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Stimulus book

Earth & Environmental Science

Paper 1

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Stimulus 1

The contour map below illustrates the township of Oxapampa in Peru and the surrounding physical terrain. The town has suffered from successive flood events in each of the past four years. Most rainfall has fallen across the Cerro Bochorno range, north-west of Oxapampa.
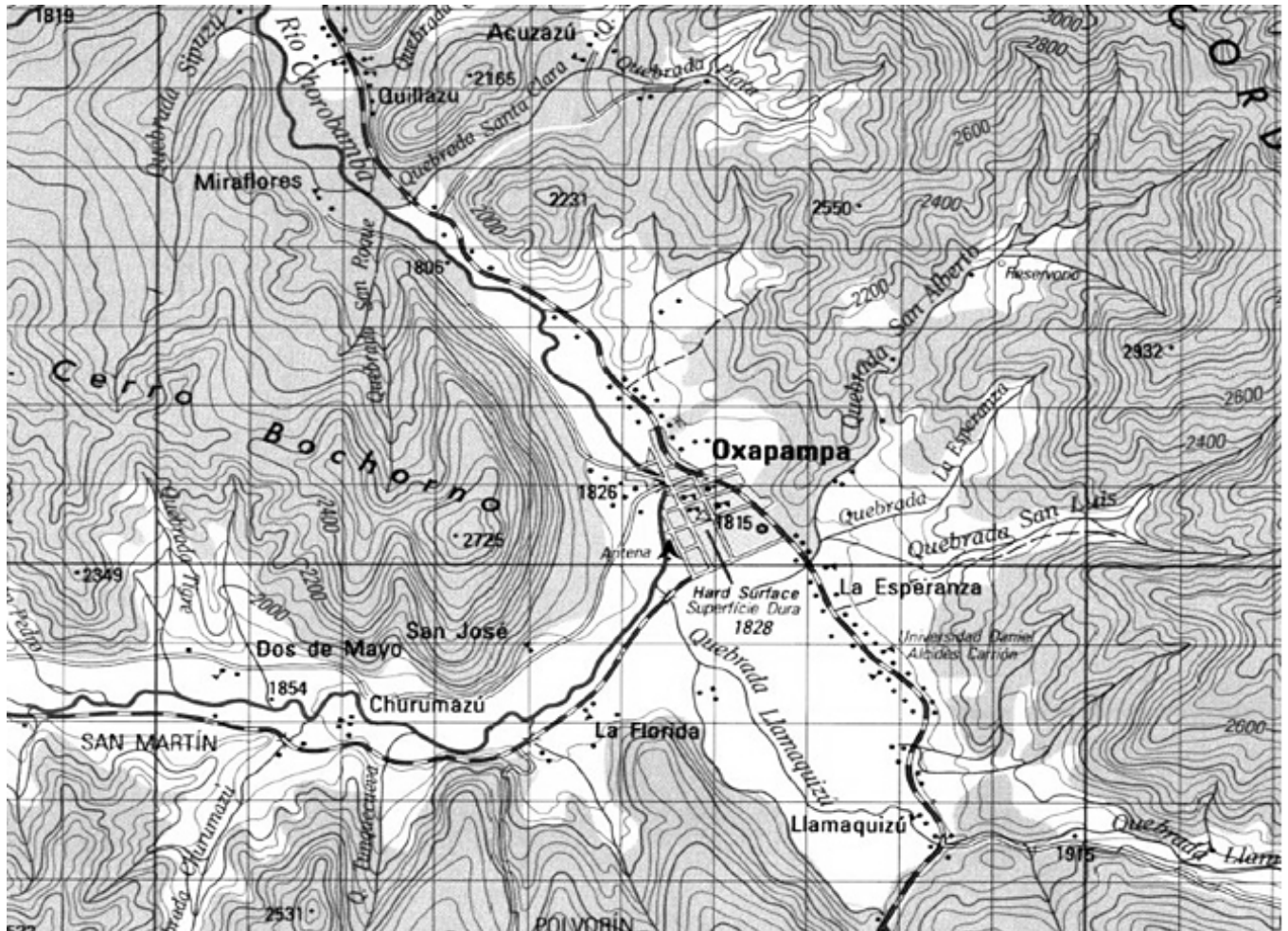
All weather roads		Streams	Building •
		Less than 36 m wide	
		36 m to 50 m wide	
Fair or dry weather roads		Over 50 m wide	

Stimulus 2
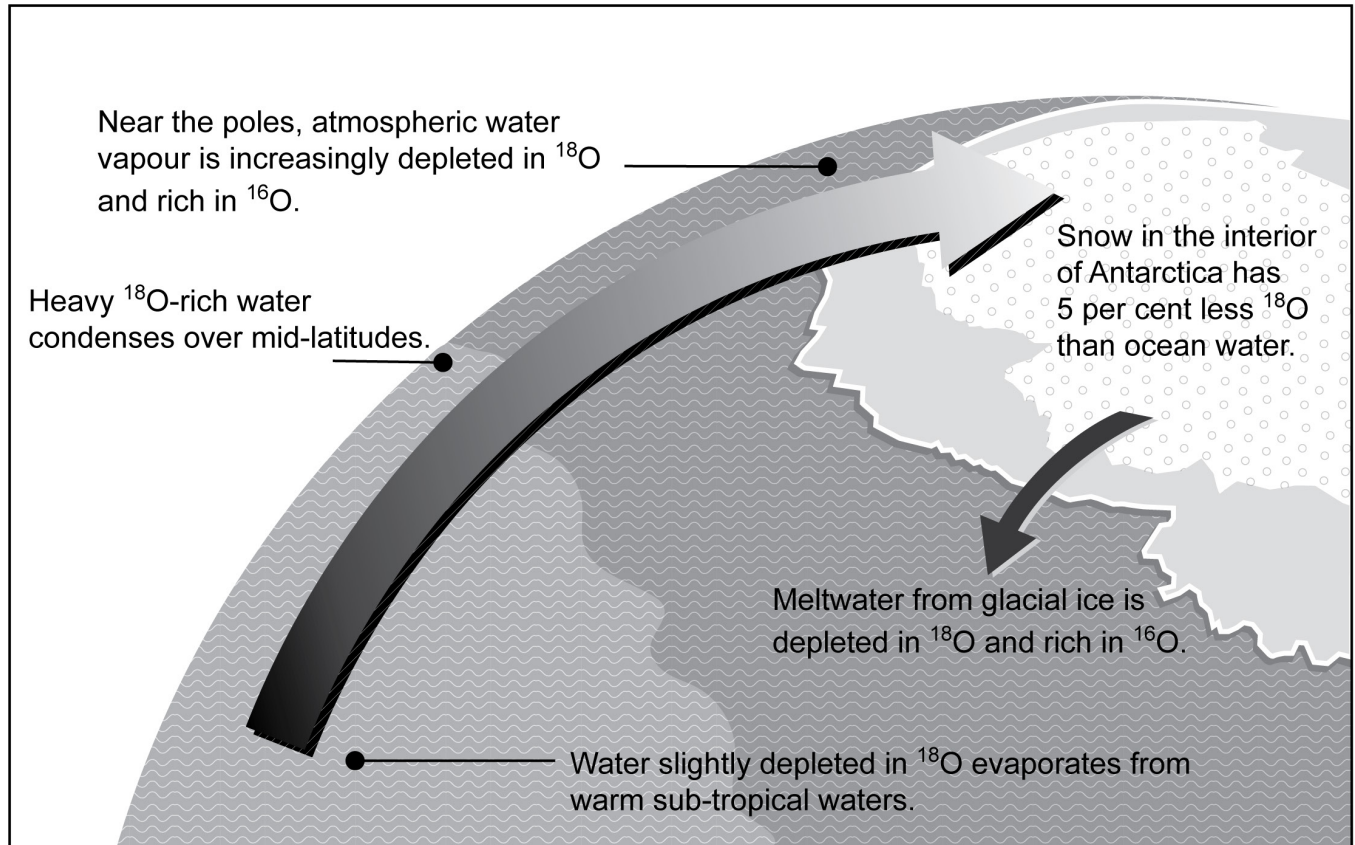
The graph below shows the long-term change of oxygen isotope ratios in fossils during the Phanerozoic eon.
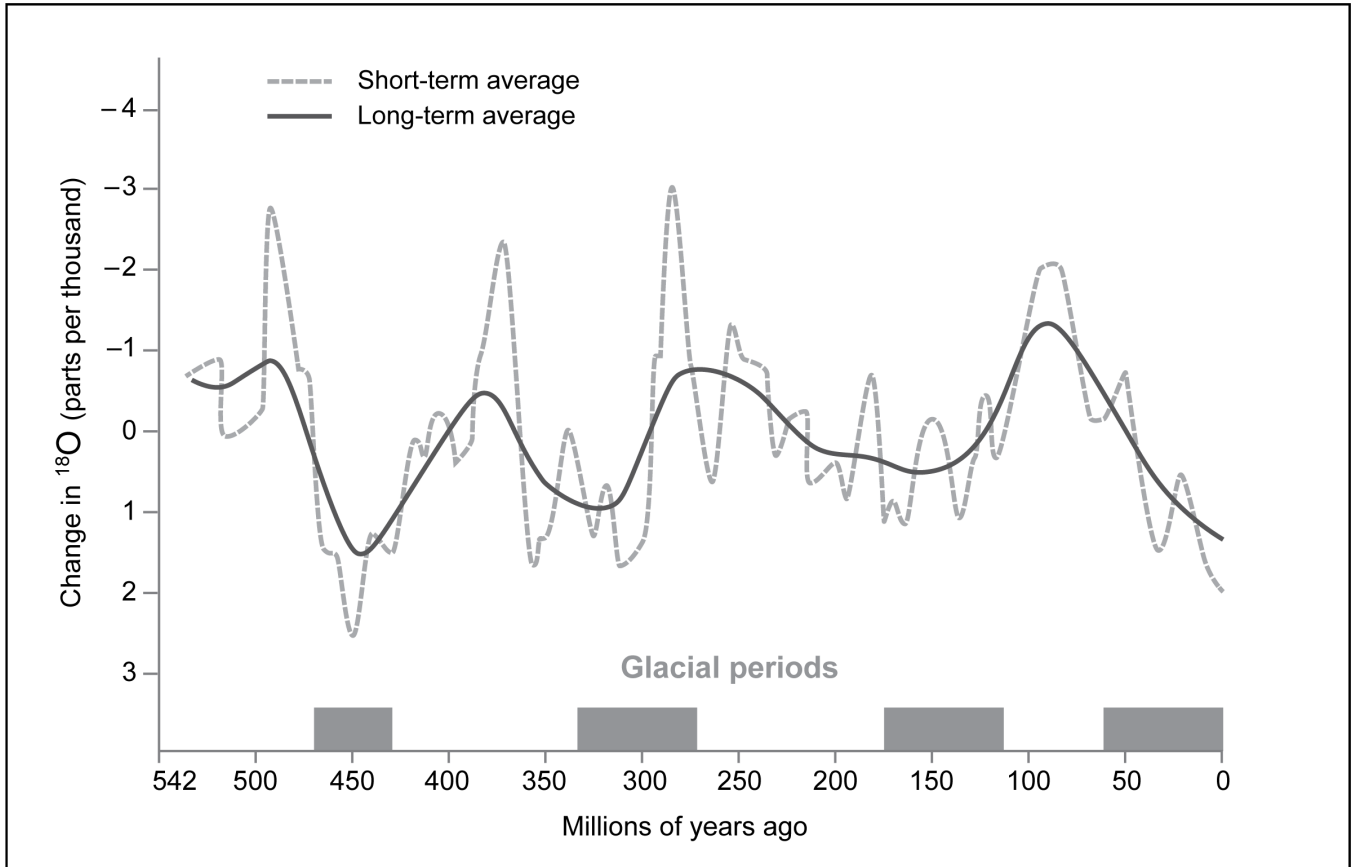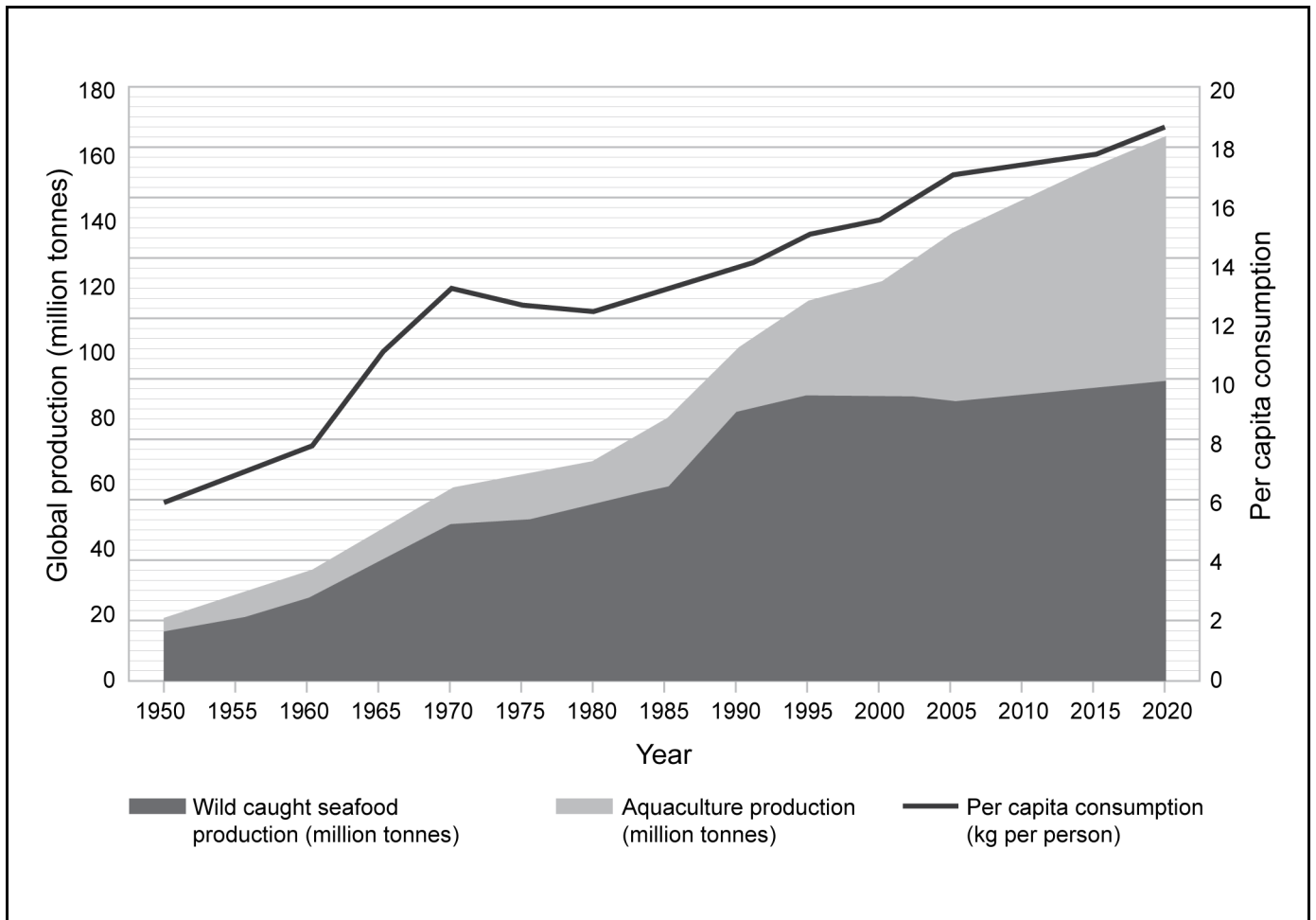
Stimulus 3

The following image illustrates the effect of temperature on the amount of ^{18}O (heavy oxygen) relative to ^{16}O found in water at different latitudes.

Near the poles, atmospheric water vapour is increasingly depleted in ^{18}O and rich in ^{16}O.

Heavy ^{18}O-rich water condenses over mid-latitudes.

Snow in the interior of Antarctica has 5 per cent less ^{18}O than ocean water.

Meltwater from glacial ice is depleted in ^{18}O and rich in ^{16}O.

Water slightly depleted in ^{18}O evaporates from warm sub-tropical waters.

Stimulus 4

The following graph illustrates global seafood supply and demand.

References

Stimulus 1

U.S. Defense Mapping Agency 1987, Oxapampa (topographic): Sheet 1849, https://legacy.lib.utexas.edu/maps/topo/peru. Courtesy of the University of Texas Libraries, The University of Texas at Austin.

Stimulus 2

Figure derived from Rhode, RA 2010, *Phanerozoic climate change*, https://commons.wikimedia.org/w/index.php?curid=184098, CC BY-SA 3.0, https://creativecommons.org/licenses/by-sa/3.0.

Stimulus 3

NASA Earth Observatory 2005, 'Paleoclimatology: The oxygen balance', https://earthobservatory.nasa.gov/features/Paleoclimatology_OxygenBalance. Illustration by Robert Simmon.

Stimulus 4

The global seafood supply graph by QCAA adapted from Figure 2, Béné, C, Barange, M, Subasinghe, R et al. 2015, 'Feeding 9 billion by 2050 — Putting fish back on the menu', *Food Security*, vol. 7, no. 2, pp. 261–274, https://doi.org/10.1007/s12571-015-0427-z.

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