A Level

Geography

7037/1

Report on the exam

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Summary

The students were generally well prepared for this series. There were few rubric issues. Students almost completely understood the requirement to choose one question from each optional section. Similarly writing stamina was strong with the vast majority of students finishing the paper within the scheduled time. Answers seemed to be balanced across the paper in most cases. For those who fell short on a unit, it was evidently more reflective of revision and preparation than any inability to physically complete the paper.

Some question types were generally more effectively attempted than others. For the 4-mark AO1 questions, as is usually the case, students either knew the relevant subject matter or they did not. Where they did, it was relatively easy to score well.

For the skills questions, students now understand those questions that require analysis. However, some still struggled with the skill evaluation questions e.g. Q.2.2, Q.3.2, Q.4.2 and Q.5.2. Students need to be mindful that skills questions can test analysis, evaluation and interpretation of geographical information and skills (AO3).

The 9-mark AO1/AO2 questions in Section C generally caused no major issues. The key differentiator was around those who understood the key terms of the specification (*nuees ardentes* in Q.5.4 and regions experiencing ecological change in Q.6.4).

For the 20-mark questions there was a more physical focus to most of the questions in this series. Those that prepared well (and, crucially, those that read the questions carefully), comfortably scored Level 3/4.

Understanding the focus of the novel situations questions and how the assessment objectives AO1 and AO2 are applied, still remains an issue for some students. This was specifically the case with the 'x.3' questions on all core and optional units. Many are still analysing data rather than applying knowledge to the resource provided. For example, in response to Q1.3 many failed to consider the challenges around carbon sequestration and instead simply analysed the compound bar graph. This remains an area to improve for many students.

Areas where students excelled

- On the compulsory unit, Water and Carbon, the skills question (Q.1.2) was successfully answered by many students. The resource had some complexity and it was handled well by many. Opportunities to manipulate data (e.g. calculation of actual amounts used in different sectors) were taken by many.
- Students who read the essay question (Q.1.4) carefully, generally accessed Level 3/4 comfortably. They were required to consider how changes to the carbon budget affected a named tropical rainforest. Some misread the Q and considered how changes in the forest affected the carbon budget. As the question was effectively about positive and negative feedback, it was still possible to find credit with this approach.
- On Question 2, weathering processes in hot deserts was well understood (Q.2.1).
- Similarly, Q.2.3 was relatively straightforward for most. Most understand the difference between the physical and human factors affecting flash flooding in this desert landscape.
- Q.2.4 was successful for those who showed understanding of how different sources of energy lead to distinct landscapes.
- Q.3.3, was generally successfully answered, most particularly where students engaged with the concept of sustainability and the information inferred by the data.
- Q.3.4 posed no major issues for students. Many considered natural process versus human impacts on coastlines, not least through coastal management.

- On the Hazards unit, most readily understood the role of mitigation in hazard management with many referencing the hazard management cycle to good effect.
- Q.5.3 was well answered in general. Students readily applied potential management techniques to different areas in the Waikato District.
- On the Ecosystems unit, Q6.2 was very successful for many. Although quite a challenging resource it was really positive to see how many were able to spot patterns, manipulate data and identify anomalies in the data set.
- Q6.5 was an accessible question for most students. Knowledge of development pressures facing the Amazon and the Savanna was generally impressive.

Areas where students struggled

- On Water and carbon unit, the purpose of the flood hydrograph (Q1.1) is not the same as what the hydrograph shows. A significant number failed to get beyond what it shows which limited their available credit.
- For Q.1.3 many struggled to with the concept of carbon sequestration and instead simply analysed the data.
- On each of the skills questions in Section B (Q1.2, Q.2.2, Q.3.2), many students failed to show understanding of the use and limitations of standard deviation. So, whilst many had access to the first 3 marks, few went to score well on the second 3 marks. It is important that all students show that they can evaluate the strengths and limitations of different graphical, cartographical and statistical skills.
- On Q.4.1, students either knew about ice movement or they did not. This question therefore produced quite polarised responses. Basal sliding and internal deformation were most common but other approaches such as extensional and compressional flows were also considered.
- On Q.4.3, application of knowledge rarely came through strongly. Opportunities to link to positive feedback for example were not taken.
- On Q.4.4, those that properly understood fluvioglacial processes and landforms did really well. The issue was that many confused fluvioglacial landscapes with glacial landscapes and this held many responses back to partial answers at best.
- For Q.5.2, careful evaluation would have shown that these resources do very little to show that wildfires are increasing in intensity and severity. This again shows the need for more practice on evaluation of resources and techniques.
- Q.5.4 is a reminder that all areas of content can be examined over the lifetime of the specification. Too many simply did not know the hazards created by *nuees ardentes*. This limited those responses.
- On Q.5.5, physical processes and factors should have been relatively straightforward. This could have included factors such as climate, geographical location, tectonic setting etc. Too many never really engaged with these, but did show some awareness of human factors. Such responses were limited.
- On Q.6.1, net primary production was simply not understood by many.
- For Q.6.3 there was quite a lot more alluded to than just the conflict between visitors and ecosystems through the interface of footpaths. Many failed to go beyond this.
- Concerning Q.6.4, limited awareness of a region experiencing ecological change was a significant factor in many responses. Without a sound basis many students failed to progress their response.

4 mark AO1 questions

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

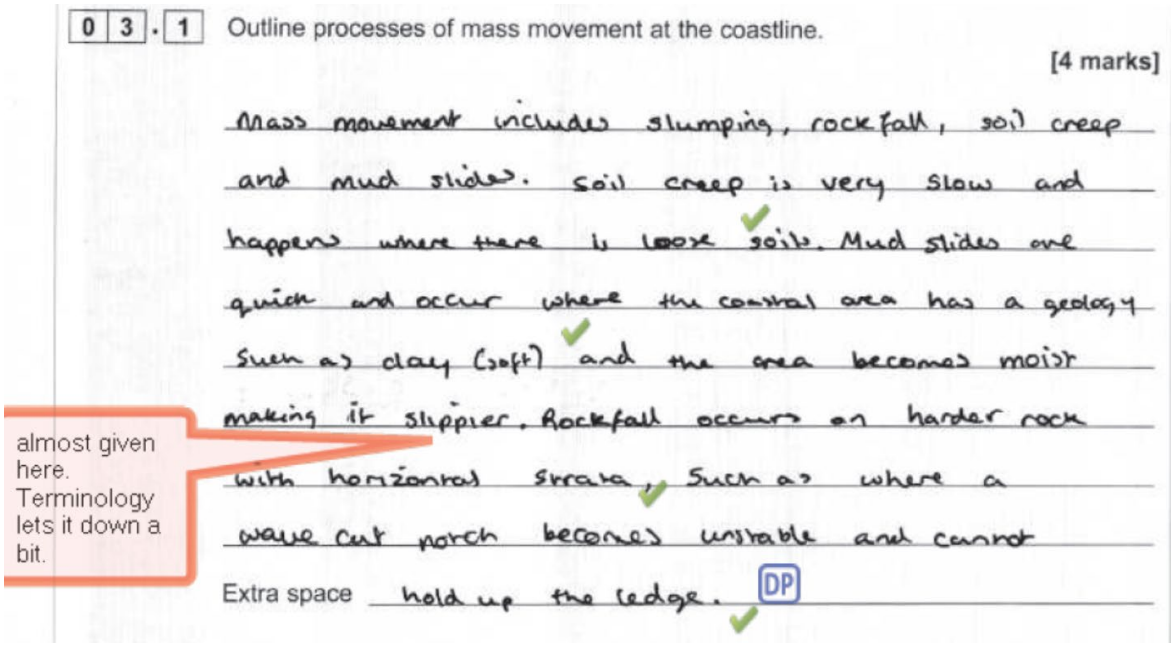
Qualities seen in more successful responses

The key as ever with these questions is subject knowledge. For example, on Q.1.1, the purpose of the flood hydrograph is to provide information for planners and managers on the circumstances lead to river floods in particular locations. This who understood that the purpose is therefore to help with flood analysis and management strategies readily scored credit.

On Q.2.1, Q.3.1 and Q.4.1 students needed to focus on weathering, mass movement and processes by which glaciers move. Any deviation away from these key terms / concepts simply does not score credit.

For Q.5.1 and Q.6.1 those that understood mitigation in hazard management and net primary production readily accessed the marks.

Q.3.1 (below) – this response shows a very clear understanding of different types of mass movement with no drift into erosion or weathering processes, scoring 4 marks.



0 3 . 1 Outline processes of mass movement at the coastline.

[4 marks]

Mass movement includes slumping, rockfall, soil creep and mud slides. Soil creep is very slow and happens where there is loose soils. Mud slides are quick and occur where the coastal area has a geology such as clay (soft) and the area becomes moist making it slippier. Rockfall occurs on harder rock with horizontal strata, such as where a wave cut notch becomes unstable and cannot hold up the ledge.

Extra space

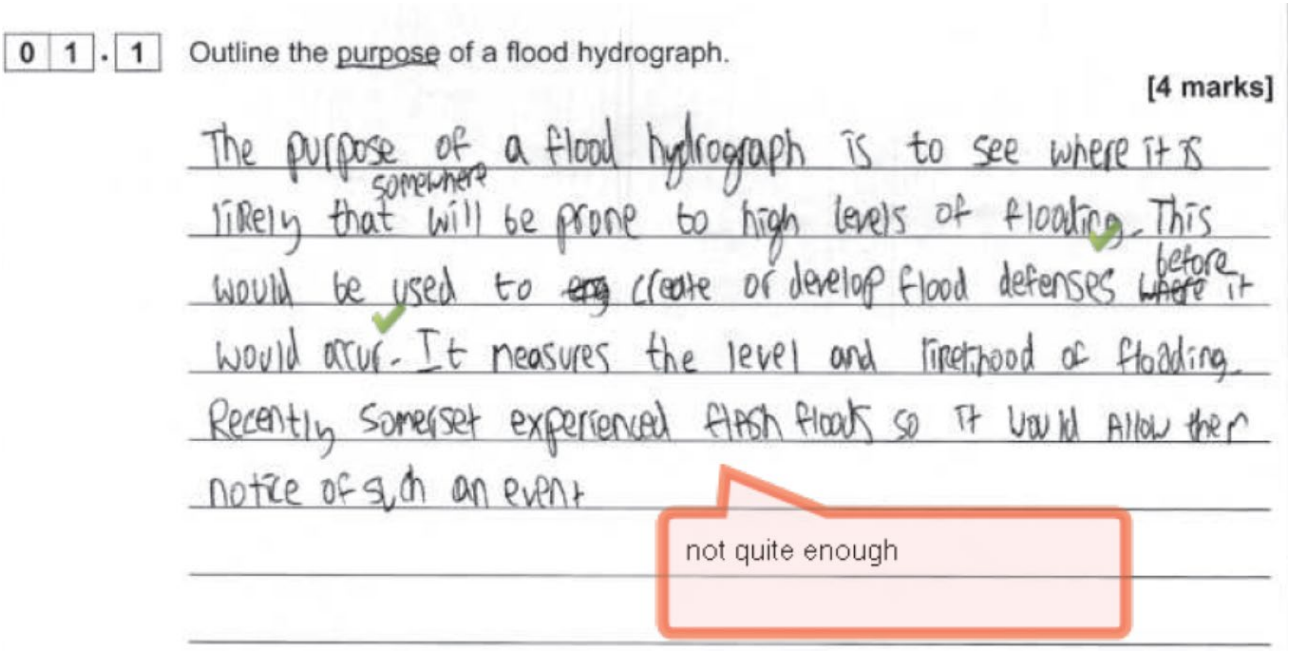
DP

almost given here. Terminology lets it down a bit.

Limitations of less successful responses

Where issues are encountered by students on 4 mark questions, it is generally related to a lack of subject knowledge. If students do not know what these terms mean, there is almost certainly no route to credit. Since there are 12 marks available for these AO1 questions, it really is well worth ensuring that students are completely familiar with all technical terms in the specification, as this is common focus for 4 mark questions.

In Q.1.1 below, the student was certainly writing about the purpose but it was not developed enough, therefore scoring 2 marks. It could have gone on to mention urban planning or comparing drainage basins for example.



0 1 . 1 Outline the purpose of a flood hydrograph.

[4 marks]

The purpose of a flood hydrograph is to see where it is somewhere likely that will be prone to high levels of flooding. This would be used to ~~era~~ create or develop flood defenses before where it would occur. It measures the level and likelihood of flooding. Recently Somerset experienced flash floods so it would allow them notice of such an event

not quite enough

6 mark AO3 questions

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

Qualities seen in more successful responses

Sometimes there are multiple stimulus materials, or multiple pieces of information within a single resource. Students score more marks when they are able to make links between these different pieces of information.

For evaluation, those that show a critical awareness of the data being presented are invariably operating at a higher level than who do not.

This response below scored 5 marks and could have done a little more to analyse the data (e.g. calculation of actual numbers for each sector).

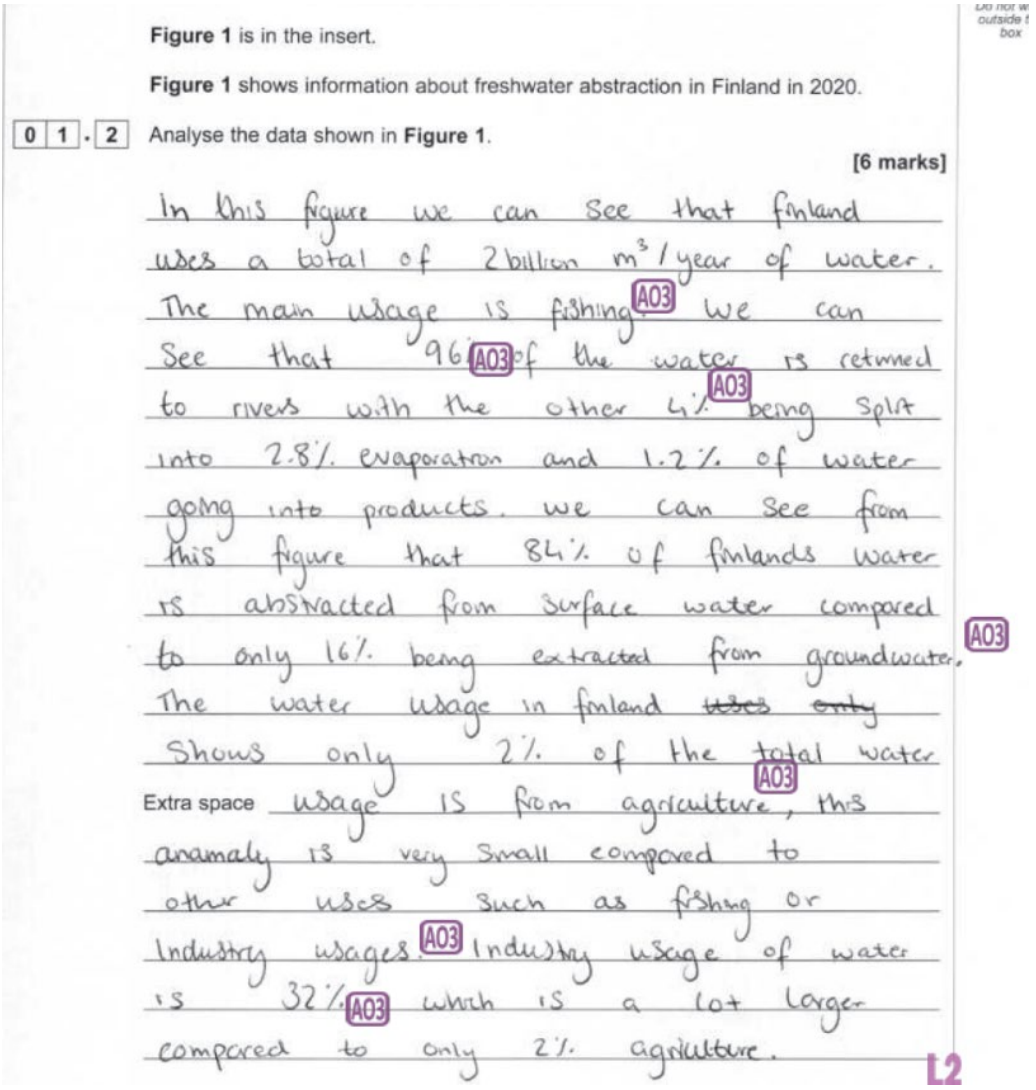


Figure 1 is in the insert.

Figure 1 shows information about freshwater abstraction in Finland in 2020.

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

[6 marks]

In this figure we can see that finland uses a total of 2 billion m^3 / year of water. The main usage is fishing AO3 we can see that 96 AO3 of the water is retrned to rivers with the other 4% AO3 being splt into 2.8% evaporation and 1.2% of water going into products. we can see from this figure that 84% of finlands water is abstracted from surface water compared to only 16% being extracted from groundwater. AO3 The water usage in finland ~~uses~~ ~~only~~ shows only 2% of the total water usage is from agriculture AO3, this anamaly is very small compared to other uses such as fishing or industry usages. AO3 Industry usage of water is 32% AO3 which is a lot larger compared to only 2% agriculture.

Extra space

L2

Limitations of less successful responses

Evaluation is an important skill to demonstrate in these questions. Q.5.2 required evaluation of the usefulness of the resource. Students are expected to read the question carefully, interface with the resource and then craft their response. Had they clearly engaged with the resource they would have realised that the resource was not in fact very useful.

The same was true of Q.2.2, Q.3.2 and Q.4.2. Students needed to evaluate the usefulness of the standard deviation calculation in the context of the question i.e. how it can help us to make inferences from the data set as well as its potential limitations.

This response (Q.2.2) only managed to score credit for one aspect of the calculation. 1 mark was awarded.

Figure 3 shows the changing size of the Sahara Desert between 1980 and 1990.
A standard deviation calculation has been started.

Figure 3

Year	Area (millions of km²) x	$x - \bar{x}$	$(x - \bar{x})^2$
1980	8.6	−0.609	0.371
1981	8.9	−0.309	0.095
1982	9.25	0.041	0.002
1983	9.4	0.191	0.036
1984	10.0	0.791	0.626
1985	9.25	0.041	0.002
1986	9.1	−0.109	0.012
1987	9.4	0.191	0.036
1988	8.9	−0.309	0.095
1989	9.2	−0.009	0.000
1990	9.3	0.091	0.008
	$\sum x = 101.3$		$\sum (x - \bar{x})^2 = 1.283$
	$\bar{x} = 9.209$		

Key
x = area of Sahara Desert
$\bar{x}$ = mean
$\sum$ = sum of
σ = standard deviation
n = number in sample

Standard deviation formula

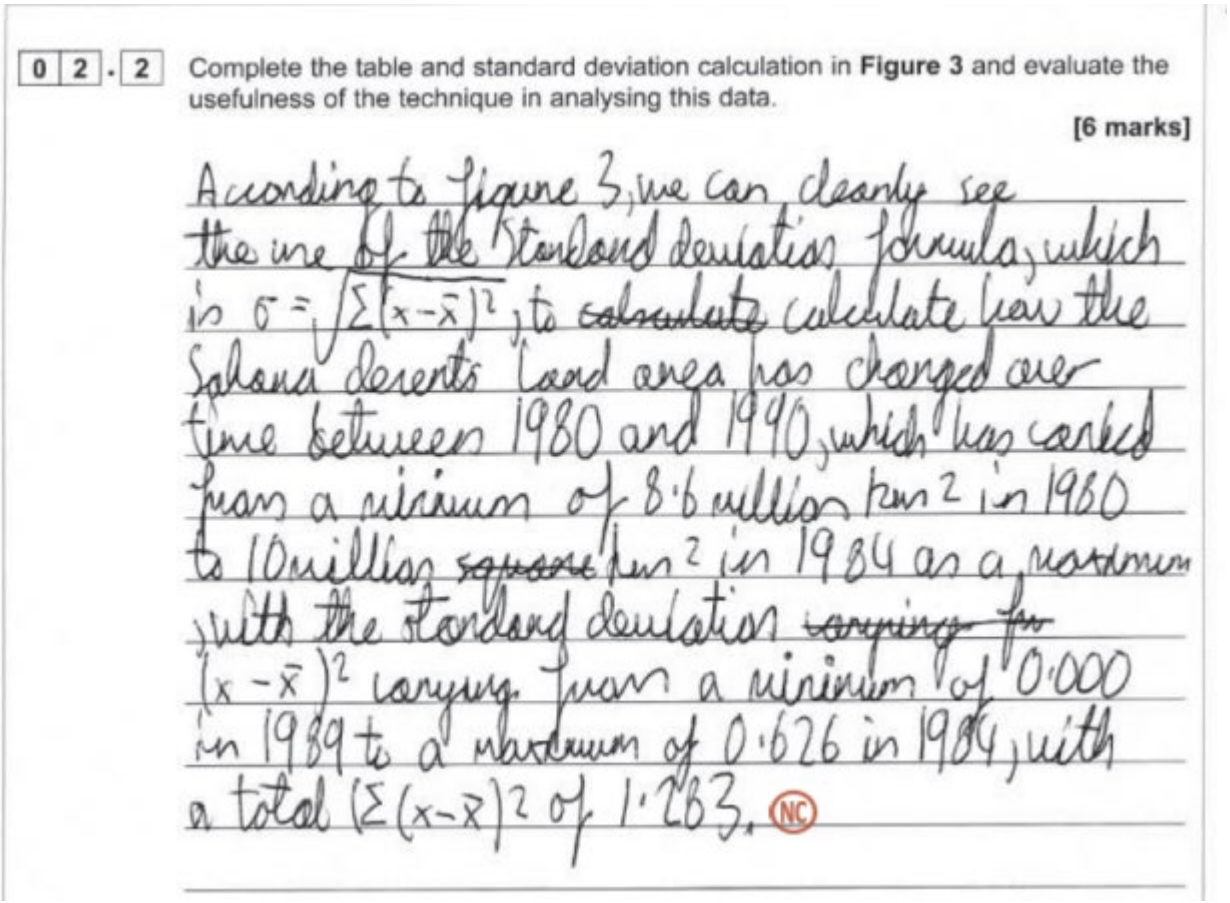
$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

Space for working

$\sqrt{\sum(x-\bar{x})^2} \rightarrow \sqrt{10(\cdot 3(10-9\cdot 209)^2} \rightarrow 2\cdot 460406 \rightarrow 2\cdot 4$

$10-9\cdot 209(x-\bar{x}) \rightarrow 0\cdot 791 \quad (10-9\cdot 209)^2 (x-\bar{x})^2 \rightarrow 0\cdot 625$
$0\cdot 626 \times 681$

$\sigma = 2\cdot 4$



0 2 . 2 Complete the table and standard deviation calculation in **Figure 3** and evaluate the usefulness of the technique in analysing this data.

[6 marks]

According to figure 3, we can clearly see the use of the standard deviation formula, which is $\sigma = \sqrt{\Sigma(x-\bar{x})^2}$, to ~~calculate~~ calculate how the Sahara deserts land area has changed over time between 1980 and 1990, which has varied from a minimum of 8·6 million km^2 in 1980 to 10 million ~~square~~ km^2 in 1984 as a maximum with the standard deviation ~~varying for~~ $(x-\bar{x})^2$ varying from a minimum of 0·000 in 1989 to a maximum of 0·626 in 1984, with a total $\Sigma(x-\bar{x})^2$ of 1·263. NC

6 & 9 mark A01/A02 questions with stimulus

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

Qualities seen in more successful responses

These questions require students to think on their feet. Students cannot simply interface with data in the resource, nor can they simply recite learned content. Instead they have to apply their learned knowledge and understanding to the novel situation.

A really good example where many did this really well was in relation to Q.5.3. Students readily identified the fault lines and rock types and successfully linked these to the potential hazards associated with seismic activity. Many considered sensible measures to do with evacuation planning, building re-enforcements and land use zoning particularly in areas prone to liquefaction.

Performance on Q.2.3 was such that most were able to distinguish between the physical and human factors affecting flooding in this desert settlement. Similarly, on Q.3.3, many were able to see the conflicting information about sustainability that was presented. The best saw how the graph presented a challenge to sustainability, with the photography being used to show how the root systems could defend against storm surges.

The example below shows clear engagement with the resource and some sensible management strategies are suggested. This answer scored 7 marks.

0 5 . 3 Using **Figure 10** and your own knowledge, discuss likely approaches to seismic hazard management in this area.

[9 marks]

Figure 10 shows us that the areas most at risk are built up areas such as Hamilton and Thames. AO2 This means that ~~Strong~~ seismic activity will be devastating due to built up infrastructure collapsing. AO1 Since seismic hazards are impossible to predict, buildings may be adapted to withstand earthquakes. AO1 This could be from a heavy weight placed on top to counteract the earthquake AO1 or from creating a more solid base foundation. AO1 This is likely to be expensive AO2 however, New Zealand is a HIC. AO1

Another approach could be building settlements in less hazardous areas shown in Figure 10 (source D), as there have hardened limestone over 75 million years old, AO2 meaning if an earthquake were to occur,

Extra space there would be less chance of soilflution. AO2

Overall, New Zealand should build earthquake resistant buildings, and try to build further away from fault lines, as we know this is where the earthquake will occur. AO2

liquefaction

L3

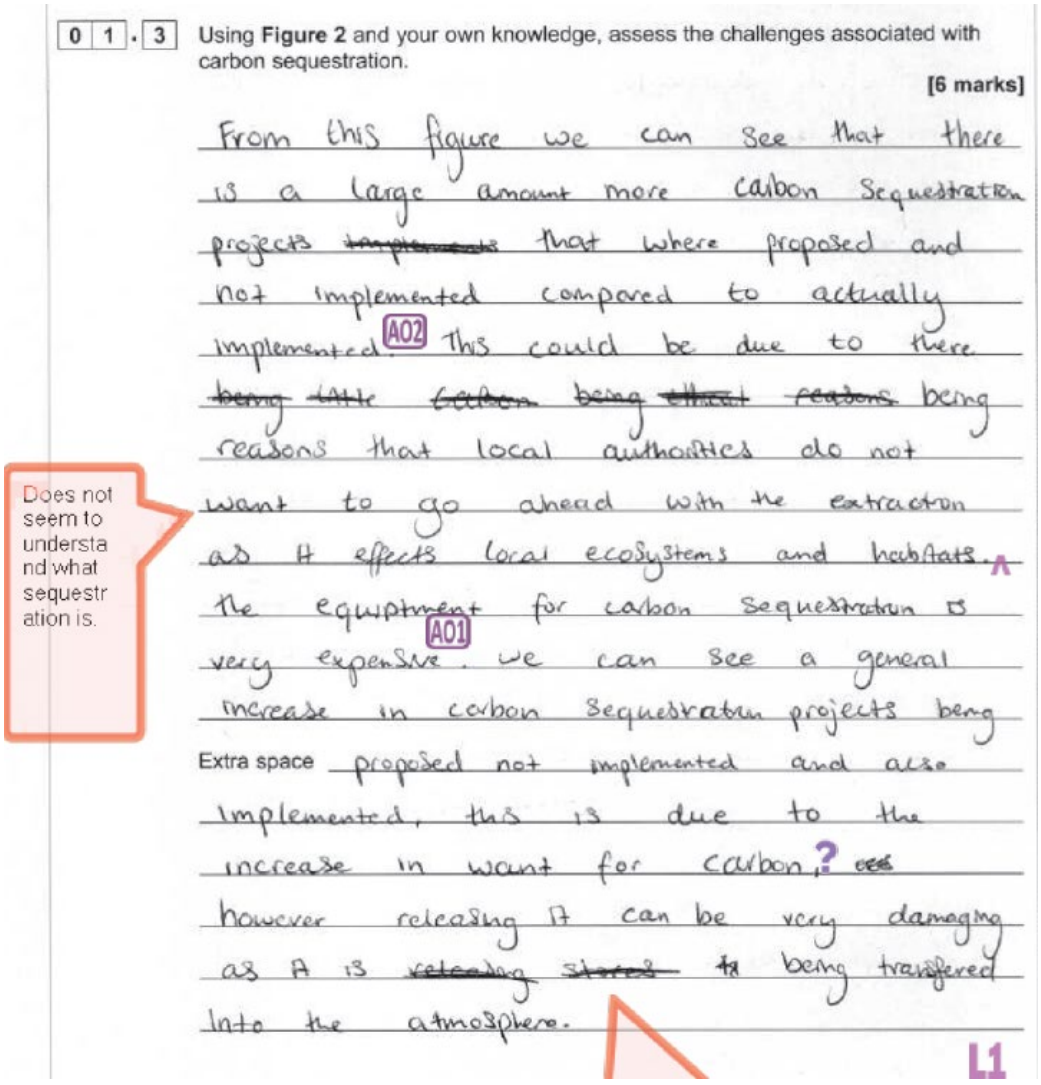
Engages with the resource in a detailed fashionand well focused on sensible mamnagement approaches. Answers the Q.

Limitations of less successful responses

Less successful responses were those who simply regurgitated the data / information presented without drawing on their specification content. Similarly, there were some who recited knowledge without applying this to the context of the resource.

For instance, on Q.1.3 many failed to show understanding of the concept of carbon sequestration. On Q.4.3 a number of responses simply analysed the data. This could only ever answer the question partially at best. On Q.6.3 the main issue was the narrow nature of the tourism versus conservation argument put forward by many. Such responses needed to go further than just referring to the footpath encroachment into the ecosystem.

In the response below the student did not seem to understand what carbon sequestration is, scoring L1 – 2 marks.



0 1 . 3 Using **Figure 2** and your own knowledge, assess the challenges associated with carbon sequestration.

[6 marks]

From this figure we can see that there is a large amount more carbon Sequestration projects ~~implemented~~ that where proposed and not implemented compared to actually implemented. AO2 This could be due to there ~~being little carbon being effect reasons~~ being reasons that local authorities do not want to go ahead with the extraction as it effects local ecosystems and habitats. The equiptment AO1 for carbon Sequestration is very expensive. we can see a general increase in carbon Sequestration projects being proposed not implemented and also implemented, this is due to the increase in want for carbon? ~~cos~~ however releasing it can be very damaging as it is ~~releasing stored~~ is being transfered into the atmosphere.

Extra space

L1

Does not seem to understand what sequestration is.

9 mark A01/A02 questions (no stimulus)

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

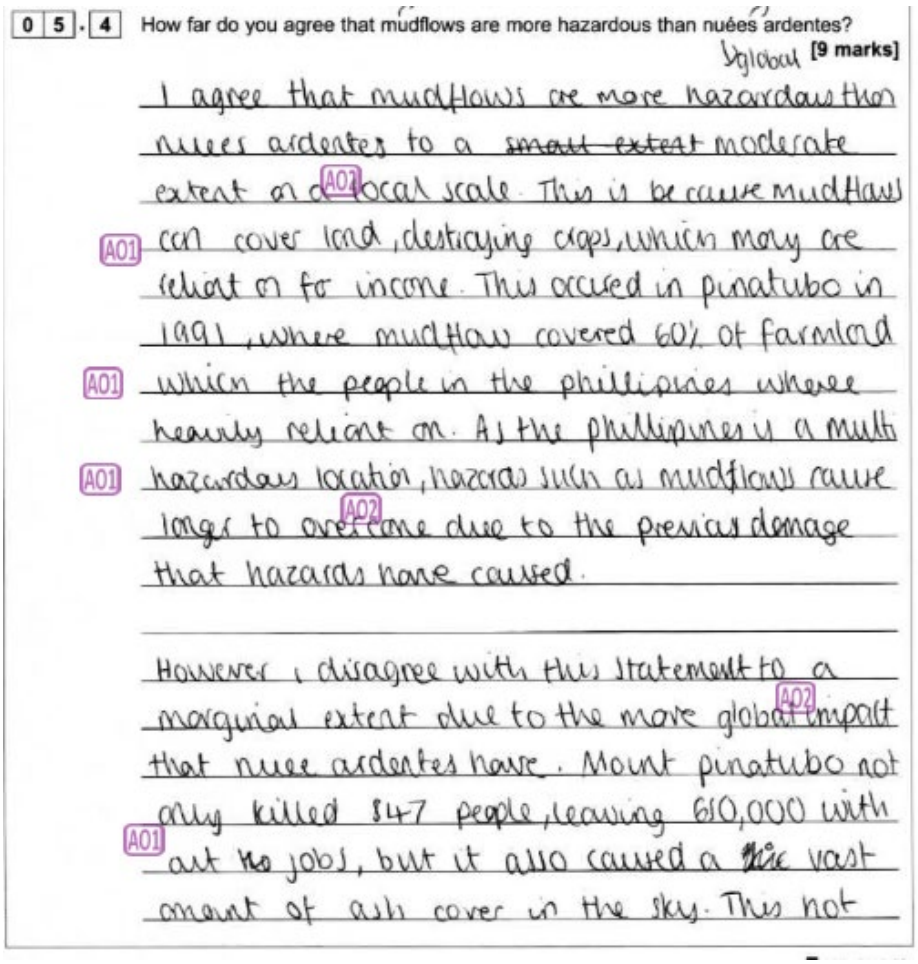
The two questions on Section C in this series considered links with specification units. The cross-specification question appeared on 7037/2 this year.

For Q.5.3 some students did not know what was meant by the term *nuée ardente*. Similarly, those students who did not understand what could be considered as a region experiencing ecological change also struggled to answer this question.

The key point here is that understanding of the required content of the specification, including the geographic terms used, is absolutely key to a successful response.

Qualities seen in more successful responses

Those who knew the two hazards and offered some reasonable support could readily access L3 provided they made some sort of assessment. This one (Q.5.3) scored L3 – 8 marks.



0 5 . 4 How far do you agree that mudflows are more hazardous than nuées ardentes? [9 marks]

I agree that mudflows are more hazardous than nuees ardentes to a ~~small extent~~ moderate extent on a local scale. This is because mudflows can cover land, destroying crops, which many are reliant on for income. This occured in pinatubo in 1991, where mudflow covered 60% of farmland which the people in the phillipines where heavily reliant on. As the phillipines is a multi hazardous location, hazards such as mudflows cause longer to overcome due to the previous damage that hazards have caused.

However, I disagree with this statement to a marginal extent due to the more global impact that nuee ardentes have. Mount pinatubo not only killed 847 people, leaving 610,000 with out no jobs, but it also caused a ~~the~~ vast amount of ash cover in the sky. This not

Extra space ash contributes to global warming, there are having a more hazardous impact globally AO1 AO2

overall mudflows are more hazardous on a local scale, destroying many homes & jobs but nuee ardentes are more hazardous on a global scale due to its contribution to climate change.

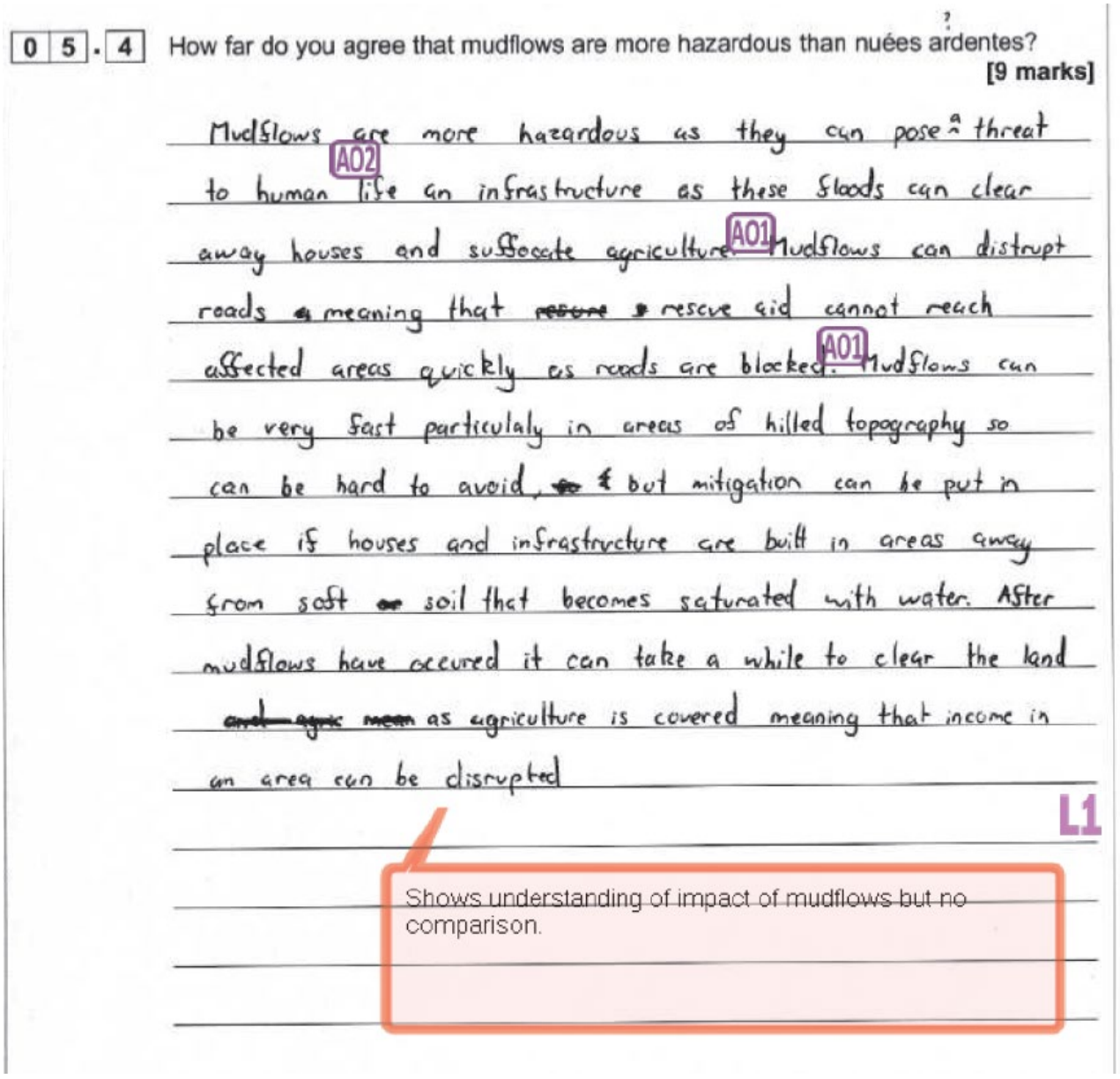
L3

Qualities seen in less successful responses

Q.5.3 was problematic if students did not what was meant by the term *nuée ardente*. Similarly, those students who did not understand what could be considered as a region experiencing ecological change (Q.6.3) also struggled to answer this question.

The key point here is that command of the technical content of the specification is absolutely key to a successful response.

The example below had no obvious awareness of *nuée ardente* though did come to a view. Nevertheless, it was still held to L1 – 3 marks.



0 5 . 4 How far do you agree that mudflows are more hazardous than nuées ardentes?

[9 marks]

Mudflows are more hazardous as they can pose a threat to human life AO2 an infrastructure as these floods can clear away houses and suffocate agriculture AO1 Mudflows can distrupt roads meaning that ~~rescue~~ rescue aid cannot reach affected areas quickly as roads are blocked AO1 Mudflows can be very fast particulaly in areas of hilled topography so can be hard to avoid, ~~so~~ but mitigation can be put in place if houses and infrastructure are built in areas away from soft ~~or~~ soil that becomes saturated with water. After mudflows have occured it can take a while to clear the land ~~and agric mean~~ as agriculture is covered meaning that income in an area can be disrupted

L1

Shows understanding of impact of mudflows but no comparison.

20 mark questions

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

It was pleasing to see so many well-constructed essays. Typically many students asserted their own position in relation to the question at the outset (AO2 – argument) before proceeding to argue their points (AO2) and back this up with solid subject knowledge (AO1). Their conclusions then often returned to the theme of the question and pulled together the previously argued points into one closing paragraph. Generally, new content should not be introduced into the conclusion. Also supporting knowledge and understanding should be relevant and be used to help articulate the position in relation to the question.

Qualities seen in more successful responses

Those who read the questions carefully, answered the question in a clear structure and supported this with detailed knowledge easily accessed Level 3/4. On Q.3.4 for example students offered strong arguments on the importance of natural factors in shaping coastal landscapes but then juxtaposed these with management. This was a valid route.

Similarly on Q.2.4 once students clued into the sources of energy (solar, fluvial and aeolian), they generally and quite successfully linked these to landscape development.

Students were generally well prepared for Q.6.5. Many had strong support on the development pressures though they needed to remain focused and not drift in to general pressures faced these locations.

The answer below (Q.1.4) shows a strong response. This response achieved full marks as it was wholly focused on the impacts in the forest of changes to the carbon cycle i.e. it was strong on both elements.

0 1 . 4 Evaluate the potential impact of changes in the carbon budget on a tropical rainforest that you have studied.

[20 marks]

The Amazon is a tropical rainforest in South America AO1 that holds 20% of the world's carbon in biomass. There is a very likely large impact of changes to the carbon budget, which is defined as the net inflows and outflows AO1 of carbon to the Amazon rainforest system. These changes include more atmospheric carbon, where it is currently 400 ppm, AO1 as a result of anthropogenic CO_2. One impact is that there is more wildfires. AO2 In 2019, there were 53,000 wildfires AO1 in the Amazon and this is likely to exacerbate in the future. This is largely a result of the greenhouse effect, in which there is global warming due to greenhouse gases such as carbon dioxide and methane AO1 in the atmosphere. As a result, fires lead to a loss of biomass and deforestation, however, there are likely to be more nutrients and mineral in the soil to supplement growth in the future as decomposers and rain leads to the nutrients leaching AO1 into the ground. This may mitigate the implied impacts of changes in the carbon budget. AO2

However, another change to the carbon budget is deforestation. This is the removal of

tree biomass, largely by humans, which reduces carbon in the rainforest because trees are carbon stores, of which the Amazon has 300 billion. AO1
This deforestation, 67% of which is for pastoral farming, has the impact of ~~increasing surface temperatures in the Amazon~~ decreasing the carbon content of the soil, from 4kg to 9kg of carbon in the top 50cm of soil in the forest, to 1kg on a pasture. This limits the opportunity for net primary productivity, which is significance for the resilience of the Amazon. AO2
However, increased carbon in the atmosphere, where it is the highest in 800,000 years, increases the rate of photosynthesis AO1 in autotrophic AO1 plants in the Amazon, stimulating a negative feedback mechanism, AO2 in which more atmospheric carbon leads to more plant growth, which leads to the removal of carbon from the atmosphere, maintaining dynamic equilibrium. AO2 This may render changes in carbon budget in the Amazon less impactful because of feedback mechanisms. AO2
In conclusion, AO2 changes to the carbon budget in the Amazon, such as an increase in atmospheric carbon or a removal of carbon in biomass, are impactful to some extent, particularly where human intervention is significant, however, the Amazon is arguably resilient due to the

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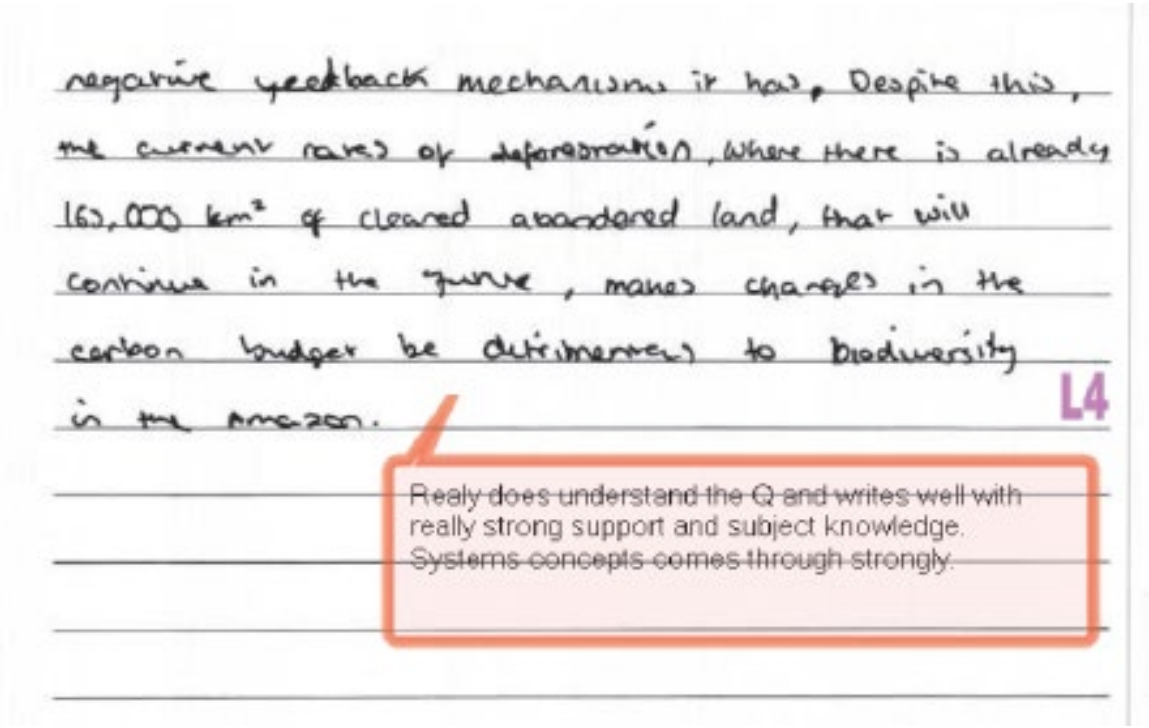

Limitations of less successful responses

On Q.1.4 some students read the question the wrong way around and wrote about the impact of changes in the rainforest on the carbon cycle. This was still potentially creditworthy but needed to then complete the feedback loop(s) and consider how these then affected the forest. Those responses which did not complete the loop(s) were held to L2, partial answer.

Similarly, on Q4.4, some confused fluvio-glacial with glacial and essentially wrote about the wrong cold environment – it was hard to find credit, except for the relevant processes. Again, these responses struggled to get out of L2.

On Q.5.5 the key limiting factor was in those who could not grasp the physical processes and factors shaping their local-scale location. Whilst examiners necessarily took a fairly relaxed view on what constituted local scale, there did need to be some engagement on the physical processes and factors. Tectonic setting or geographical location offered suitable routes to credit in this regard.

The example below failed to show clear sustained understanding of the fluvioglacial landscape and was held to L2 – 10 marks.

0 4 . 4 Analyse the relative importance of erosion and deposition in the development of fluvioglacial landscapes.

[20 marks]

Fluvioglacial landscapes are features caused by meltwater eroding material as well as depositing the material. Depositional landforms can show a lot about the area and how it was formed through features such as eskers, erratics and moraines. Erosional landforms are things such as corries and arêtes.

AO1 AO2 Both depositional and erosional landforms show the development of a landscape.

Eskers are fluvioglacial landform which shows the movement of a glacier. Material is deposited by the subglacial meltwater AO1 once it looses energy. The deposited material piles on top of eachother and maintains it shape due to hydrostatic pressure. After the glacier has advanced a mound of deposited material is left. This demonstrates the route taken by the glacier.

meltwater channel?

Erosional landforms such as roche mountonees can show the geology of the landscape. It is formed when there is an area of hard resistant rock which

the glacier moves over. The top is eroded by abrasion and creates a steep slope. Plucking at the end creates a jaggered edge called the lee slope. These landforms show the rock type in the area.

Moraines can show advancing and retreating of a glacier. There are multiple types of moraine however push moraine shows advance as material is deposited at the snout after a sudden advance. Recessional moraine shows retreat of the glacier. where material has been deposited by meltwater will show possible climate as it shows whether ablation exceeded accumulation or the other way around.

Extra space

In conclusion both AO2 erosional and depositional landforms play a part in the development of fluvioglacial landscapes however depositional landforms are more AO2 common and can show how the glacier moved through the landscape. They are also directly created by the glacial meltwater. L2

Only partially answers the Q. Does understand erosional and deposition processes but focus at least in part of glacial not fluvio.

Synoptic question

These questions assess knowledge, understanding applied to links across specification content

The synoptic question appears once each series in either Paper 1 or Paper 2 and makes links across specification content.

This series, the synoptic question appeared in Paper 2 and details of how students performed can be found in the report on the exam for 7037/2.

Further support

Mark ranges and award of grades

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