22nd International Geography Olympiad

Istanbul, Türkiye

11 – 17 August 2026

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.

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Contributions from: Brazil, Canada, China (Taipei), Croatia, Denmark, New Zealand, Singapore, Uzbekistan
Committee Convenor: Ivan Šulc (Croatia)
Director of Tests: Paul VanZant (Canada)

Section A: Pluvial flooding in urban areas

Table A1: Rainfall and discharge for two storm events in Dardenne Creek Basin, Missouri, USA in 1982 (pre-urbanisation) and 2003 (post-urbanisation)

Time elapsed (hours)	Rainfall (mm), 1982 and 2003*	Discharge (m^3/s) in 1982	Discharge (m^3/s) in 2003
0	0	2	1.5
1	5		
2	9		
3	16	2.5	12
4	10		
5	6		
6	4	4	35
7	0		
8	0		
9	0		
10	0		45
11	0		
12	0	9	
13	0		
14	0		20
15	0		
16	0		
17	0		
18	0	15	
19	0		
20	0		5
21	0		
22	0		
23	0		
24	0	11	
25	0		
26	0		
27	0		
28	0		
29	0		
30	0		2.5
31	0		
32	0		
33	0		
34	0		
35	0		
36	0	6	2

* The time distribution of rainfall was the same for both storm events.
(https://data.usgs.gov/datacatalog/data/USGS:5e711aefe4b01d5092682394)

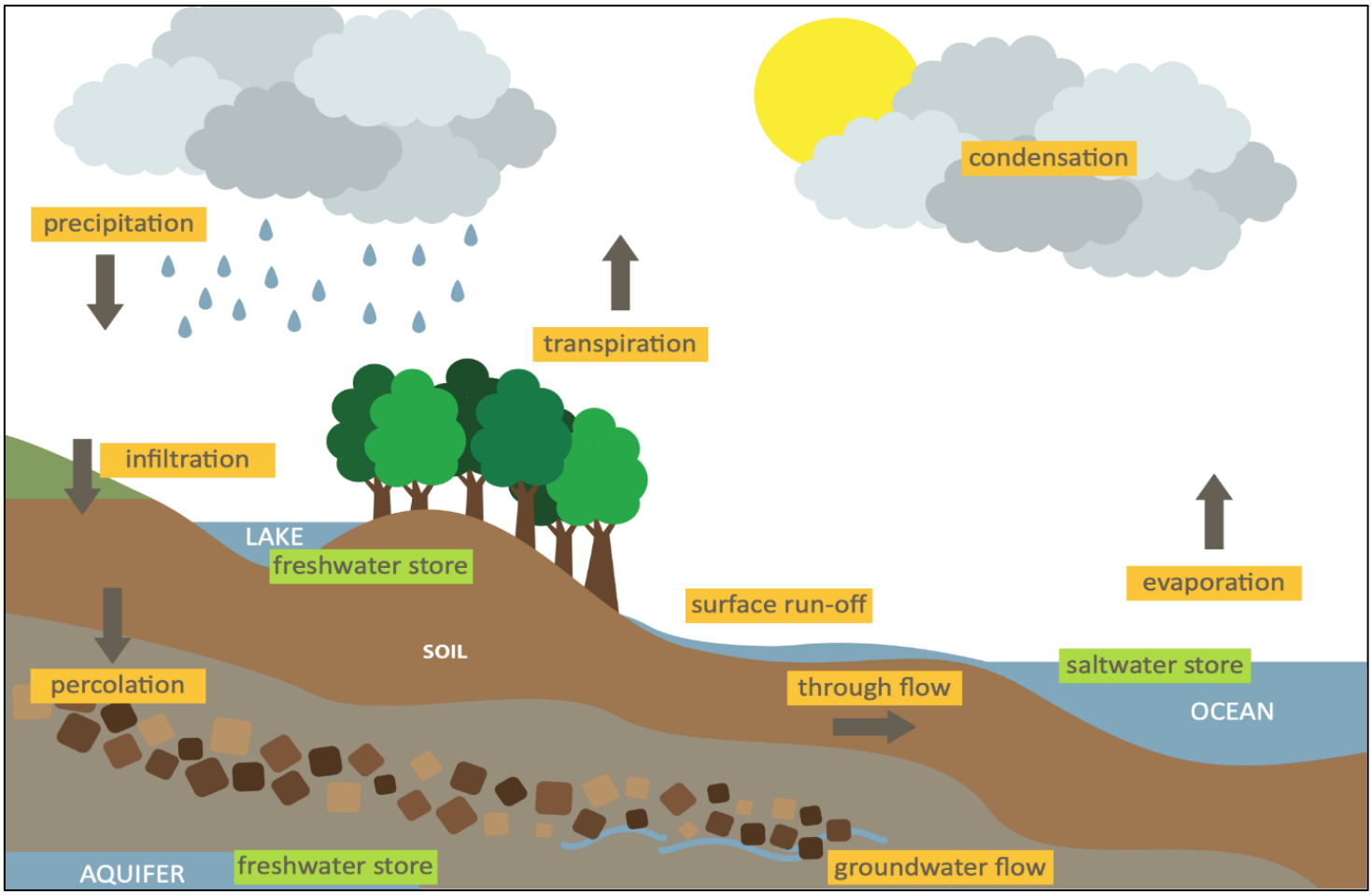


Figure A1: Hydrological cycle
(https://www.internetgeography.net/wp-content/uploads/2023/06/The-Hydrological-Cycle.png)



Figure A2: Individual elements that constitute a sponge city
(https://www.sciencedirect.com/science/article/pii/S2588912521000035?via%3Dihub)

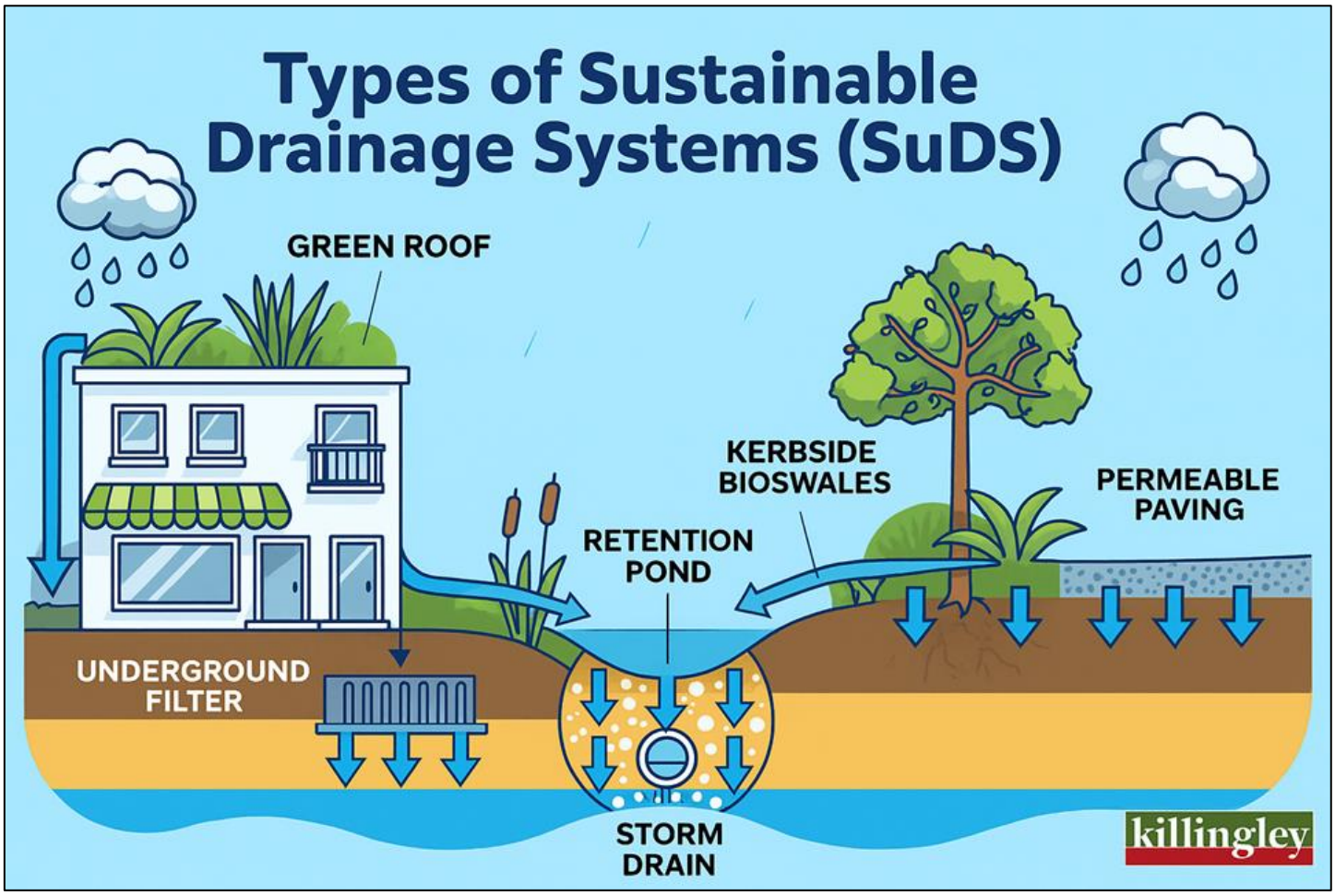


Figure A3: Types of sustainable drainage systems
(https://www.killingley.co.uk/hard-landscaping/what-are-sustainable-drainage-systems-suds/)

Section B: Agriculture and soil degradation

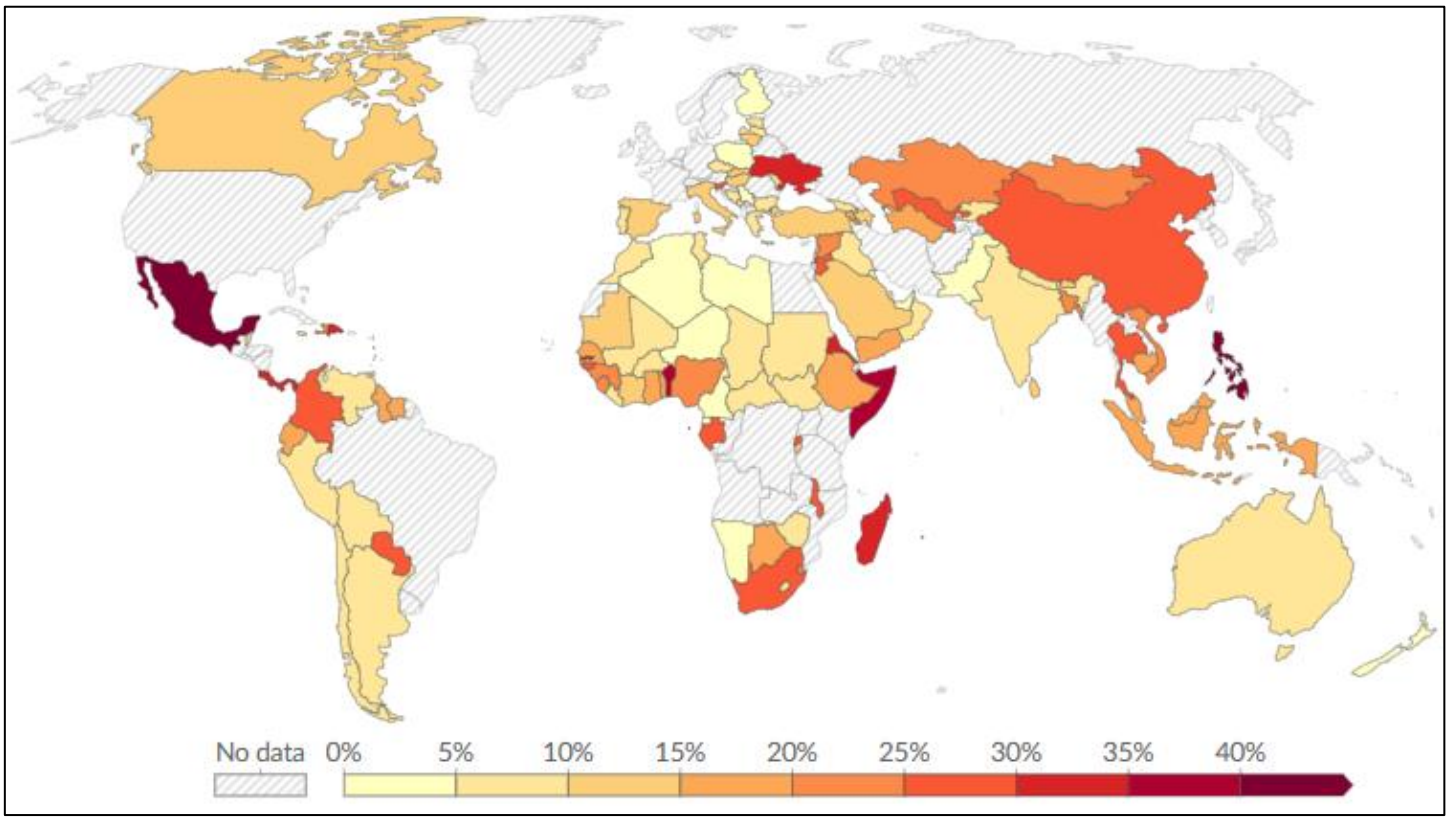


Figure B1: Share of degraded land worldwide in 2019, by country
(OurWorldinData.org/land-use)

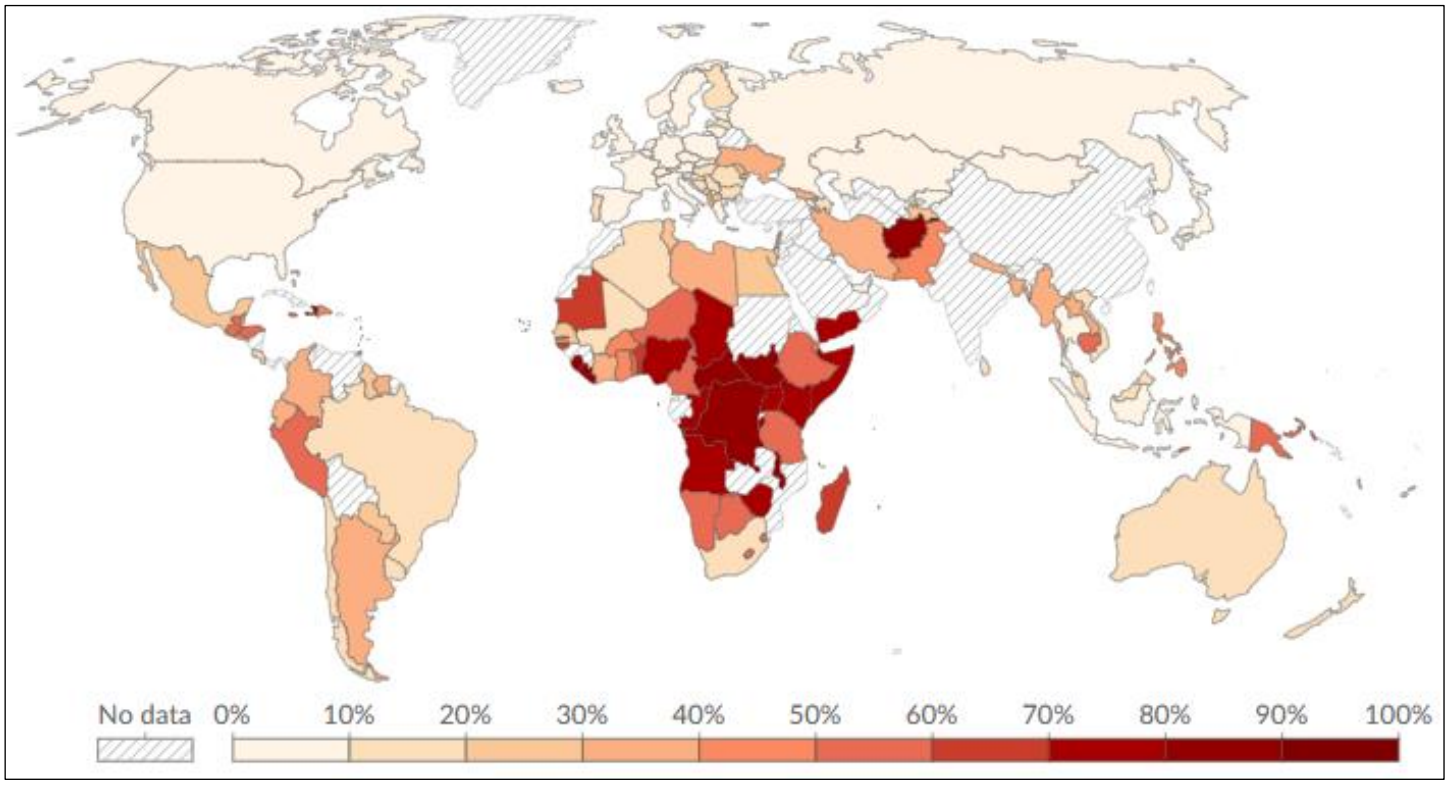


Figure B2: Share of the population experiencing moderate to severe food insecurity, by country
(OurWorldinData.org/hunger-and-undernourishment)

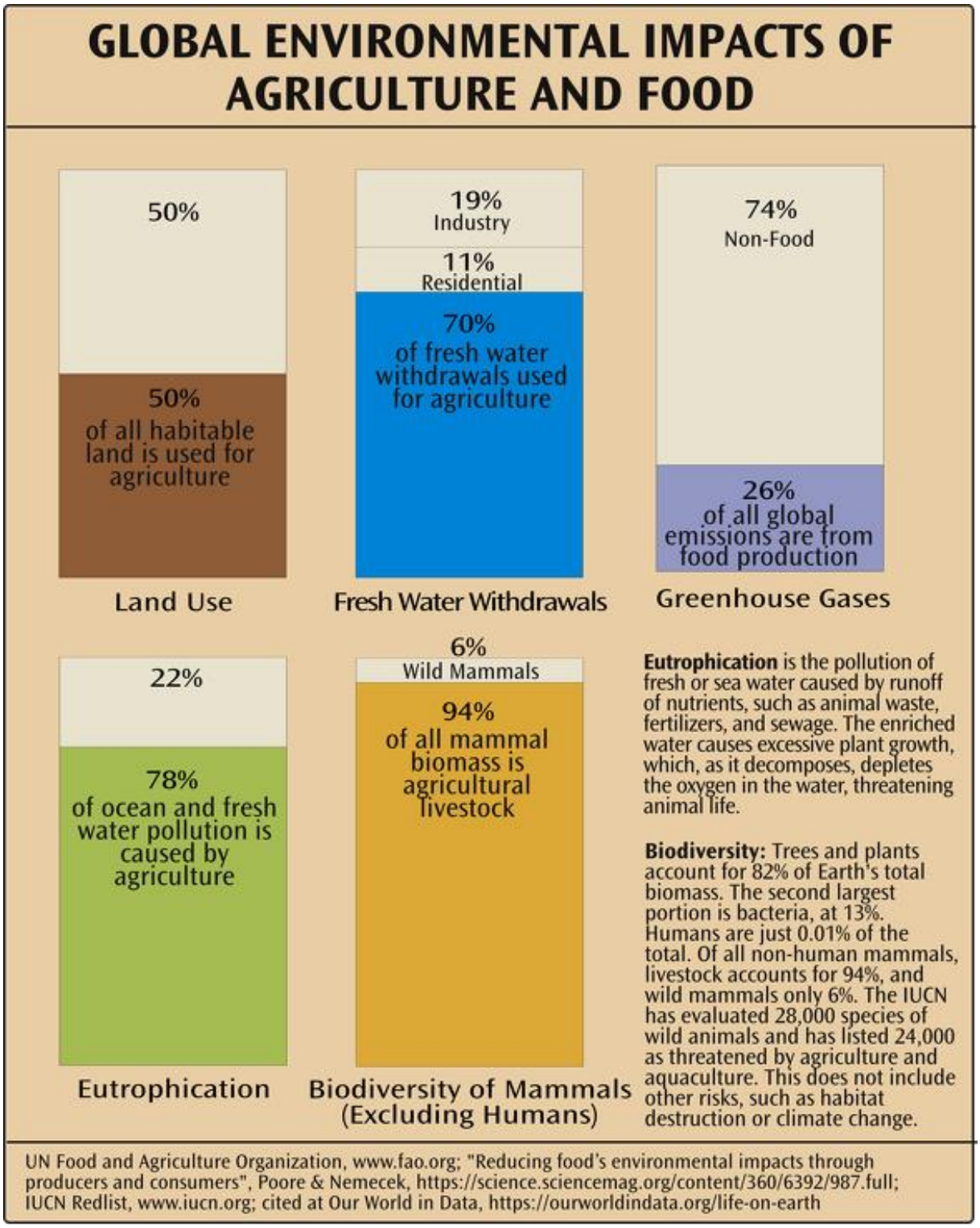


Figure B3: Environmental impacts of food and agriculture
(https://www.theglobaleducationproject.org/earth/agriculture-food/environmental-impacts-of-food)

Section C: Natural resources

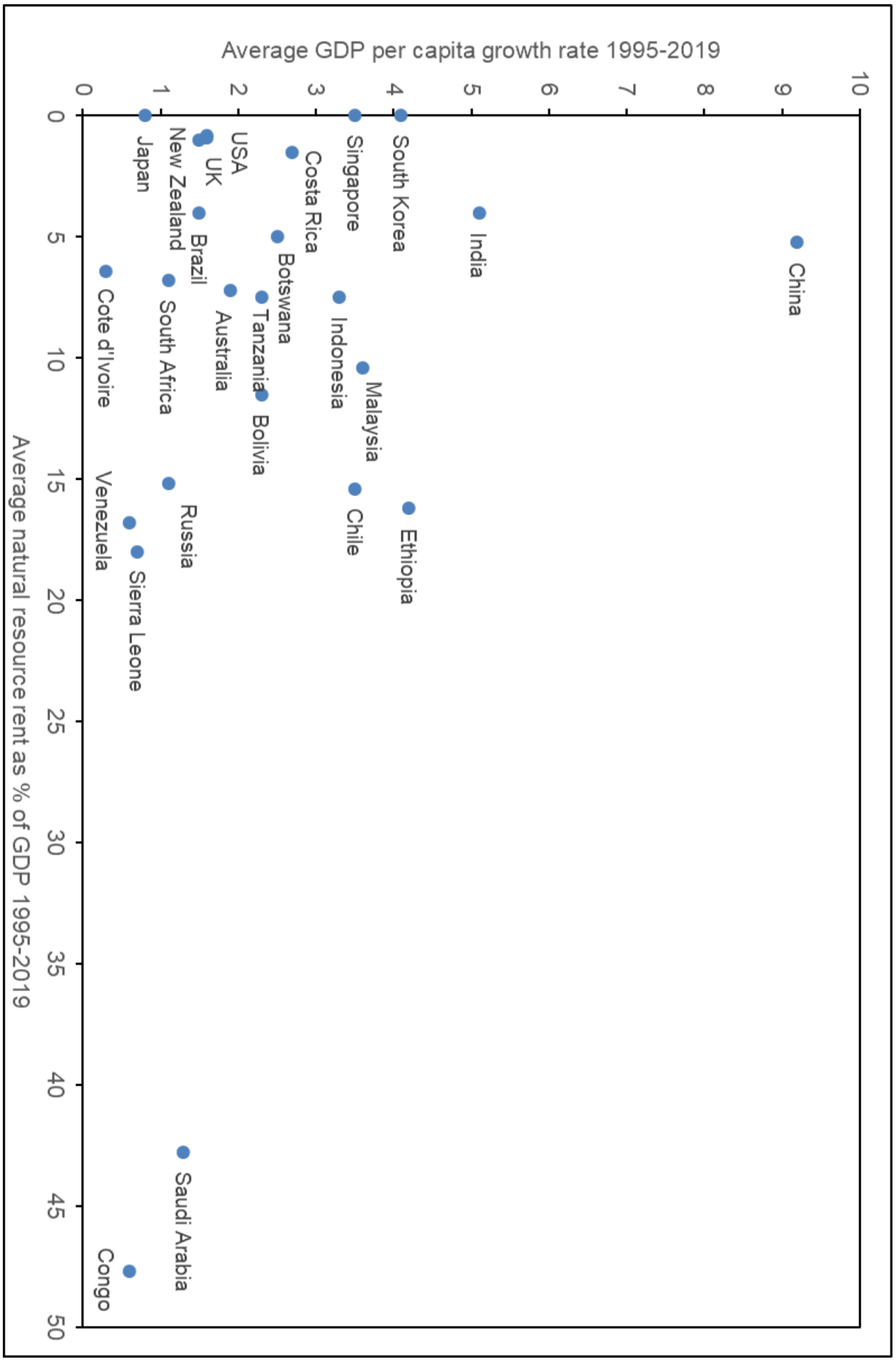


Figure C1: Average natural resource rent as a percentage of GDP and the average GDP per capita growth rate (1995–2019) worldwide, by country

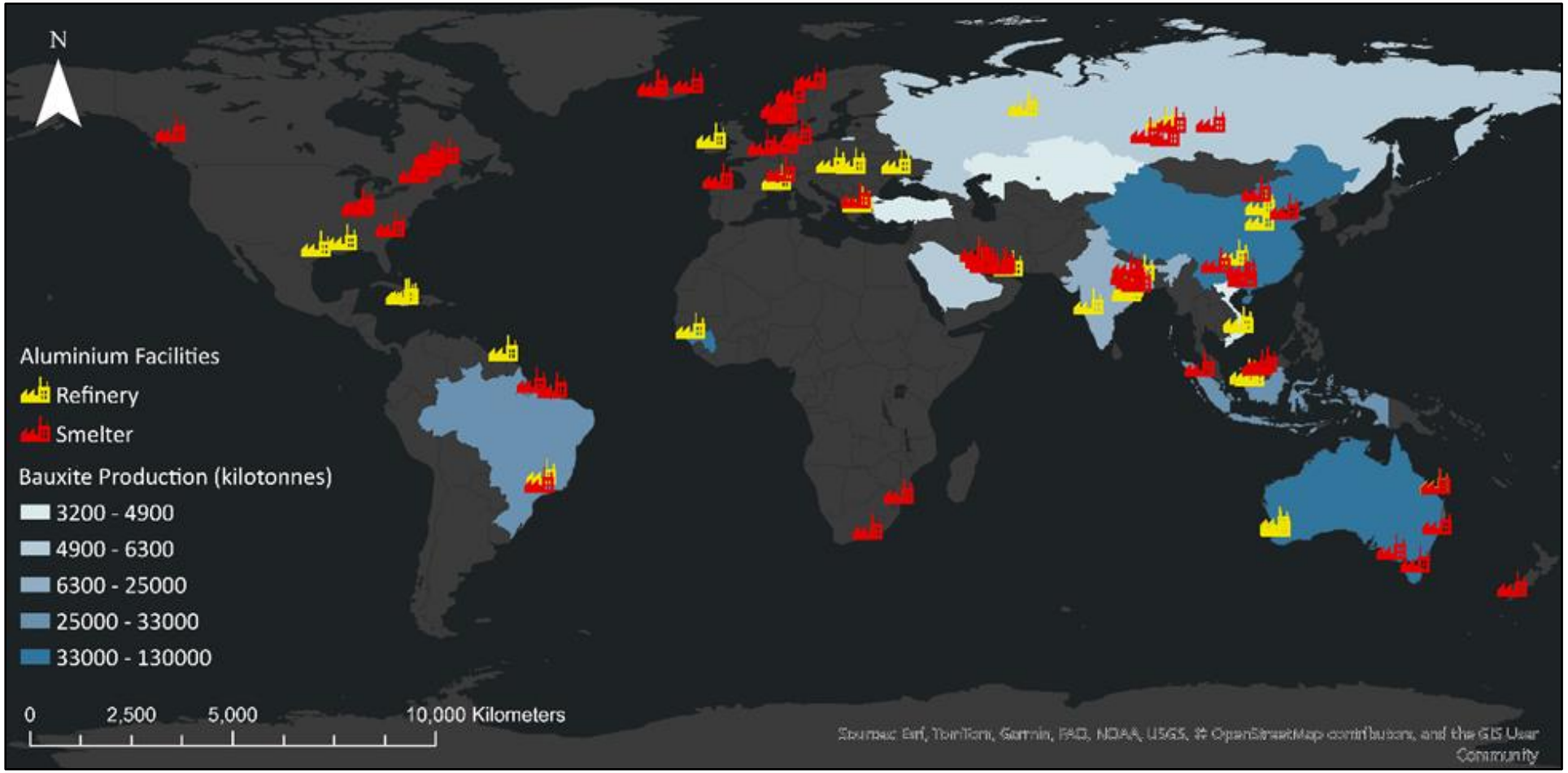


Figure C2: Global bauxite mining, aluminium smelting and refining (2024) and information on lateritic bauxite deposits. Note: 88% of the world's bauxite is obtained from lateritic deposits

Section D: Arctic ice

Table D1: Average temperatures and precipitation for Camp Summit, Greenland (72.38°N, 38.45°W, elevation: 3216 m)

(https://www.meteoblue.com/en/weather/week/summit-camp_greenland_6949601)

Month	Monthly precipitation (mm)	Average temperature (°C)
January	6	-36
February	4	-37
March	4	-36
April	5	-29
May	6	-22
June	6	-16
July	7	-13
August	9	-16
September	11	-23
October	7	-30
November	8	-34
December	5	-36

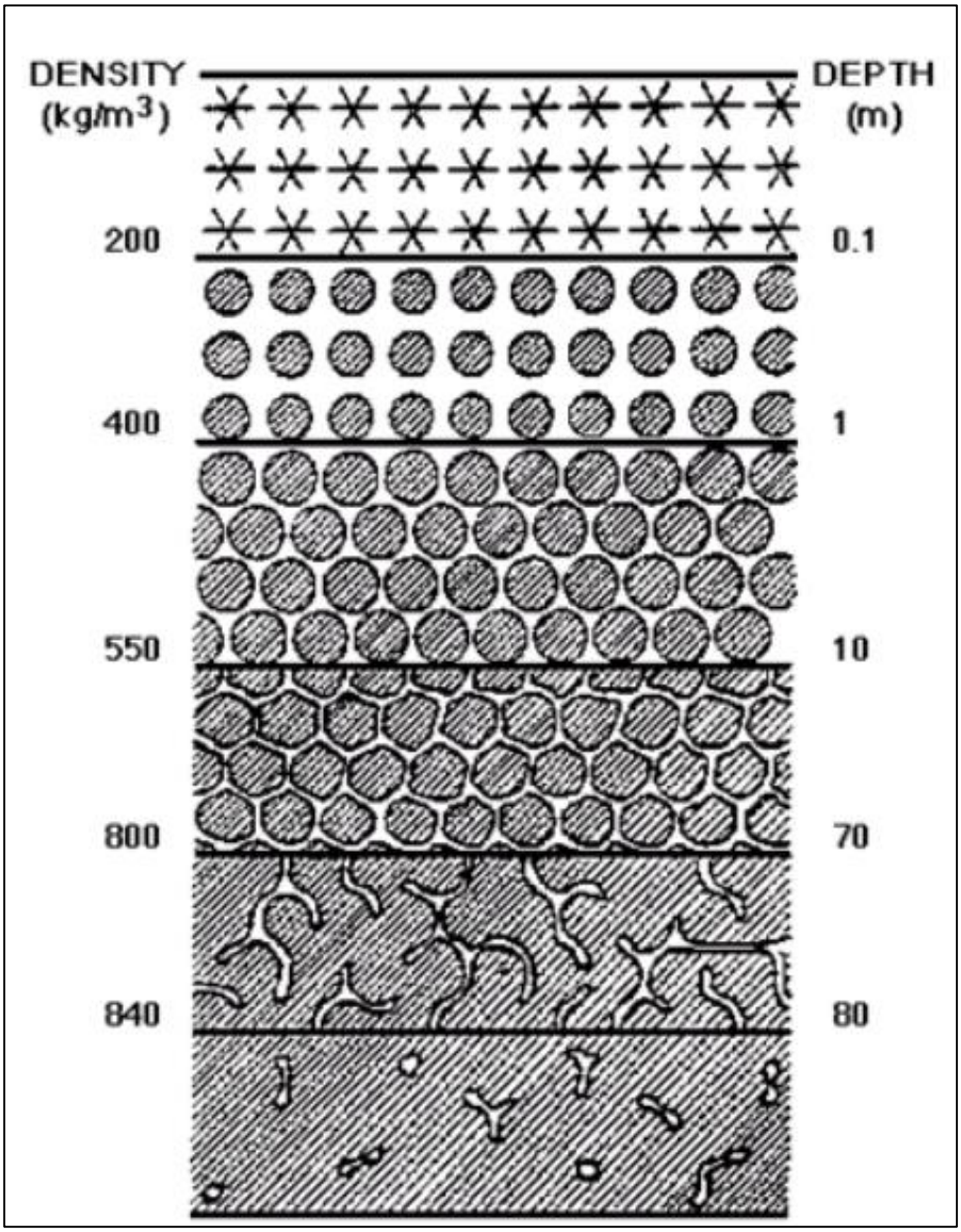


Figure D1: Transformation of snow into ice

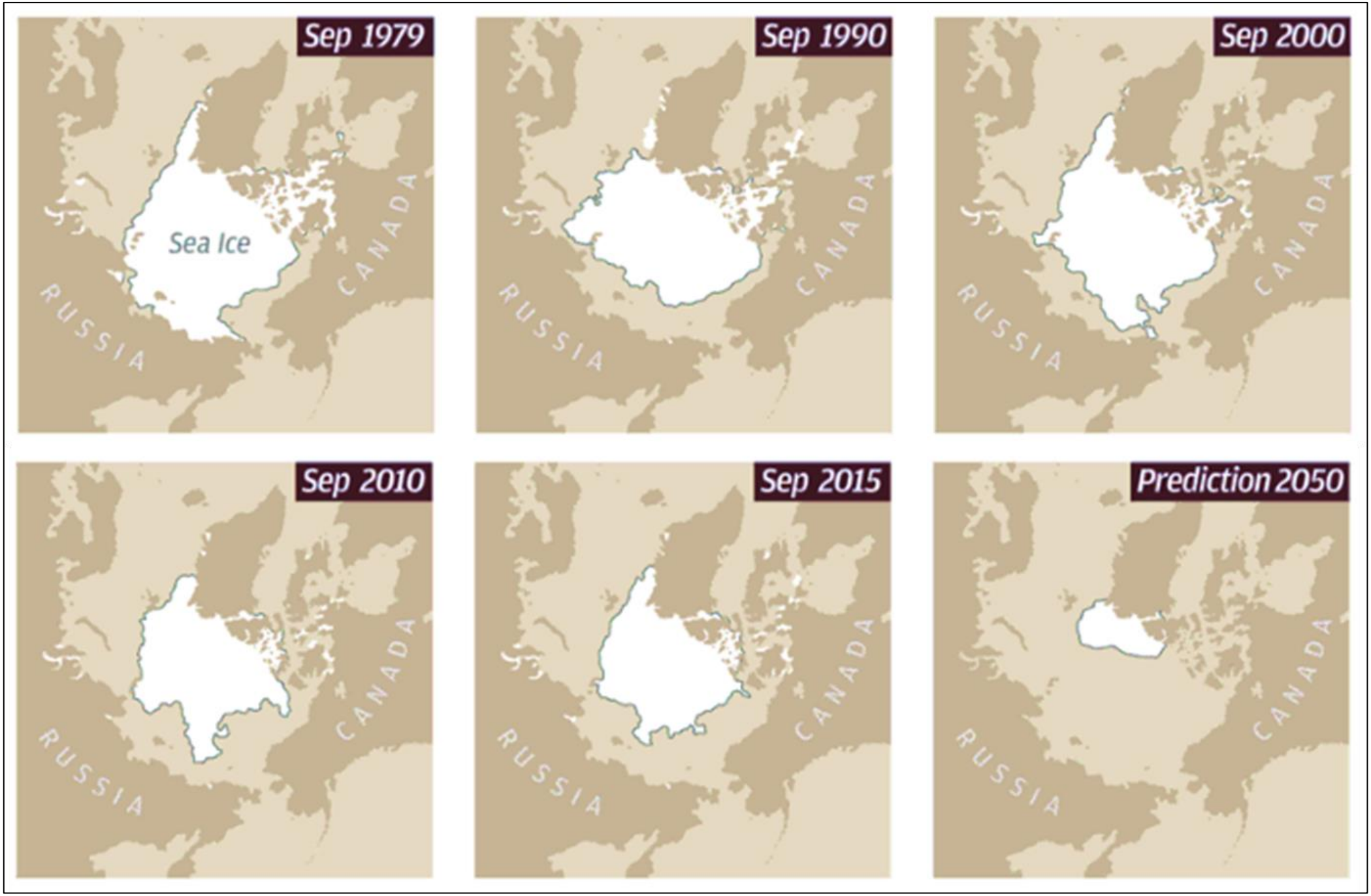


Figure D2: Decline of Arctic sea ice from 1979 to 2015, with projections to 2050

(https://www.meteoblue.com/en/weather/week/summit-camp_greenland_6949601)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Passenger ships	10	14	12	17	14	17	17	9	13	15	20	18
Crude oil tankers	12	10	9	14	17	19	26	24	18	16	31	46
Gas tankers	1	0	1	0	4	13	24	26	26	26	31	43
Offshore supply ships	25	52	41	25	36	45	45	51	52	31	44	38
Chemical tankers	42	45	54	50	50	60	60	53	47	55	53	58
Oil product tankers	62	70	58	47	58	53	55	55	58	54	53	54
Research vessels	62	70	59	58	60	53	48	47	50	51	54	56
Refrigerated cargo ships	71	68	77	76	92	81	81	89	83	81	90	89
Cruise ships	58	58	55	63	63	65	73	7	12	78	96	87
Other activities	55	65	60	72	67	67	67	69	85	81	104	98
Bulk carriers	71	66	78	78	75	86	106	98	96	114	119	111
Towing / Pushing vessels	76	71	87	79	79	80	93	97	119	104	121	133
General cargo ships	141	160	164	199	182	155	174	187	219	183	181	187
Fishing vessels	566	568	590	622	636	663	716	681	807	736	725	692
Total	1298	1370	1398	1446	1477	1494	1628	1546	1740	1677	1782	1781

Table D2: Number of ships by type in the Arctic region from 2013 to 2024

(https://wwwcdn.imo.org/localresources/en/About/Events/Documents/2025%20Polar%20Maritime%20Seminar%20-%20PP%20presentations/Session%201%20-%20Hjalti%20and%20Jon%20Arve%20-%20ASTD.pdf,
https://www.imo.org/en/googlesearch/searchposts/default.aspx?q=Statistic%20cruise%20ships%20in%20Arctic)

Section E: Coral reefs and tourism management

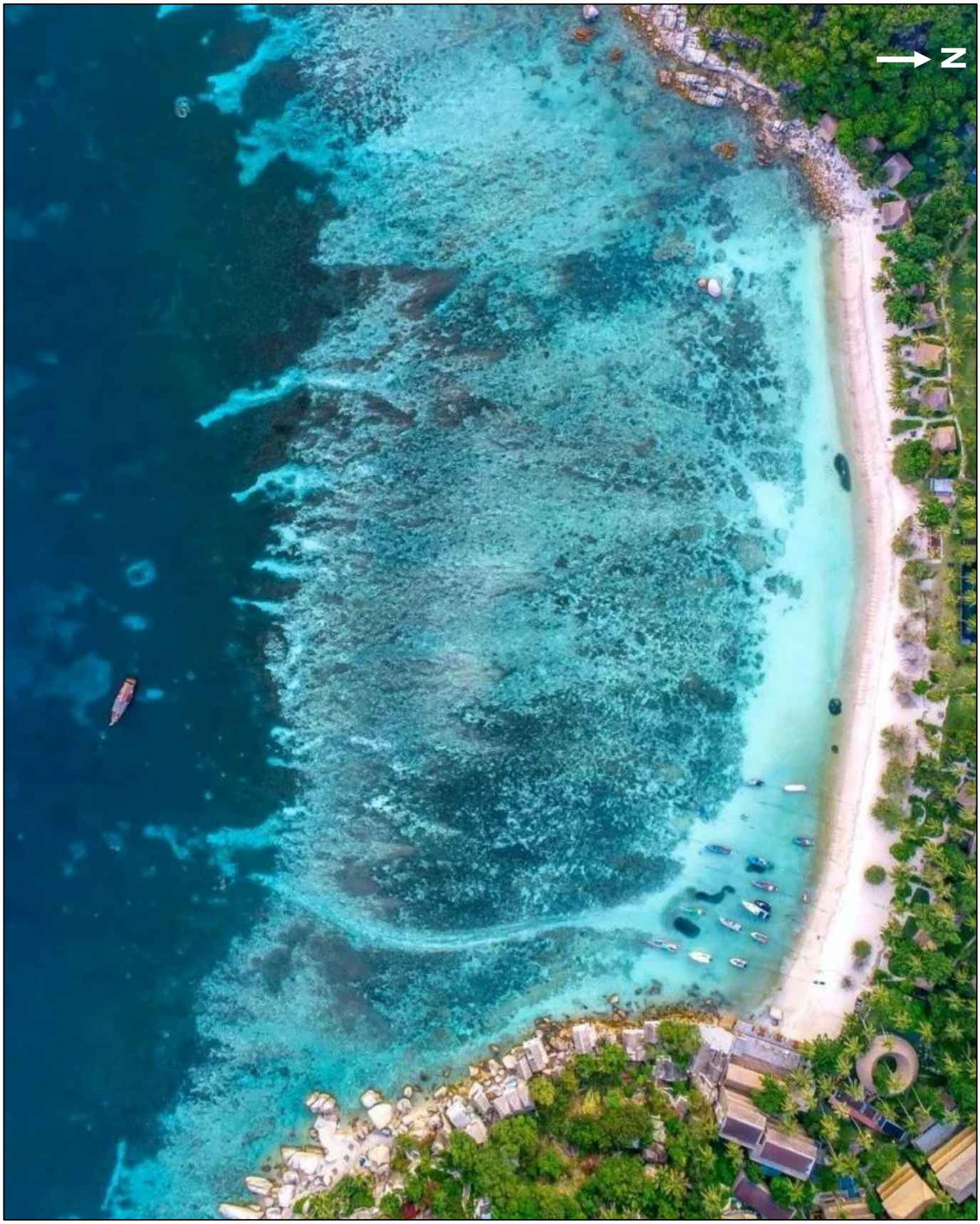


Figure E1: Aerial images of the bay on a tropical island in South East Asia (https://doi.org/10.1007/s00338-025-02706-w)



Figure E2:
(A) The same bay on the tropical island as on figure E1
(B) (C) Different styles of accommodation along the bayside
(https://earth.google.com/, https://www.airbnb.ie/)



Figure E3:
(A) A sea turtle swims in a healthy coral reef;
(B) A sea turtle and a snorkel diver swim in a compromised coral reef
(https://doi.org/10.1007/s00338-025-02706-w)

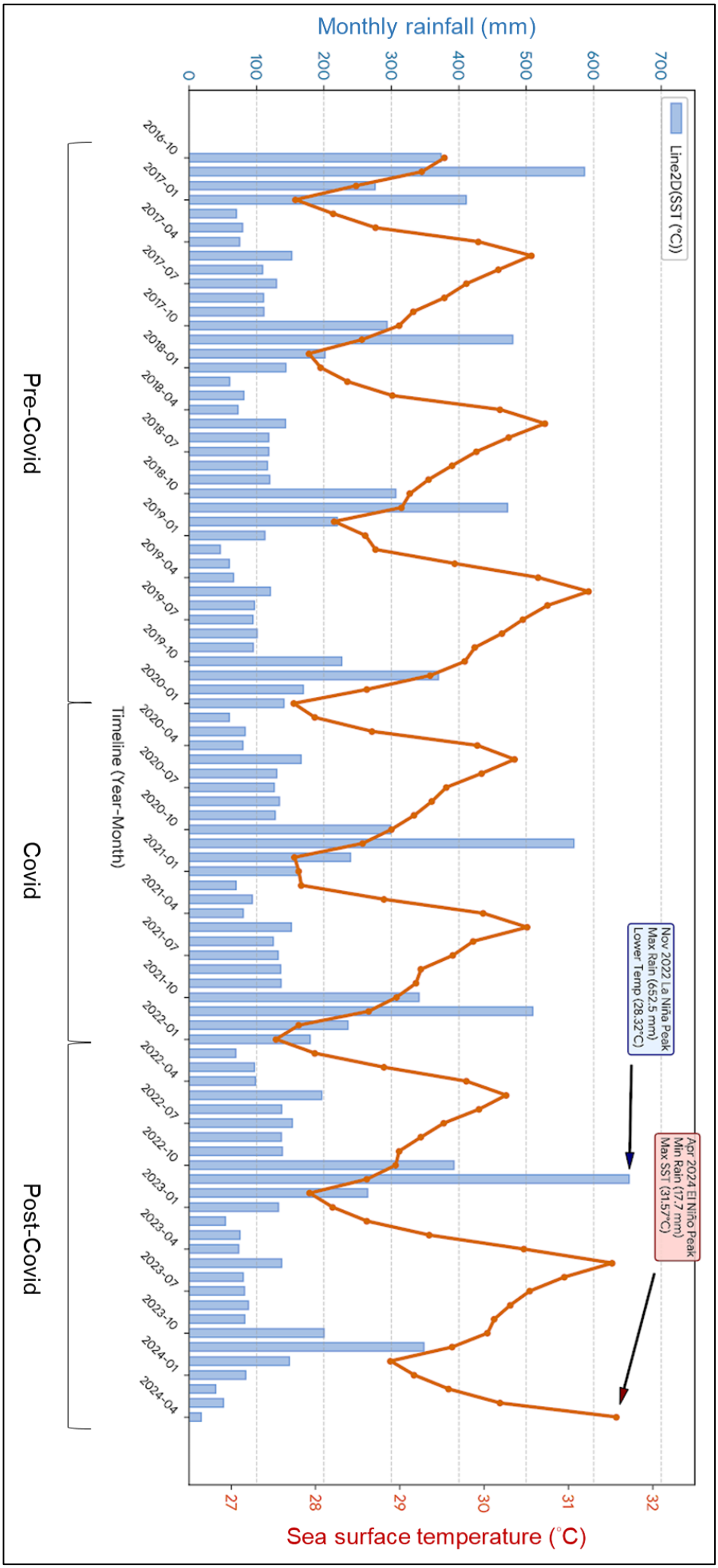


Figure E4: Sea surface temperature and monthly rainfall in the bay (thermal bleaching is caused by water temperature increasing over 31 °C)

(https://doi.org/10.1007/s00338-025-02706-w)

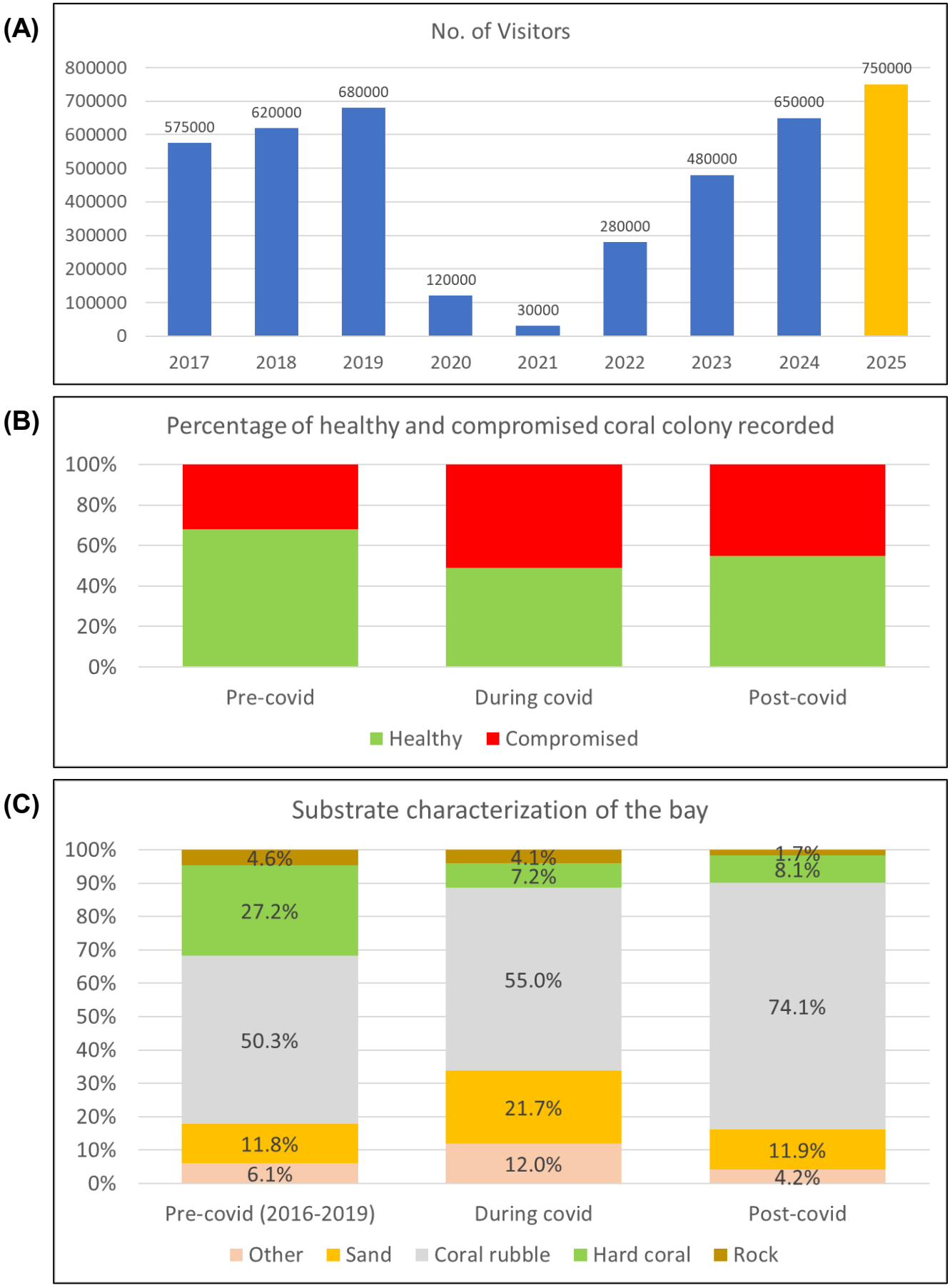


Figure E5:
(A) Number of visitors to the tropical bay from 2017 to 2025
(B) Percentage of healthy and compromised coral colonies recorded in the bay during different periods
(C) Substrate characterisation of the bay in different periods.
(https://doi.org/10.1007/s00338-025-02706-w)

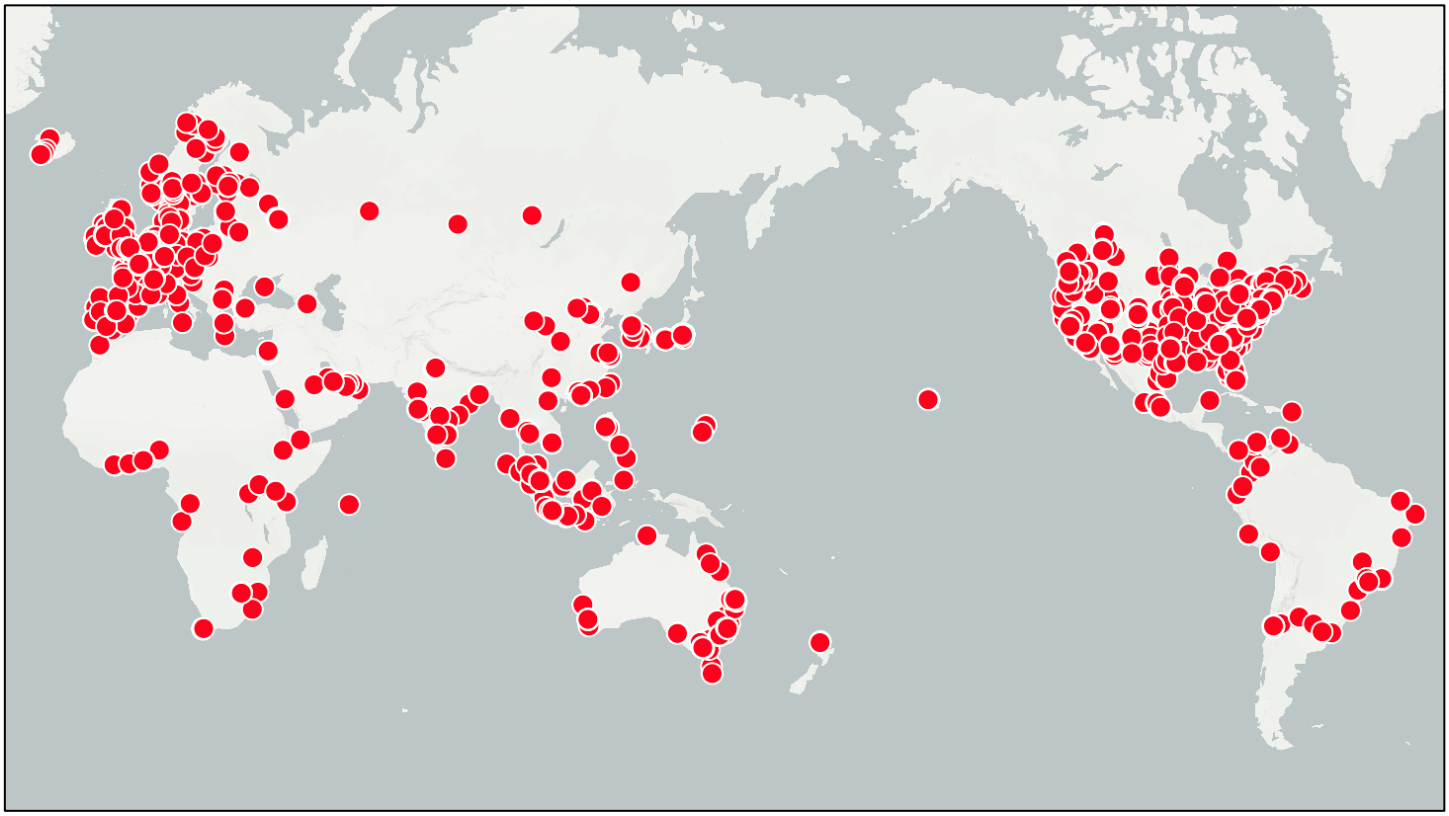


Figure F1: AI data centres in the world in June 2026
(https://energyathaas.wordpress.com/2023/10/09/data-centers-are-booming/)



Figure F2: Land use in the Grange Castle Business Park, Dublin, Ireland in 2012 and 2025
(https://earth.google.com/)



Figure F3: Infrastructure related to AI: (A) Google data centre in the Netherlands; (B) Solar farm in the USA; (C) Amazon Web Services data centre in the USA; (D) Cooling infrastructure for a data centre in Denmark

(https://sustainability.google.com; https://www.dlrgroup.com; https://www.scientificamerican.com; https://datacentrenews.uk)

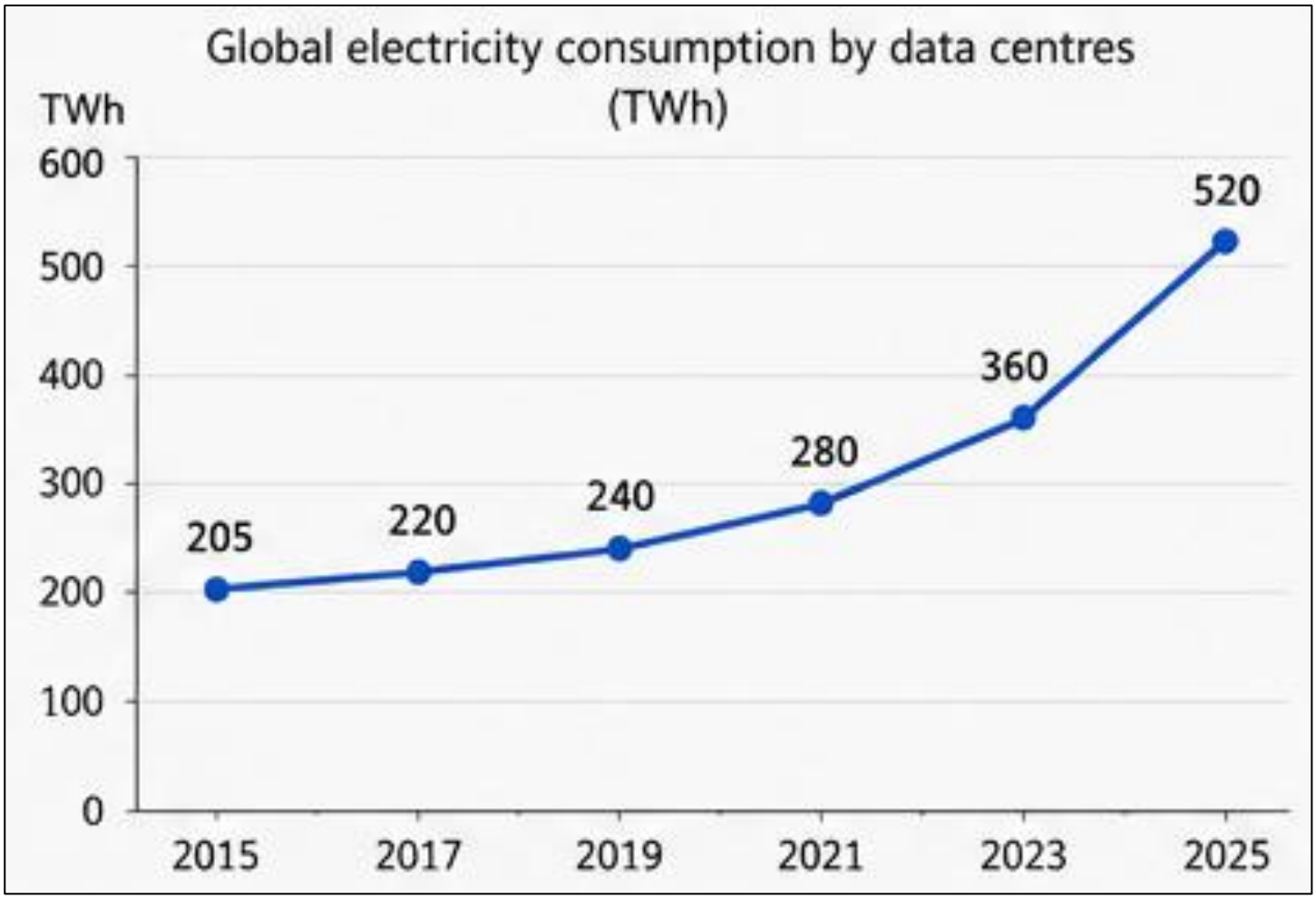


Figure F4: Global electricity consumption by data centres (TWh)
(International Energy Agency, IEA)

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