16th International Geography Olympiad

Hong Kong

30 July – 5 August 2019

Written Response Test

Resource Booklet

Do NOT open the Booklet before instructed to do so by a supervisor.

Do NOT write any of your answers in this Booklet.

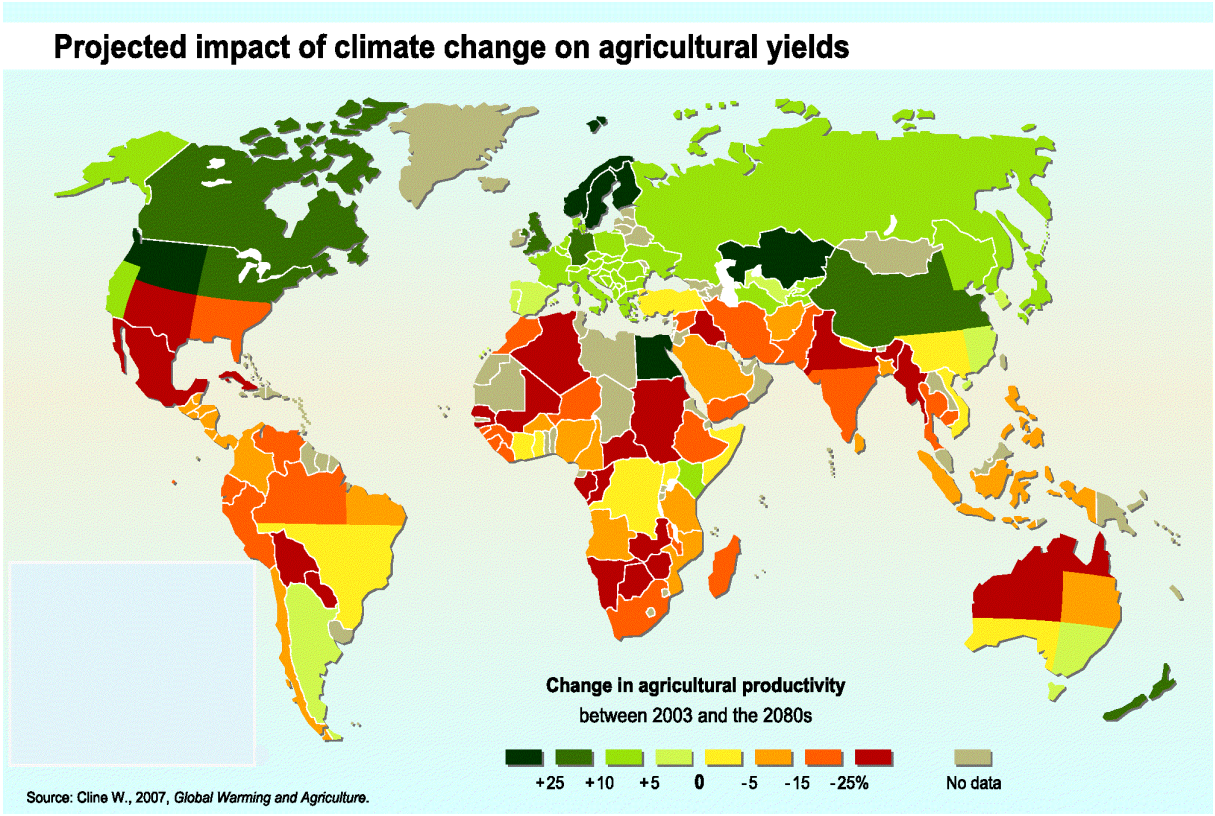
This page is intentionally blank.

Written Response Test
Contributions from: Australia, China Taipei, Romania
Committee Convenor: Dubravka Spevec (Croatia)
Deputy: Mark Higginbottom (UK)

Director of Tests: Sue Lomas (UK)

Section A: Agriculture and Climate Change

Figure A1: Impact of climate change on agricultural yields between 2003 and 2080 (projections)
Source: https://www.eea.europa.eu/data-and-maps/figures/projected-impact-of-climate-change



Section B: Earthquakes

Figure B1: Ecuador earthquake on February 22nd, 2019

Source: https://earthquake.usgs.gov/archive/product/poster/20190222/us/1553201441748/poster.jpg

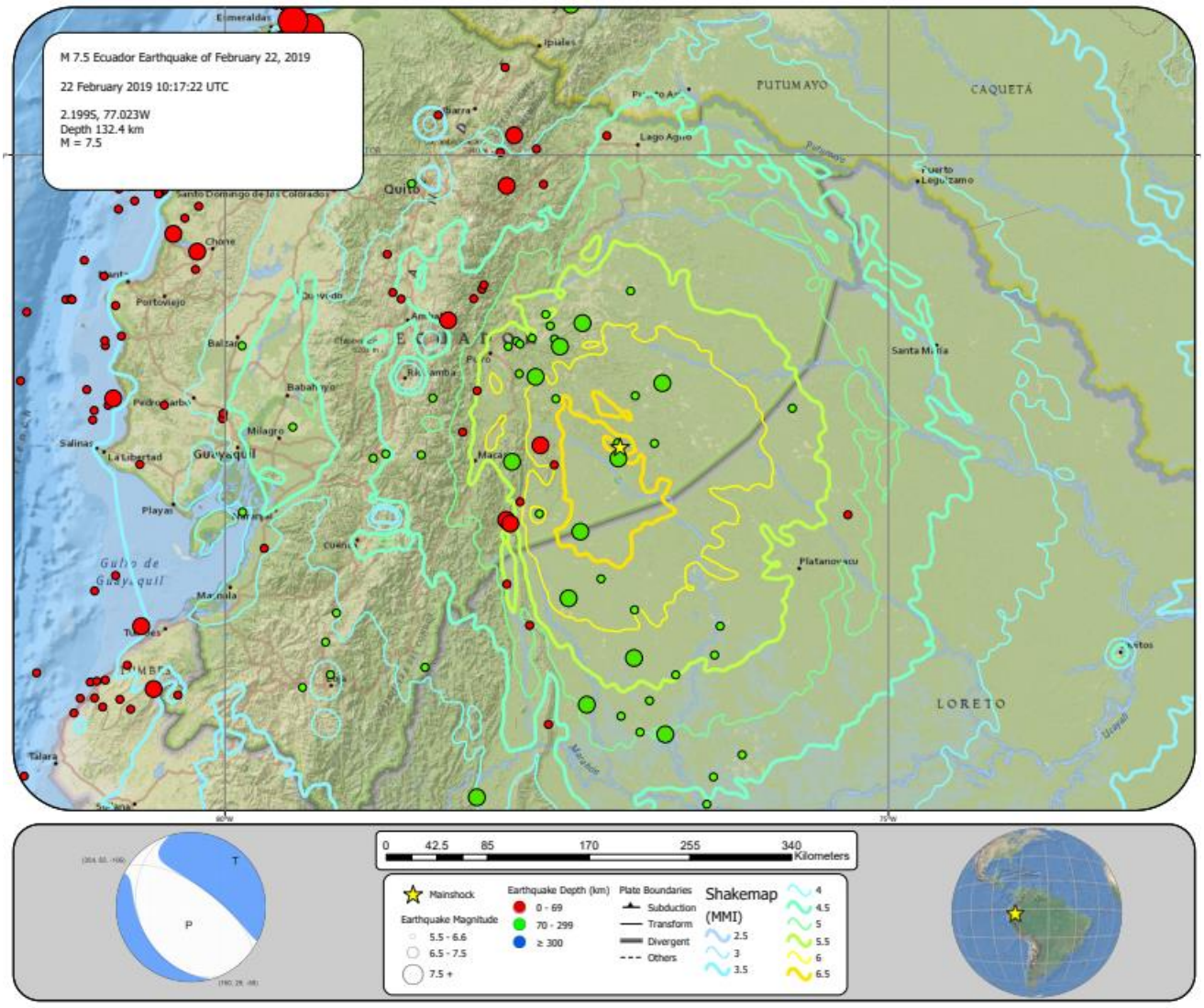
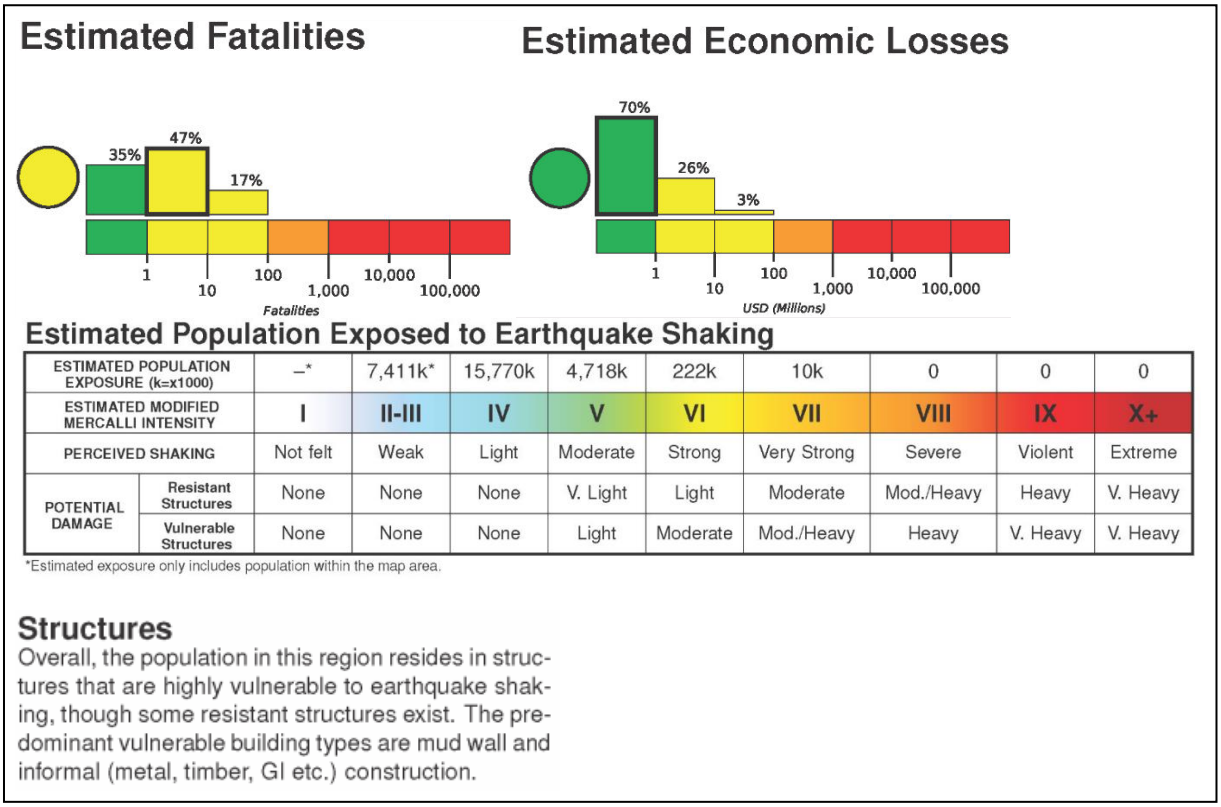


Figure B2: Impact of Ecuador earthquake

Source: https://earthquake.usgs.gov/archive/product/poster/20190222/us/1553201441748/poster.jpg



Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k=x1000)		–*	7,411k*	15,770k	4,718k	222k	10k	0	0	0
ESTIMATED MODIFIED MERCALLI INTENSITY		I	II-III	IV	V	VI	VII	VIII	IX	X+
PERCEIVED SHAKING		Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	None	None	None	V. Light	Light	Moderate	Mod./Heavy	Heavy	V. Heavy
	Vulnerable Structures	None	None	None	Light	Moderate	Mod./Heavy	Heavy	V. Heavy	V. Heavy

*Estimated exposure only includes population within the map area.

Structures

Overall, the population in this region resides in structures that are highly vulnerable to earthquake shaking, though some resistant structures exist. The predominant vulnerable building types are mud wall and informal (metal, timber, GI etc.) construction.

Section C: Sand Dune Mobility and Desertification

Figure C1: Satellite image of sand dunes in the Arabian Desert
Source: https://www.bing.com/images

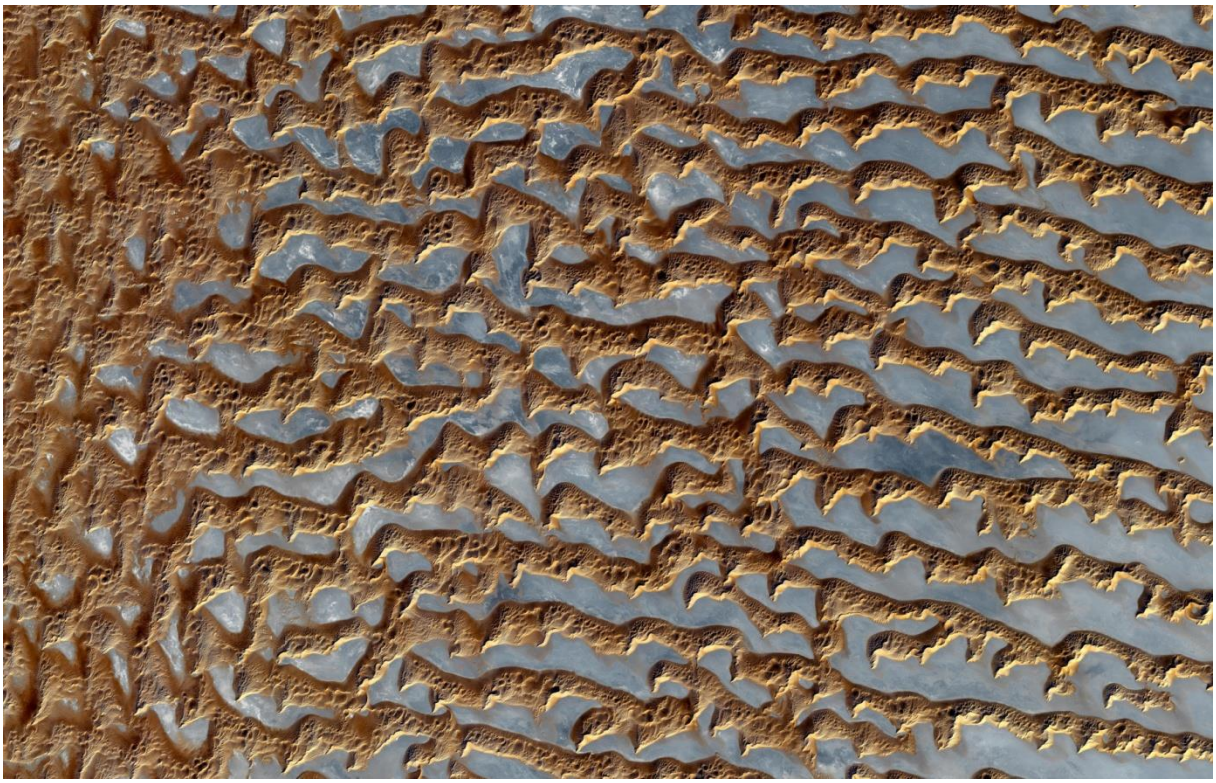


Table C1: Values of dune mobility index (M) and dune activity codes

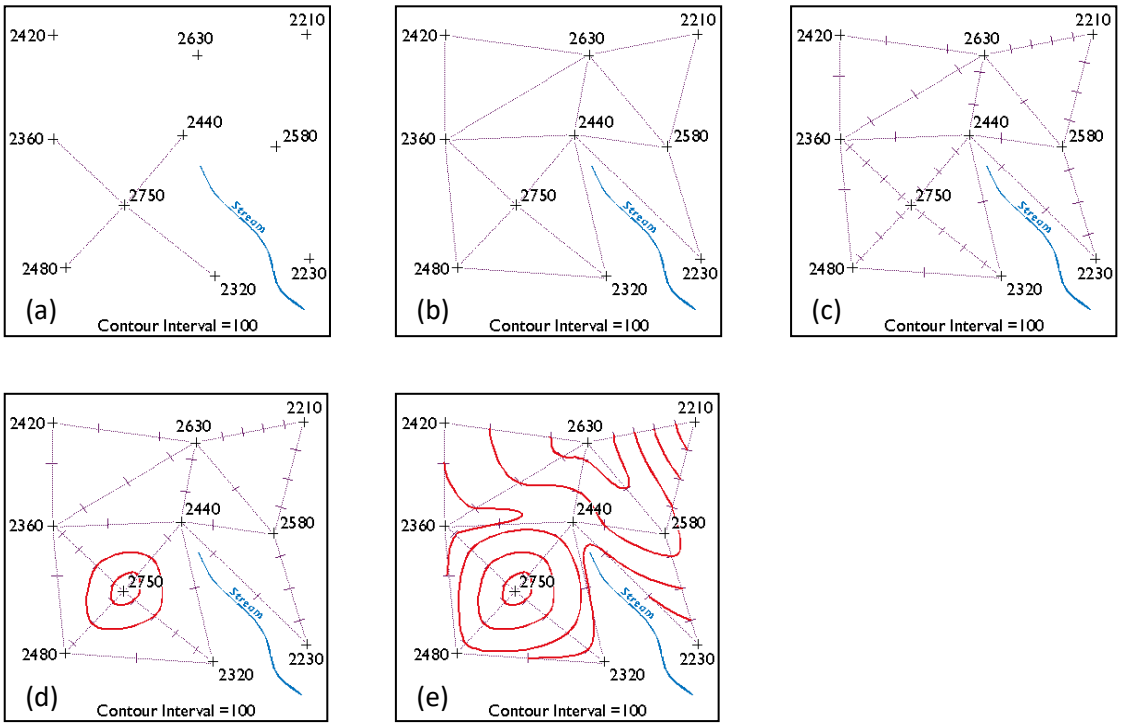
Weather monitoring site	**Sand transport** (%)	**Precipitation** (P) (cm)	**Potential evapotranspiration** (PE) (cm)*	**P/PE**	**Dune Mobility Index** (M)	Code**
1	10.0	1.6	2.0	0.80	12.5	IA
2	15.0	1.7	4.0	0.43	35.3	IA
3	22.0	1.9	6.0	0.32	69.5	CA
4	31.0	3.0	14.0	0.21	144.7	IS
5	46.0	3.8	30.0	0.13	363.2	AD
6	50.0	5.8	50.0	0.12	431.0	AD
7	44.0	7.8	30.0	0.26	169.2	IS
8	30.0	7.0	16.0	0.44	68.6	CA
9	49.0	5.0	8.0	0.63	78.4	CA
10	48.0	3.2	4.0	0.80	60.0	CA
11	33.0	2.5	3.0	0.83	39.6	IA
12	10.0	1.8	2.0	0.90	11.1	IA

** Dunes inactive (IA), Dune crest active (CA), Dunes active (IS), Fully active dunes (AD)

Instruction for drawing contour lines (by hand)

This instruction will walk you through a methodical approach to drawing contour lines from a range of spot elevations (Rabenhorst and McDermott, 1989).

1. Starting at the highest elevation, draw straight lines to the nearest neighbouring spot elevations (a). Once you have connected to all of the points that neighbor the highest point, begin again at the second highest elevation. (You will have to make some subjective decisions as to which points are "neighbors" and which are not.)
2. Taking care not to draw triangles across the stream, continue until the surface is completely triangulated (b). The result is a triangulated irregular network (TIN).
3. Now draw ticks to mark the points at which elevation contours intersect each triangle side (c). For instance, look at the triangle side that connects the spot elevations 2360 and 2480 in the lower left corner of Figure (c). One tick mark is drawn on the triangle where a contour representing elevation 2400 intersects. Now find the two spot elevations, 2480 and 2750, in the same lower left corner. Note that three tick marks are placed where contours representing elevations 2500, 2600, and 2700 intersect.
4. Finally, draw your contour lines. Working downslope from the highest elevation, thread contours through ticks of equal value (d).
5. Move to the next highest elevation when the surface seems ambiguous (e).



Section D: Ocean Currents

Figure D1: Part of North Atlantic Ocean current circulation
Source: https://www.nature.com/articles/srep46192

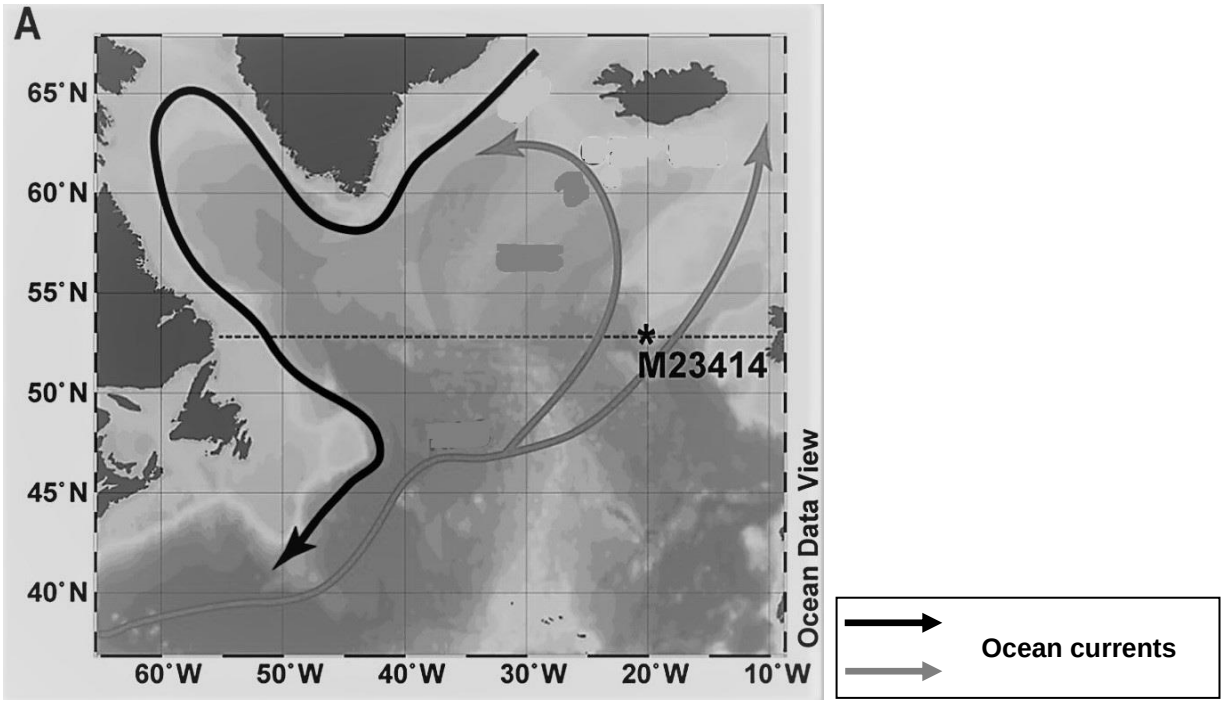


Figure D2: Water temperatures (°C) and salinity (Practical Salinity Unit – PSU) in Northern Atlantic Ocean
Source: https://www.nature.com/articles/srep46192

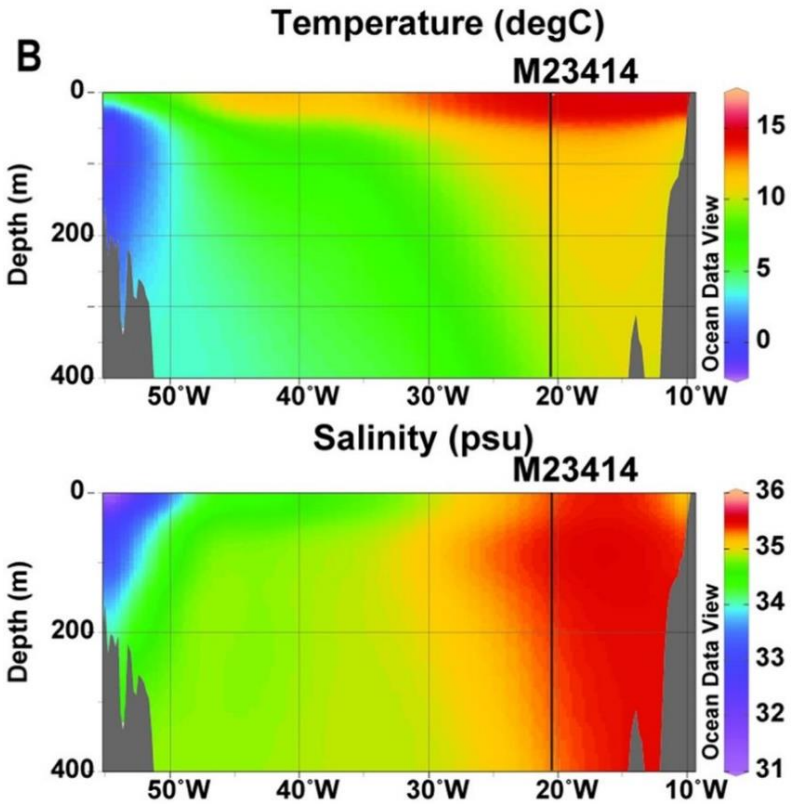
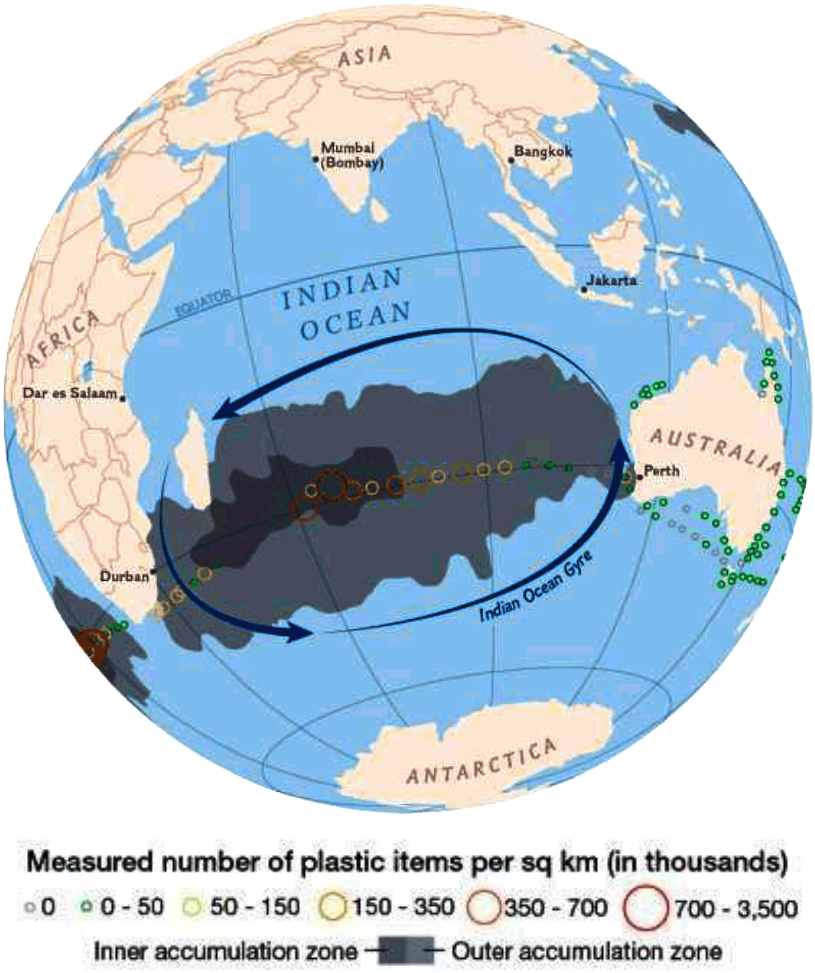


Figure D3: Measured number of pieces of plastic waste in the Indian Ocean gyre garbage patch

Source: http://www.blue-growth.org/Oceans_Rivers_Seas/Indian_Ocean_BlueGrowth_Agenda_2030.htm

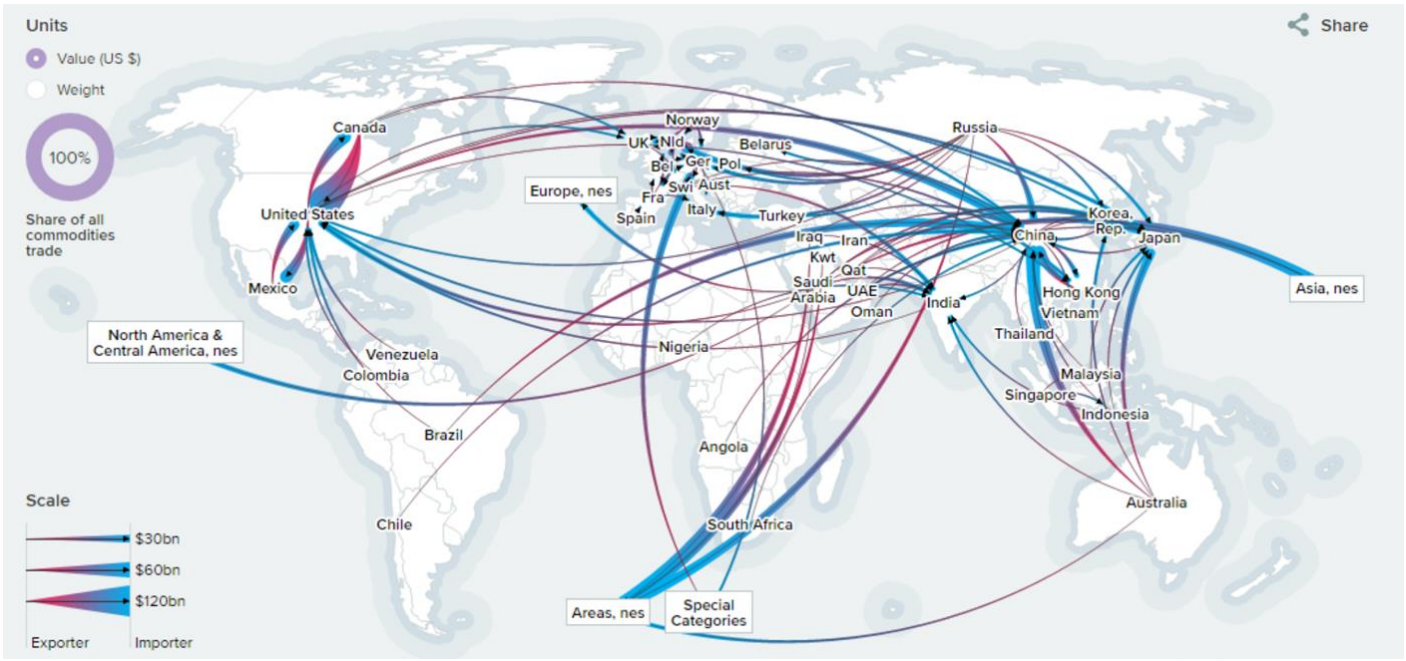


Section E: Globalisation

Table E1: Growth of popular social media sites (2014–2019)
Source: Statista

Number of global users in millions	2014	2015	2016	2017	2018	2019
Snapchat	46	80	122	166	191	190
Facebook	1,317	1,490	1,712	1,936	2,196	2,375
WhatsApp	430	700	1,000	1,510	1,590	1,618
Twitter	235	237	246	255	263	270

Figure E1: The share of world exports and imports by country
Source: https://comtrade.un.org



Section F: Water Security

Figure F1: Global withdrawal and consumption of water from 1900-2025 (projected)
Source: https://www.bing.com/images

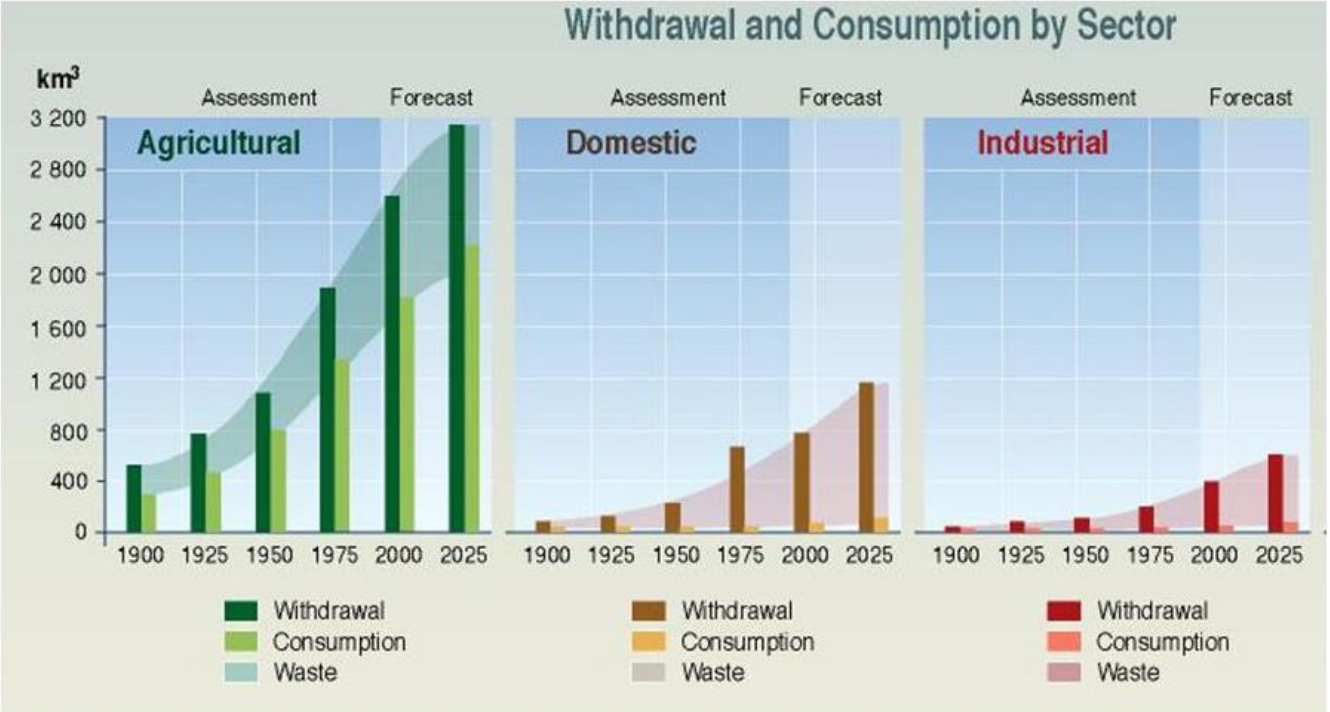


Figure F2: Water distribution from the River Jordan

Source: http://kanat.jsc.vsc.edu/student/conant/surface-waterIsrael.gif

end ■