Figure 5. [6 marks]

Fig 5. shows that ~~the~~ small urbanised islands are the most at risk from sea level rise. ^{A03} with no to low human response, the high emission scenario will result in a 100% chance of high risk risk, ^{A03} severe, irreversible impacts - 2x the 50% chance seen with Arctic ^{A03} communities at the upper end of the predictions. Small urbanised islands are the anomaly in that all sea level rise under any scenario result in detectable impact, ^{A03} unlike for example HICs.

Extra space which, with human response, can result in undetectable impact into high emission scenarios. ^{A03} In large tropical agricultural deltas, there is 400% more likely to experience significant and widespread impact than if the maximum potential human response is taken, or an extra 0.22°C until these effects are felt. ^{A03}

on average, in Arctic communities and small urbanised islands - the max potential response doubles the temperature at which impacts are undetectable, AC i.e 0.2°C to 0.4°C felt. ^{NAQ}

That is actually true.

It does look to be about 4x bigger.

Has misunderstood the y axis, but pretty well expressed other than that.

L2

1 6

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The response slightly misunderstood the y axis so full credit was not accessible. However, there was enough evidence to access the middle Level 2.

Level 2 (5 marks)

Limitations of less successful responses

Question 04.2 (AO3) (6 marks) there were many ways to access credit by spotting the differences between and within north and interior Alaska. Students who drifted into applying knowledge and understanding failed to score credit for such an approach.

Figure 7 is in the insert.

Figure 7 shows permafrost temperature variation in interior Alaska compared to northern Alaska from 1978 to 2020.

0 4 . 2

Analyse the data shown in Figure 7.

[6 marks]

Figure 7 Shows that in general, variation is greater in Northern Alaska than interior Alaska. AO3 This may be due to the type of permafrost located here, with continuous permafrost in Northern Alaska changing to be more sporadic as time goes on. NC West Dock AO3 has a large temperature variation, with AO3 3°C. Comparing this to the 0.1°C change AO3 in Livengood. It is evident that Northern Alaska is experiencing less temperature variation as it is getting warmer all year round. ? This means there is an increase in the depth of the Active layer in Northern Alaska. NC Interior Alaska likely shows little variation because here it is warmer NC so there is less permafrost covering the area here. NC

L1

Too much drift in here and a general lack of accuracy.

This response needed to focus upon analysis, trend, manipulation of data in support, connection or differences within the data set and identification of anything bucking the trend. Instead, the response tried to account for variations.

Level 1 (2 marks)

In **question 05.2 (AO3) (6 marks)** students needed to compare patterns on the map with information evidence in the resource. There was plenty to write in terms of the quite varied patterns on the map and how this correlated or arguably contradicted that which was evident in the resource. There was ample opportunity to evaluate the effectiveness of the resource. This is always creditable on the skills questions. In this case, the logarithmic scale was really of quite limited use in displaying what is clearly a very large variation in risk of seismic event in this part of the USA.

0 5 . 2 Interpret the data shown in Figure 9.

[6 marks]

Figure 9 shows that in general there is low likely hood of a large scale earthquake, with most areas including Sacramento and San Diego being reasonably safe, with a less than 0.1% chance. However, an exception to the trend is in the west border near San Francisco. These areas have an average of a 9.5% chance of experiencing an earthquake with a magnitude of over 6.7 in the next 30 years. This could be detrimental to areas with lower probabilities as the ~~stability~~ nature of earthquakes in California mean neighbouring areas could also be impacted. However, California's high level of economic development mean they will likely be able to respond quickly. They can also predict and adapt to the almost guaranteed effects of earthquakes which are guaranteed to strike.

Almost completely irrelevant to the Q. Drift into K/U spec content.

This response really needed to compare patterns on the map with information evident in the resource. This response drifted away from the theme of the question quite considerably.

Level 1 (1 mark)

6- & 9-mark AO1/AO2 questions with stimulus

These questions assess knowledge and understanding when applied to novel situations (resource prompts).

Qualities seen in more successful responses

These are quite challenging questions, which students do often find to be quite difficult in general. The key to success is to quickly ascertain what the resource shows and which part of the specification is being targeted. Once this is established, students simply need to answer the question being posed, drawing upon relevant learned material as part of that unit.

In **question 06.3 (AO1 & AO2) (9 marks)** a simplified nutrient cycle was displayed. Students needed to consider how human activity might affect different aspects of both the stores and transfers. The best responses showed how knock-on effects could occur within the cycle once one part is disrupted.

06.3 Using Figure 12 and your own knowledge, assess impacts of human activity on the cycling of nutrients in a temperate deciduous woodland. [9 marks]

Human activity such as the construction of new infrastructure can significantly impact the nutrient cycle. The construction of HS2 (so far) has led to the removal of over 20ha of mature deciduous woodland, taking a significant amount of nutrients out of the biomass, therefore reducing the overall cycling of nutrients. However, the drilling required has weathered and broken up rocks in the ecosystem, leading to new input into the cycle, as seen in Fig 12. As well as this, climate change is having a significant impact on the cycling of nutrients. Burning of hydrocarbons is leading to increased global warming through the enhanced greenhouse effect. The process of decomposition speeds up in warm and wet conditions (also helped by the 30% predicted increase in winter rainfall by 2050), making the nutrient cycle much faster - which an increased soil store and reduced litter store as a result.

* EXTRA PAPER

6.3 In conclusion, human activity can both increase and decrease the speed of the cycle, change the size of the stores and reduce the amount of nutrients in it through climate change and infrastructure construction. In the future it is clear that due to increasing climate change the cycle in this ecosystem will get faster through speedier decomposition - and population increase will lead to more infrastructure projects to support them - removing more nutrients from the cycle.

Pretty strong and sees the connections between different aspects of the process.

Level 3 (8 marks)

This was a strong level 3 response. This response did rather well on detailing the impact of human activity on some aspects of the nutrient cycle but could have been a little broader. For example, when considering deforestation, a little more detail was needed on how this disrupts the cycle. Cutting down trees exposes soil to potentially increased leaching whilst also reducing the litter, which provides the soil with one important source of nutrients. Nevertheless, this was a strong level 3 response.

In **question 01.3 (AO1 & AO2) (6 marks)** there was no real credit for long narrative on either sustainable water supply case study material or on a flooding case study. This was not the focus of the question. Students had to pick out physical and human factors affecting the water cycle, many of which were hinted at in the resource. Once they did this, the question then needed some consideration of the relative importance i.e. which group of factors was more important in meeting the definition provided in the resource. Students were free to argue either way. Some suggested that without a supply of water in the first place, sustainability would be impossible to achieve. Others argued that it does not matter how much water is available, if it is not potable water, it can never be sustainable.

Figure 2 is in the insert.

Figure 2 shows a simplified sustainable water supply system in north-east Ohio, USA.

0 1 . 3 Using Figure 2 and your own knowledge, assess the relative importance of physical and human factors in achieving a sustainable water supply. [6 marks]

On one side, physical factors are much more important when achieving a water supply that can actively sustain an entire population. As seen in figure 2, without the occurrence of a stream, a physical factor of the Ohio area, the access to water for the area as a whole may not be sustainable. Without the initial access to the source, no water would be able to be created, and thus provided for human activity, or else the area had only sufficient access. expensive transfer schemes would have to be imported to ensure ~~the~~ water.

On the other side, human factors are much more significant. This is because despite the physical extra space factors determining the introduction of water, human factors allow water to be sufficiently used. For example, as seen in figure 2, without waste treatment plans, and pumps to supply water, the ~~area~~ ^{as untreated water is unsuitable for consumption and other activities} would be an extreme reduction in usable water on a local scale. This is why, overall, human factors are more important to a distinct extent, as even if the physical factors provide the initial source of water, without the human technologies, the water may remain unusable.

Pick out some physical and human factors and assesses these with application to the resource.

L2

This response produced a well-focused answer on the physical and human factors affecting the water cycle. It argued in favour that it does not matter how much water is available, if it is not potable water, it can never be sustainable and scored full marks.

Level 2 (6 marks)

Limitations of less successful responses

Question 03.3 (AO1 & AO2) (6 marks), the coasts question, focused on different groups and types of coastal management strategies, many of which would be familiar to students. The resource was set out as a series of steps in an integrated approach. Students needed to consider each step and judge or assess the likely sustainability of the approach. For example, hard engineering schemes certainly perform a function in protecting a coastline. However, many argue that these are not in keeping with the local environment and may disrupt natural processes, causing issues elsewhere. Conversely many would argue that restoring wetlands is inherently sustainable as coastal impacts can be absorbed by the wetlands, whilst also creating natural habitats supporting a rejuvenated ecosystem.

03.3

Using **Figure 6** and your own knowledge, assess the sustainability of management strategies in reducing risk of coastal flooding.

[6 marks]

AO1

Figure 6 shows decreasing risk reduction strategies. The highest risk reduction is shown to be restoring wetlands and eco-friendly infrastructure. This is an approach used to in the Odisha coast of India. They use ICZMs to protect ~~the~~ their coastline.

AO1

There are mangroves in place which boost biodiversity as well as hold sediment in place - acting as a natural coastal defense.

AO1

The second most effective strategy is in ^{one way} SMP - shoreline management

Extra space ~~plans~~ plans. These focus on using coastal defenses such as hard engineering to combat high energy waves.

AO1

Some K/U but only implied answer to the Q.

L1

This response relied too heavily on case study support. It would benefit from more direct engagement with the resource and a clearer focus on addressing the specific demands of the question.

Level 1 (2 marks)

On question 04.3 (AO1 & AO2) (6 marks) an infographic was presented which displayed a variety of changes to alpine tundra in the coming decades in different climate change scenarios. Students had to translate those changes into potential impacts. The focus was then on picking out the potential negative impacts or challenges. Opportunities were missed to consider impacts on farming, tourism, water supply and invasive species into the natural habitats.

Figure 8 shows the impact on alpine tundra of a changing climate in Europe.

04.3 Using **Figure 8** and your own knowledge, assess the challenges that climate change is likely to pose in these alpine tundra regions. [6 marks]

Figure 8 presents us with the idea that an increase in global temperatures by just ~~30~~ 3° Celsius will lead to a decrease in Alpine Tundra areas by 84%. In addition, the figure also suggests that the tree line will move up to 8 metres annually with this temperature rise. This is significant as such a change will result in an overall decrease in vegetation, since the ground-level shrubs which characterise the Alpine Tundra will be unable to grow at higher altitudes, which have harsher climatic conditions. Overall, it is clear that climate change poses a threat to not only the existence of Alpine Tundra regions, but also the features that define it.

AO1 **L1**

Extra space

Question 4 continues on the next page

Never really gets to the thrust of the Q.

Turn over ▶

This response was limited. It only really hinted at one challenge in a superficial fashion.

Level 1 (1 mark)

9-mark AO1/AO2 questions (no stimulus)

These questions assess knowledge and understanding of links made within or across specification units.

Qualities seen in more successful responses

Question 06.4 (AO1 & AO2) (9 marks) required consideration of the likely impacts of climate change on savanna grasslands, with a particularly focus upon people. So, whilst climate change initially affects the natural environment, it was the knock-on effects to people which really triggered the credit.

06/4 Assess the potential impact of climate change upon people living in savanna grasslands. [9 marks]

Climate change will cause temperature to increase with global warming, causing savanna grasslands areas such as the Serengeti to become hotter and more arid as moisture is evaporated and lost from the ecosystem. This increase in aridity cause annual rain precipitation to fall from 1000mm annually to less than 500mm causing the area to become a semi-arid area. This aridity may therefore decrease crop productivity due to the lack of water, causing food scarcity for people within the Serengeti, as observed in the 1960s where years of droughts caused water crop failures and undernourishment. Thus climate change with savanna grasslands may increase food scarcity causing famine.

Moreover, climate change with temperature predicted to rise by 1.5°C by the end of the 21st century.

Extra space Increase wildfires within the savanna grasslands like the Serengeti, these wildfires may also burn grazing land for cattle, causing them, fire-resistant trees such as Baobab to remain, which cattle do not eat. This may cause livestock to die, forcing people with savanna grasslands to migrate to uninhabitable areas where livestock may thrive, in turn causing overcrowding of areas as more people migrate causing lower quality of life.

To conclude, climate change may be causing increasing temperature may increase crop productivity and livestock productivity, forcing people to migrate to avoid food scarcity and undernourishment which previously occurred in the African savanna in the 1960s.

Plenty of detail here with useful support

This response offered strong knowledge and understanding but also applied this well to show understanding of how people may face negative impacts arising out of the changes.

Level 3 (9 marks)

Limitations of less successful responses

Question 05.4 (AO1 & AO2) (9 mark) should have been more straightforward than many found this to be. A typical answer acknowledged that economic development will usually mean that a higher income country will usually have more tools at its disposal to tackle wildfire both in planning for and responding to it. A combination of education, land use mapping, satellite imagery including weather forecasting can also help to plan for a wildfire. Wide ranging responses are also more readily available in richer parts of the world through deployment of firefighters, using aerial techniques and controlled burning. The nuance of the question really invited students to draw on their own case study support to show how other factors may contribute more substantially. This included consideration of drought, availability of fuel and proximity to built-up areas. Indeed, some of the worst wildfires (in terms of impact on people) have been in some of the richest parts of the world.

0 5 4 Evaluate the role of economic development in the management of wildfires. [9 m]

I would argue that ^{like} economic development is important in the management of wildfires, education and awareness play a much more significant role. [A02]

Firstly, it is apparent that economic development ~~does~~ play a role in determining the effectiveness of managing wildfires. For instance, during the California wildfires, the areas and homes most at risk are likely to have been somewhat well developed, since the USA is a HIC. This would, in turn, reduce the risk of potential damage to structures and a general loss of life. [A01] [A02]

Extra space However, I would argue that education plays a much more active role in effectively managing wildfires. For instance, in the USA, Smoke Pedia [A01] is used to warn children of the danger that wildfires pose and how they can be prevented. This is largely more useful for reducing the danger of wildfires by ensuring that they are never started. [L1]

Very basic really. These studies are referenced but very little support and not a very logical argument.

This response failed to get to the required depth and instead relied on only the most basic ideas.

Level 1 (2 marks)

20-mark questions

These questions assess knowledge, understanding and application: constructing arguments and drawing conclusions.

Qualities seen in more successful responses

These questions are designed to allow students to demonstrate links within different areas of the specification unit. Examiners expect to see secure underpinning knowledge and understanding as well as depth of support including case study material as appropriate. This should then be used to craft a balanced argument with a sustained line of reasoning. Students often look at more than one side of an argument. This is to be encouraged, but examiners would really hope to see a sustained argument which considered these different viewpoints, i.e. that they hold their own, well supported position throughout.

On **question 01.4**, students did analyse a number of factors driving change in the magnitude of carbon stores.

0 1 . 4

Analyse factors driving change in the magnitude of carbon stores in a tropical rainforest that you have studied.

[20 marks]

The Amazon rainforest is an example of a tropical rainforest, located in South America, primarily covering the country of Brazil. It experiences a tropical climate, with high humidity levels and around 2000mm of precipitation on an annual basis. Within this area, the carbon cycle is extremely active, however due to human activities, such as cattle farming, mining and deforestation, these stores are changing to a significant extent.

Firstly, cattle farming is the most significant human activity within the Amazon, contributing to 80% of overall deforestation. This extremely large scale activity, distinctly impacts the carbon cycle. With the loss of trees, ~~there is a transfer from~~ there is a loss of a carbon sink, with processes such as slash and burn to clear the area, leading to over 1 million tonnes of CO₂ being emitted. This, thus, creates a positive feedback loop, with decreasing biospheric stores, and increasing atmospheric stores leading to the enhanced greenhouse effect, with increasing radiation warming global temperatures. As a

result, optimal growing conditions are altered, further declining the vegetation carbon sink. Moreover, cattle digest via enteric fermentation. AO2 AO1

This means that methane, CH_4 , is emitted, AO1 which is 84x more potent than CO_2 . This AO1 therefore forms the previous feedback loop, AO1 increasing the volume of carbon held in the atmospheric store and decreasing the biospheric store, AO2 or displaying how long term and global scale the impacts of cattle farming are.

AO1 Additionally, mining has distinct impacts on the AO2 carbon stores. With minerals, such as bauxite AO1 being mined, trees were cleared for roads to be built to transport the mined goods. AO1 With the further loss of the vegetation and AO2 extra space store of carbon, AO2 from the deforestation for the building of the trans-Amazonian highway, this has increased the global scale stores of atmospheric carbon. Moreover, by the use of vehicles for transportation and machinery for mining, further AO2 CO_2 volumes were emitted into the atmosphere, AO2 causing drastic increases in the overall atmospheric store. These exemplify how mining is fairly significant AO2 at influencing the changing stores of carbon. // AO2 Finally, afforestation is a growing action that is

A02 more positively influencing the changing stores of carbon. With programmes taking place in the Amazon to plant 25 million trees, this opposes the alternative human activities. There is an increasing opportunity for carbon storage within the vegetation, allowing a decline in the atmospheric storage. This, however, may be a longer term process, with planting trees being costly, as well as time being needed for full development into an ^{effective} carbon sink. This is why afforestation is A02 significant to a great extent at influencing carbon stores.

To conclude, End of Section A

Turn over for Section B

A02 To conclude, I believe to a great extent that cattle farming is the most significant factor in driving changes to the ~~global~~ stores of carbon, due to its large scale impact within the Amazon. However, I do believe that as growing ~~sustainable~~ initiatives emerge, afforestation will increase and may in the long term, become more significant.

A02 * A negative feedback loop is ~~seen~~ ^{due to} seen here, with increasing temperatures ^{due to} leading to carbon fertilization and increasing CO₂ intake from the vegetation carbon sink. A02

L4

Answers the Q with pretty strong support. Largely around deforestation but also considers afforestation and mining. Well written and well argued. Strong K/U.

Turn over ►



0 7

Q/Jun25/7037/1

In question 01.4, this response, though a little narrow, did analyse a number of factors driving change in the magnitude of carbon stores. The case study was good and offered some useful contextual information from the outset. The response then considered cattle farming and mining as key factors driving change in the magnitude of the carbon stores. It also considered afforestation as a factor increasing the carbon store. However, there was limited consideration of natural factors, such as wildfire, drought or floods and the associated impacts on soil and biomass stores driving change. There was enough focus and detail for mid-Level 4. It would have also been improved with a little more detail on process. For example, how deforestation might have knock-on effects beyond the biomass and into the soil store of carbon.

Level 4 (18 marks)

For **Question 05.5 (AO1 & AO2) (20 marks)** provided students had a suitable case study and understood the meaning of the term human occupation, many went on to produce clear, strong responses.

0 5 . 5

Assess the future prospects for sustainable human occupation of a multi-hazardous environment that you have studied.

→ Typhoon Haiyan

[20 marks]

The Multi-Hazardous environment I have studied is the Philippines, ^{the Philippines} AO1 which is located in the Inter-Tropical Convergence Zone. AO1 This means hazards are often more frequent and pose a higher risk to a considerably large population (over 100 million). AO1 There are future ways to sustain human occupation of the Philippines through managing and responding to hazards (e.g. Typhoon Haiyan in 2013). AO1 However, there are challenges for this management of occupation in regards to the country's economic status and its AO2 geographical location.

AO2 First and foremost, one setback to sustainable human occupation of the Philippines is its location and distribution. The Philippines AO1 is made up of hundreds of islands, meaning more coastlines are exposed. As a result, less wave energy is absorbed as there is

- less infrastructure and lead to about this. This ^[AO1] large impact is actively demonstrated in typhoon Haiyan, 2013, which was a Category 5 ^[AO1] storm with wind speeds of 150 mph. This resulted in ^{high} waves of up to 7m which caused ^[AO1] huge damage to the area. For instance, the cost of damage was \$13 billion due to destruction of houses and infrastructure such as roads and businesses. This results in more homeless people, so more people are placed together in emergency shelters where diseases are and germs are spread. Infrastructure damage means emergency services cannot access affected areas, leading to ^[AO1] more impacts. Businesses destroyed creates a negative multiplier effect, due to ~~to~~ more jobs being lost. Overall future occupation of the Philippines is hard due to its location on the tectonic and its vulnerability to high waves and wind speeds. However, ^[AO1] ~~prospects~~ ways to manage activity may include implementing warning systems; for instance, PAGASA warning system were established for typhoon Haiyan 2 days before the typhoon made landfall. This is effective in overcoming challenges faced because it ^[AO2] lead to 400,000 evacuations. It ~~is~~ also tracked the direction of the storm, meaning that people were aware if they were at risk of danger. Overall, I believe it is challenging to ^[AO2] sustainably occupy the Philippines in regards to its hazards due to its location and the frequency of tropical storms. This is still the case, despite efforts such as the PAGASA warning system, ^[AO2] which encourage people about to be affected.

Extra space Additionally on the Setback of Sustainable human

AO2 occupation of the Philippines is the country's economic situation.

The Philippines is a L.I.C, meaning responses are often limited. For instance, in Typhoon Haiyan, poor infrastructure meant emergency

AO1 services could not reach those affected. Poor infrastructure also means quality of housing is low, so more houses are destroyed,

AO1 leading to a overall high cost of damage (\$13 billion in Typhoon Haiyan). There is also worse healthcare affecting those who are injured or who require serious medical attention. Therefore,

AO2 there are huge challenges for future prospects for sustainable human occupation of the Philippines. However, foreign investment

AO1 and aid can help overcome this issue. For example in typhoon Haiyan, the aid and UN organisations provided support. Direct support from countries such as Australia who sent over Australian

AO2 airforce and volunteers to provide for the affected. Overall whilst human intervention occupation is limited due to level of development, foreign aid helps overcome this issue.

AO2 In conclusion, I think human occupation in the Philippines is very unlikely in the Philippines due to its location and its level of development. However, foreign aid and working system

help overcome these issues.

Argues in the negative which is fine. Does answer the Q and the idea of sustainable occupation permeates throughout. Plenty of detail in support and assessment re theme.

L4

Turn over ►

This student chose the Philippines and remained focused on ideas around how it might secure sustainable human occupation into the future with the main focus being on challenges in achieving such ambitions.

Level 4 (16 marks)

Limitations of less successful responses

Weaker answers on **question 03.4 (A01 & A02) (20 marks)** really failed to understand the context of the question i.e. that the focus was on high energy, erosional coastlines. They were then expected to consider factors creating such environments i.e. marine factors (fetch, tides, currents, destructive waves, deep water coastlines) alongside sub aerial factors (weather, low pressure and associated impacts), as well as rock type and geology.

03.4

With reference to **one or more** coastal environment(s) that you have studied, analyse factors and processes leading to the development of a high energy, erosional coastal landscape.

[20 marks]

Low energy depositional coastline. Wrong eg really.

Seydon Coast is ~~in~~ the North West of England, just North of Liverpool. It is 20 miles long and has the largest dunes in ~~the~~ ^{England} comprising of 40% of the England's dunes.

Human factors that are leading to Seydon becoming more erosional is beach dredging. A02

This is done for the glass industry. There is also the implementation of hard defences.

NC But can in the short term, damage the ~~the~~ natural environment. In addition, there is a popular area called Formby Point

which has lots of tourist attractions such as beaches and ~~and~~ water parks. A01

NC When people walk in the dunes, it can damage the ~~integrity~~ ~~the~~ stability of the dune, removing a natural defence against erosion.

NC * as well as native rare species such as nattergal and red squirrels.

Holderness Coast A01 is on the East British coastline. ~~The~~ factors affecting leading

to the development of high energy coasts
 and coastal landscapes have tend to be
 more physical - specifically geology. The
 coast is mainly composed of boulder clay
 which is an unconsolidated rock. This
 makes the coast subject to erosion. This
 soft rock has led to mass slippings
 in Holderness, where due to soft bases of
 clays, land slumps and mass movement
 occurs. Hornsea is a seaside town on
 the Holderness coastline with a population
 of 8000. To protect the coastline they
 implemented groynes. These groynes hold
 sediment within their artificial sediment
 cell but causes other beaches along
 the coastline to suffer from terminal
 groyne syndrome as they gain no sediment.
 This makes them more subject to erosion.
 To conclude, I think that factors contrib-
 uting to erosional and high energy
 coasts is a circumstantial? subject.
 In some regions, topology will contribute
 to more physical factors, but in areas
 where natural resources are exploited, human factors ^{prevail}



19

Has not demonstrated understanding of the Q in first part of the answer and used the wrong case study. Holderness geology is useful as is the terminal groyne idea.

Turn over ►

L2

GUJun25/7037/1

This response did improve but initially offered the wrong focus.

Level 2 (7 marks)

Question 04.4 (AO1 & AO2) (20 marks) the focus was often in the right area, but the answers lacked depth.

0 4 . 4

With reference to a glaciated landscape that you have studied, to what extent has erosion been the dominant process shaping the landscape?

[20 marks]

Using the Lake District as reference, I would agree that it is primarily erosional processes which have been shaping the landscape, since the impact of deposition is much less forthcoming.

Within the Lake District, it is clear that erosion is primarily responsible in shaping the landscape. For example, Striding Edge is an arête which stands beside Helvellyn, a pyramidal peak that has been carved out as the previously present glacier has advanced and subsequently retreated. As a result, Striding Edge is a prominent feature of the landscape, one that still stands today and serves a reminder of the erosional processes which shaped the landscape of the Lake District.

On the other hand, it may also be stated that depositional processes play a greater

role in shaping the wider geographical landscape of the Lake District, hence the remnants remain part of the present-day landscape. For instance, there is evidence of kames and eskers within the Lake District, formed by previously deposited sediment carried by sub-glacial meltwater streams.

Never really gets the Q in any depth. Aware of erosional features but not developed. No structure in terms of conclusion either. However has offered erosion and deposition factors shaping landscape an appropriate case study.

L2

On question **04.4 (AO1 & AO2) (20 marks)**, whilst the focus was in the correct area i.e. the Lake District, the argument was limited, and it never really got the required depth to produce a clear answer. The relative brevity also contributed to that lack of depth.

Level 2 (7 marks)

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