PER AXBOM

THE SPECTACULAR LIES OF MAPS

Earthrise. Photo by William Anders, 1968.

Raise your hand and keep it raised as long as you agree with my statements.

Raise your hand and keep it raised as long as you agree with my statements.

I have lied.

Raise your hand and keep it raised as long as you agree with my statements.

I have lied to someone I care about.

Raise your hand and keep it raised as long as you agree with my statements.

I believe I will continue to lie in the future.

Raise your hand and keep it raised as long as you agree with my statements.

I’ve made design decisions with insufficient data.

Raise your hand and keep it raised as long as you agree with my statements.

I will continue to make design decisions with insufficient data.

Raise your hand and keep it raised as long as you agree with my statements.

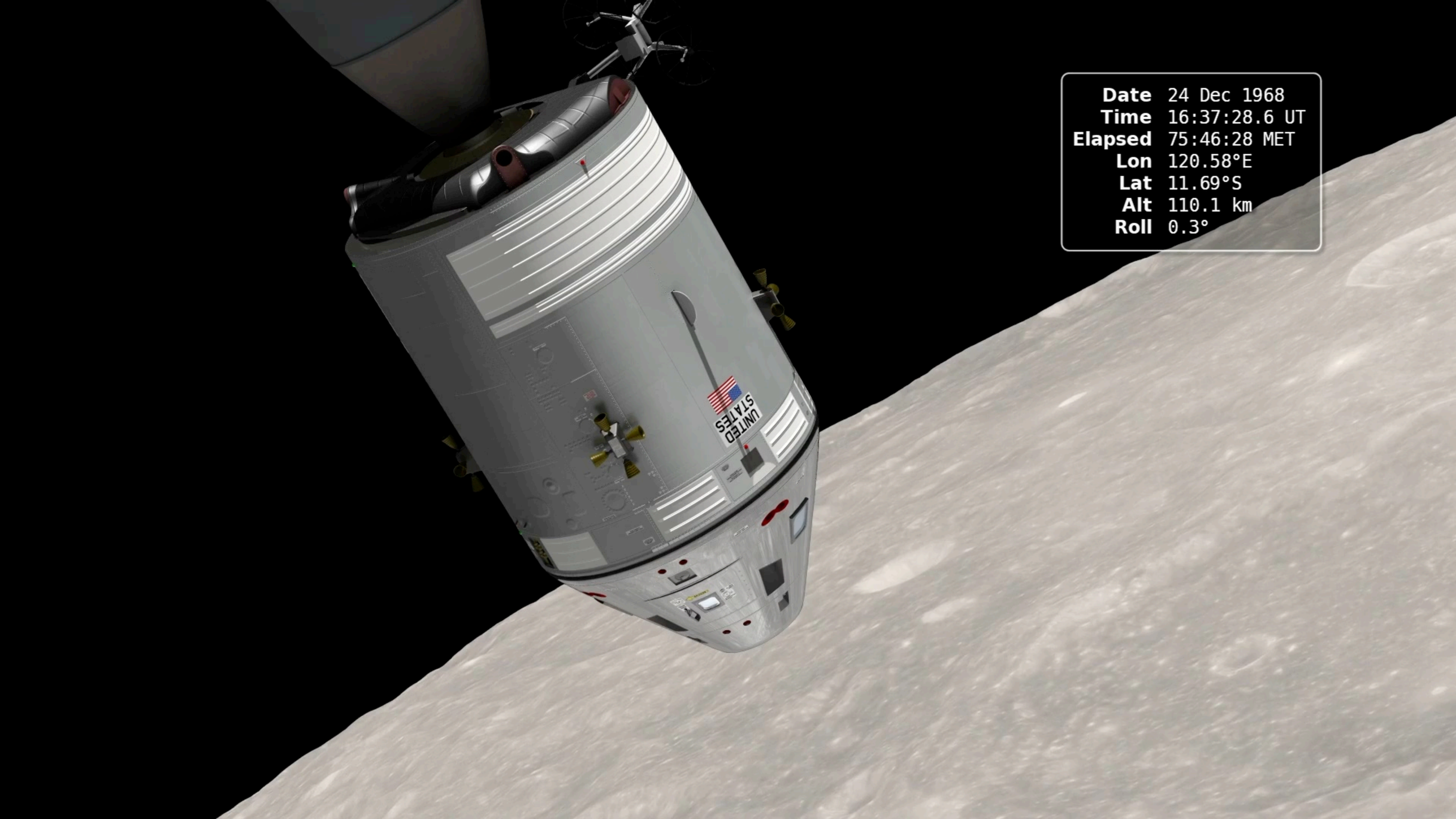
I trust maps to give me accurate information.

Raise your hand and keep it raised as long as you agree with my statements.

The Earth is flat.

Earthrise. December 24, 1968.

Taken by astronaut William Anders during the Apollo 8 mission, the first crewed voyage to orbit the Moon. The three astronauts were William Anders, Frank Borman and James Lovell.


Date 24 Dec 1968
Time 16:37:28.6 UT
Elapsed 75:46:28 MET
Lon 120.58°E
Lat 11.69°S
Alt 110.1 km
Roll 0.3°
UNITED STATES

Anders: Oh my God! Look at that picture over there! There's the Earth coming up. Wow, that's pretty.

Borman: Hey, don't take that, it's not scheduled. (joking)

Anders: (laughs) You got a color film, Jim?
Hand me that roll of color quick, would you...

Lovell: Oh man, that's great!

18 months after the Apollo 8 astronauts took this photo, 20 million people took to the streets across the US to protest environmental destruction in the first ever Earth Day.

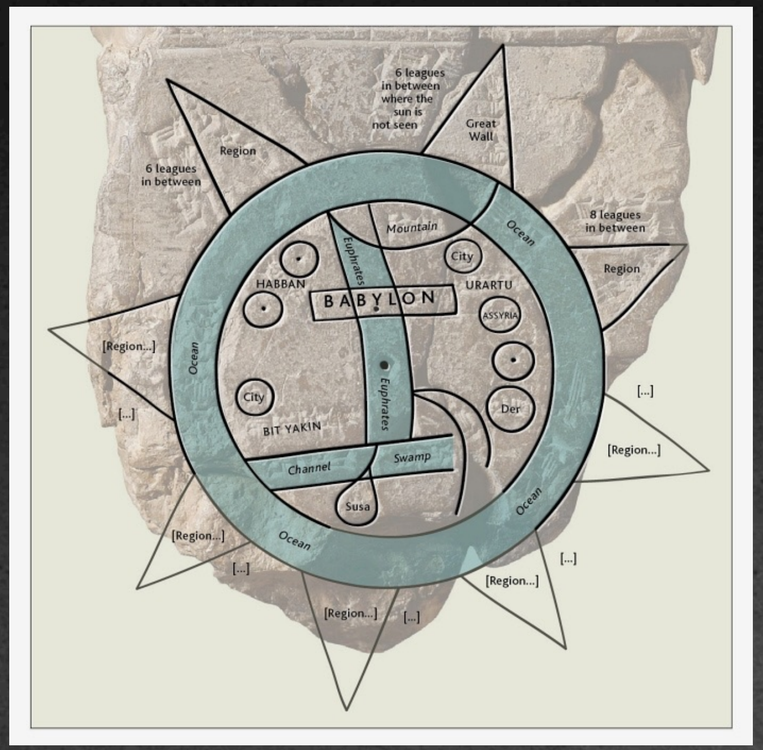
“It shows the Earth that we all live on, a little blue sphere set within this black expanse. It suggests everything from fragility to our uniqueness.”

– Michael Pritchard,
programmes director at the
Royal Photographic Society in the UK

There are no lines in space.

There are no lines in space.

Humans started drawing them to make sense of the world.

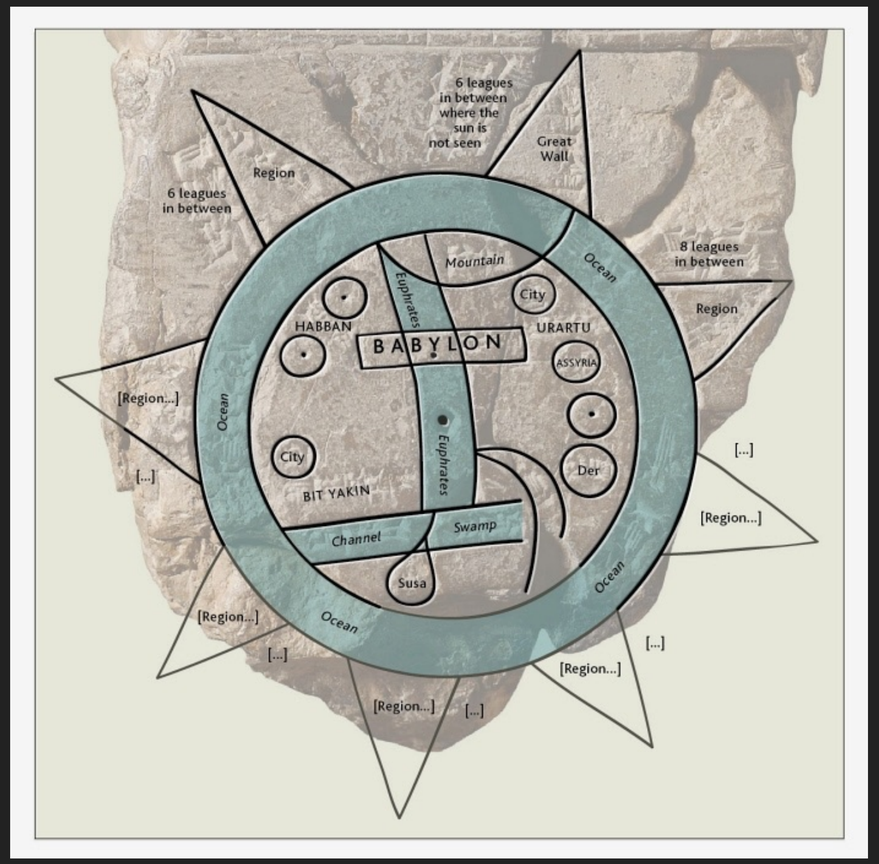


Imago Mundi

2,600-year-old Babylonian clay tablet

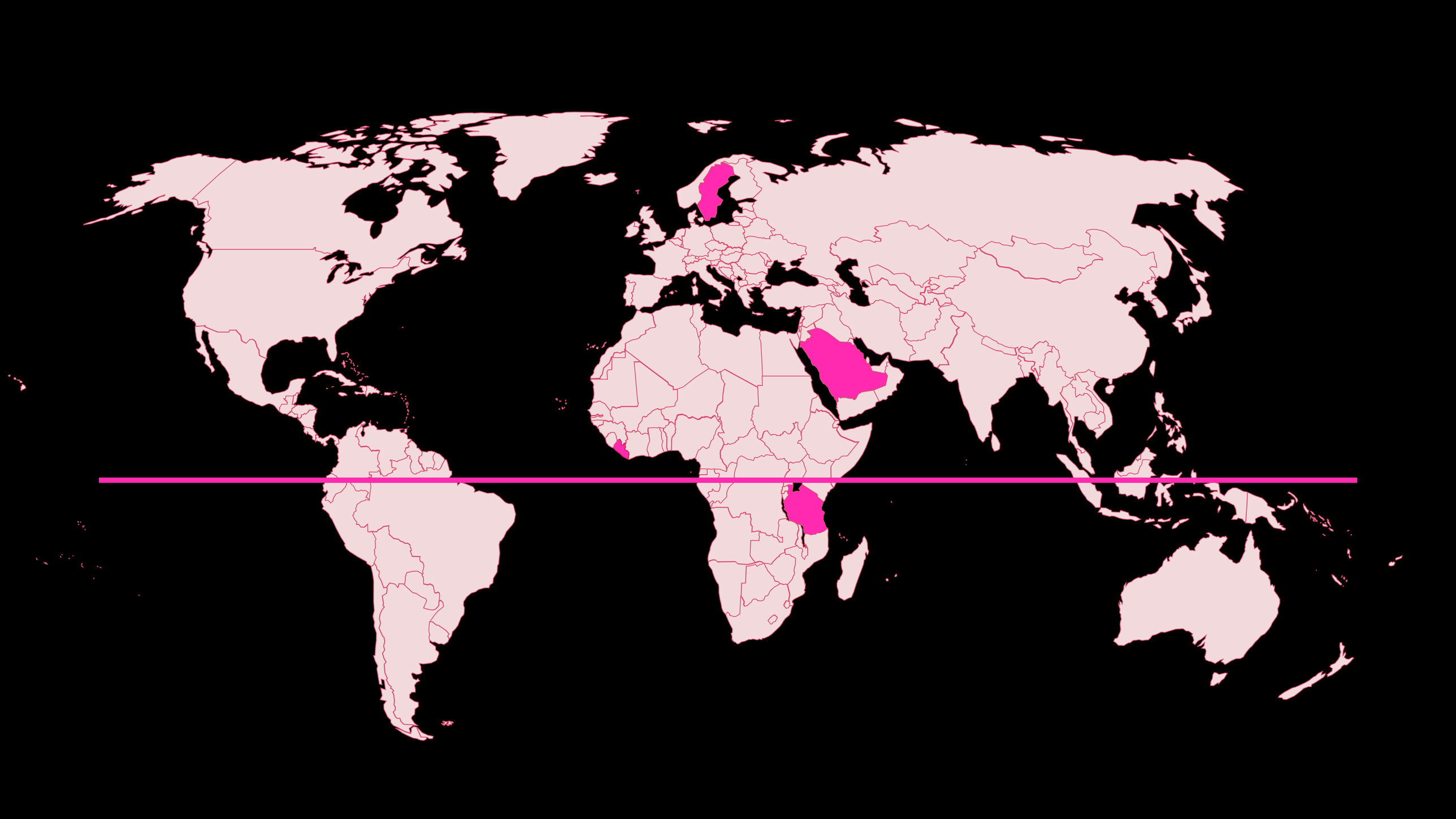
mythology, astronomy, geography

discovered in Sippar, an ancient Babylonian city along the Euphrates River, housed at the British Museum



Properties of maps

Size
Dominance
Centricity
Omission
Exaggeration
Distortion
Mythology
Perspective



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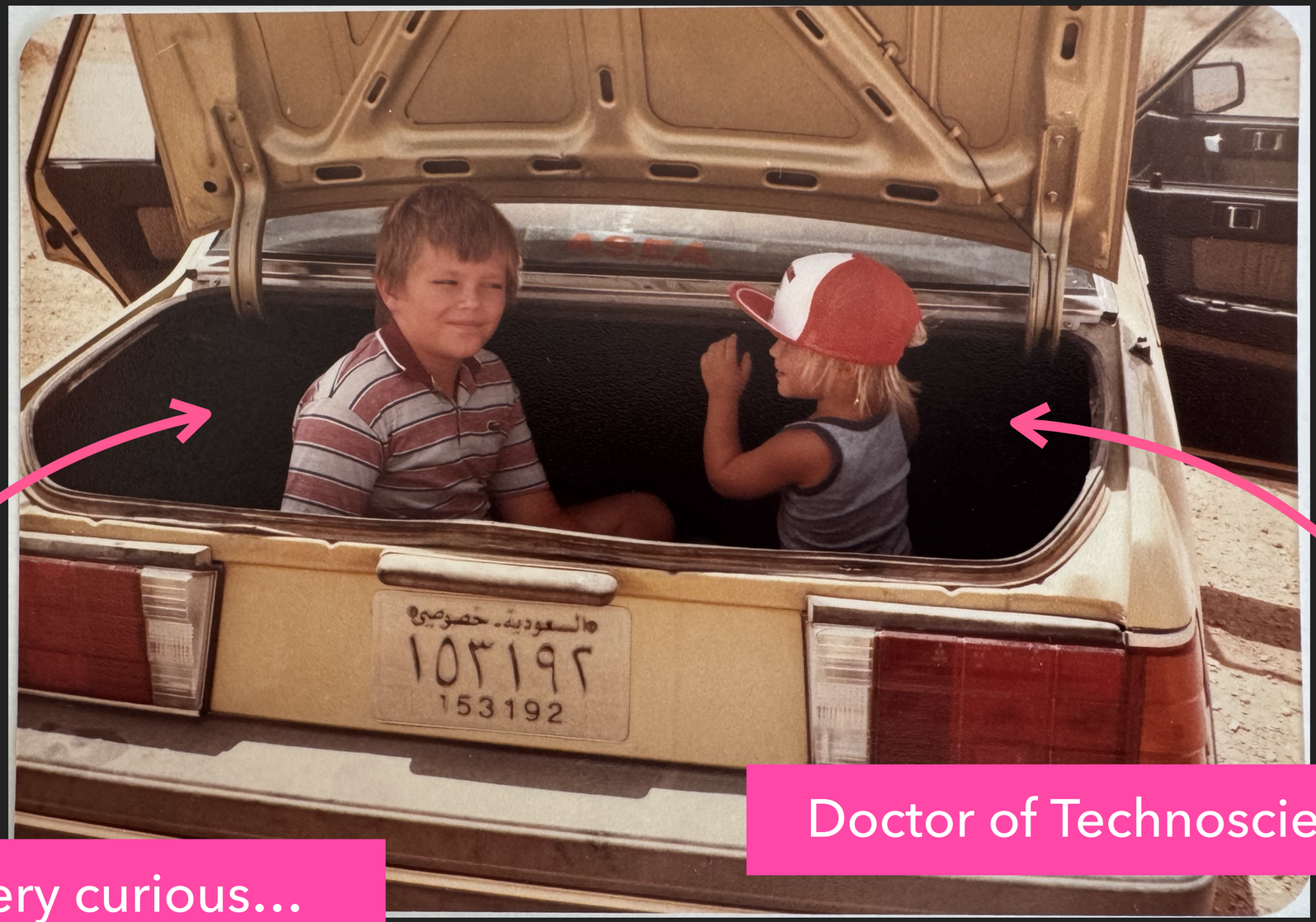
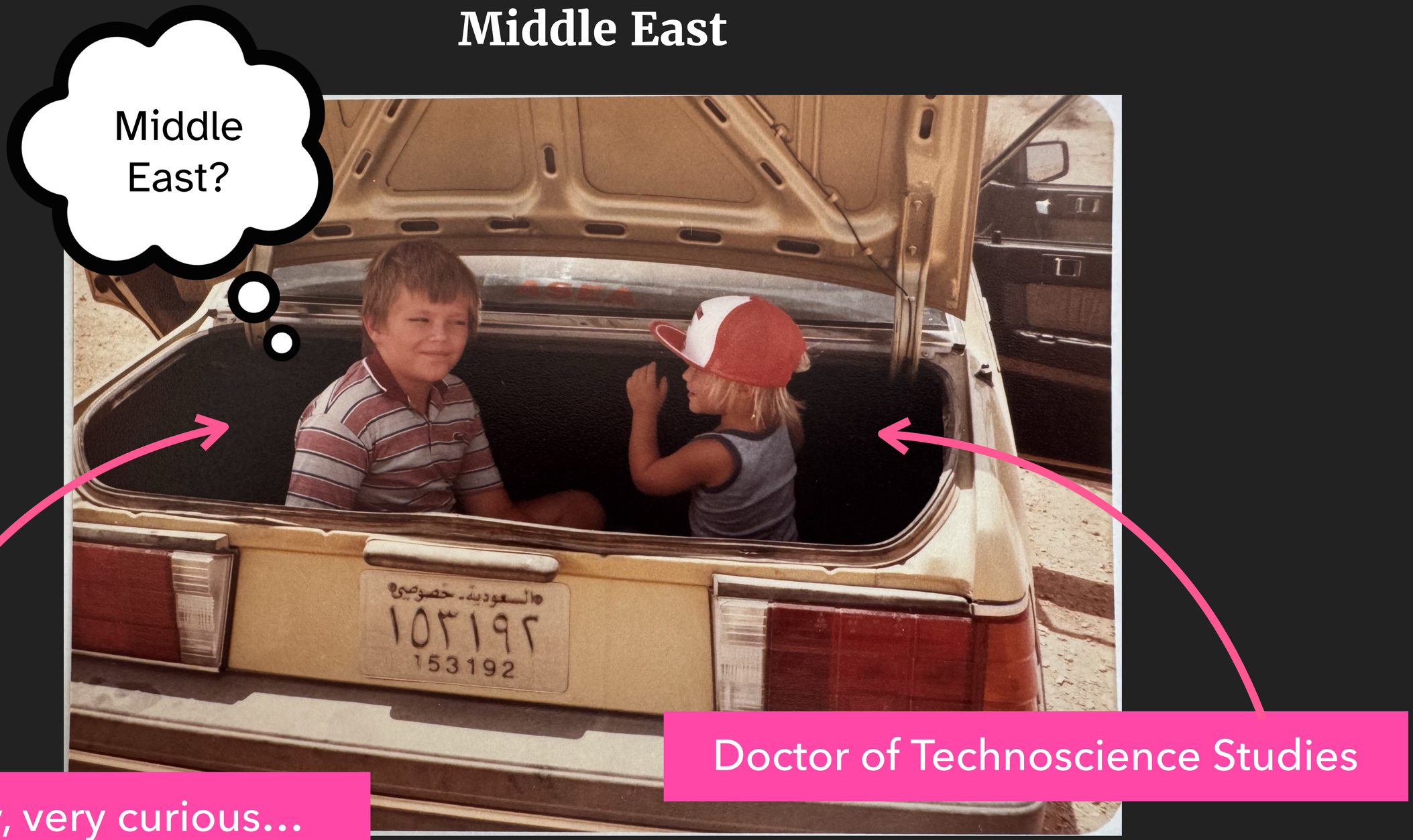
Middle East



just very, very curious…

Doctor of Technoscience Studies

Middle East


Middle East?
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just very, very curious...
Doctor of Technoscience Studies

Geographically, there’s very little ‘east’ in the Middle East.

The region known as 'the Middle East' actually encompasses some of the most northern parts of Africa and South-West Asia.

北冰洋
北美洲
格陵兰(丹)
北极圈
冰岛
雷克雅未克
法罗群岛(丹)
挪威
瑞典
芬兰
俄罗斯
欧洲
爱尔兰
伦敦
英国
比利时
荷兰
德国
波兰
法国
巴黎
白俄罗斯
乌克兰
莫斯科
西班牙
马德里
葡萄牙
意大利
罗马
罗马尼亚
土耳其
安卡拉
哈萨克斯坦
蒙古
乌兰巴托
中华人民共和国
北京
天津
上海
重庆
武汉
广州
香港
台湾岛
朝鲜
韩国
东京
横滨
印度
新德里
孟买
加尔各答
伊朗
德黑兰
伊拉克
巴格达
阿富汗
喀布尔
巴基斯坦
伊斯兰堡
沙特阿拉伯
利雅得
阿布扎比
阿曼
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恩贾梅纳
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埃塞俄比亚
亚的斯亚贝巴
吉布提
索马里
肯尼亚
内罗毕
乌干达
坦桑尼亚
达累斯拉姆
南非
安哥拉
赞比亚
纳米比亚
博茨瓦纳
津巴布韦
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斯威士兰
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比勒陀利亚
开普敦
罗安达
金沙萨
刚果民主共和国
加蓬
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摩洛哥
拉巴特
阿尔及尔
突尼斯
的黎波里
撒哈拉
南斯拉夫
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雅典
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芝加哥
底特律
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华盛顿
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匹兹堡
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圣路易斯
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休斯敦
新奥尔良
洛杉矶
圣迭戈
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墨西哥
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海地
多米尼加
危地马拉城
萨尔瓦多
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法属圭亚那
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萨尔瓦多
福塔莱萨
纳塔尔
特雷西纳
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利马
玻利维亚
拉巴斯
苏克雷
巴拉圭
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阿根廷
布宜诺斯艾利斯
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蒙得维的亚
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阿德莱德
达尔文
新西兰
惠灵顿
奥克兰
基督城
但尼丁
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大堡礁
珊瑚海
塔斯曼海
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苏瓦
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莫尔兹比港
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印度尼西亚
雅加达
马来西亚
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柬埔寨
越南
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内比都
孟加拉国
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斯里兰卡
科伦坡
马尔代夫
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世界地势图

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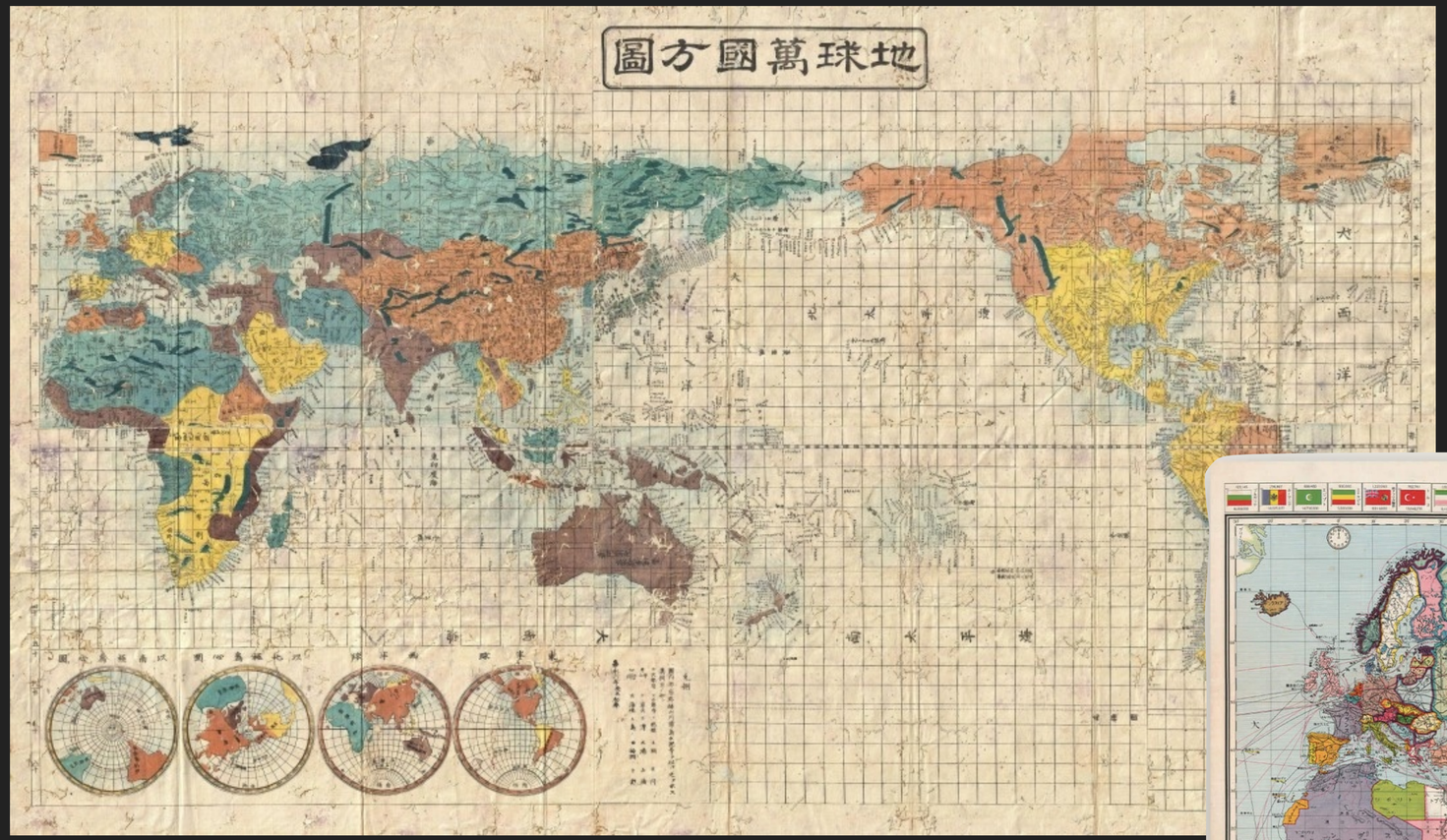
地球萬國方圖

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最新世界大地圖
滿洲國全圖
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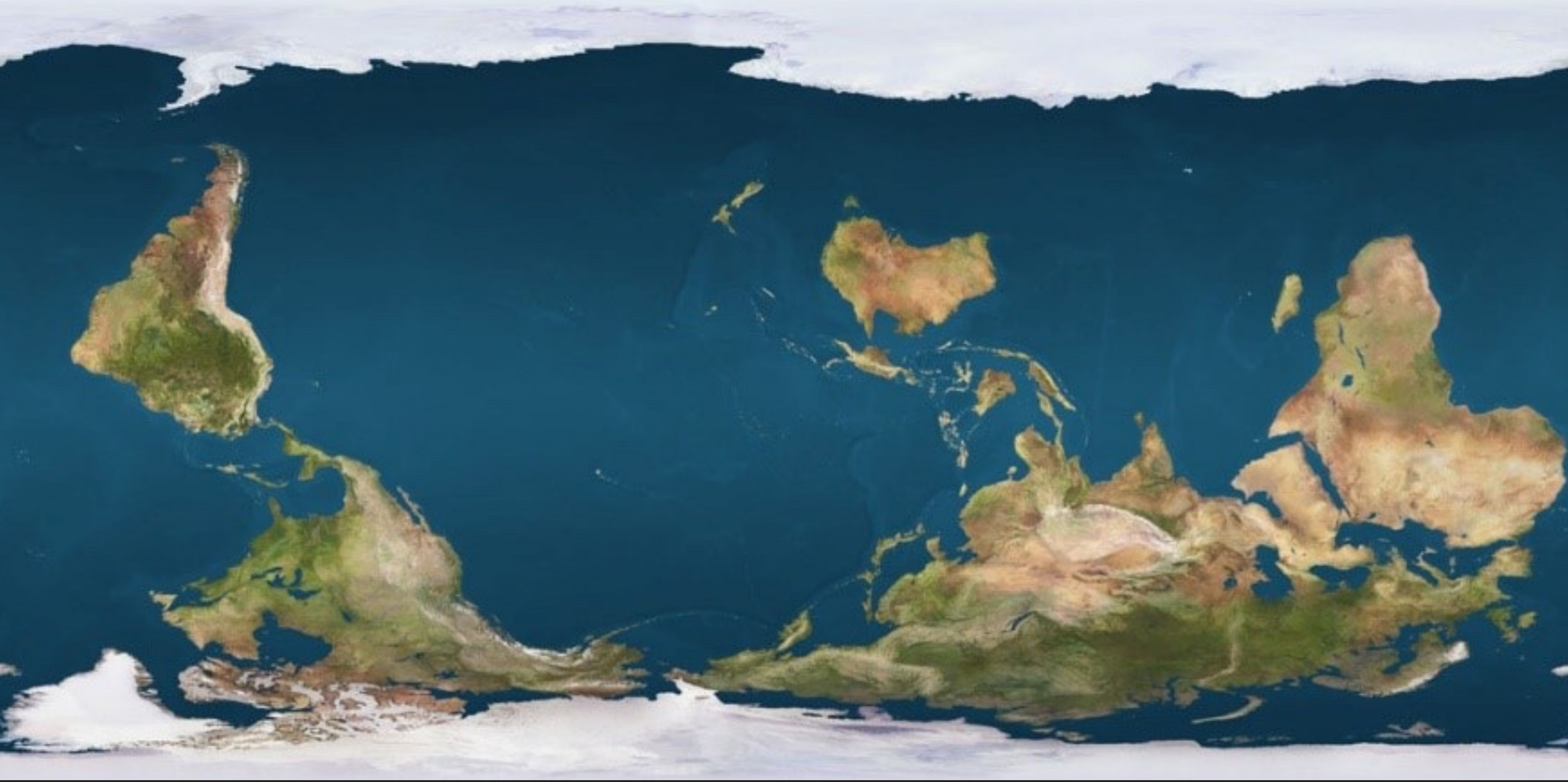
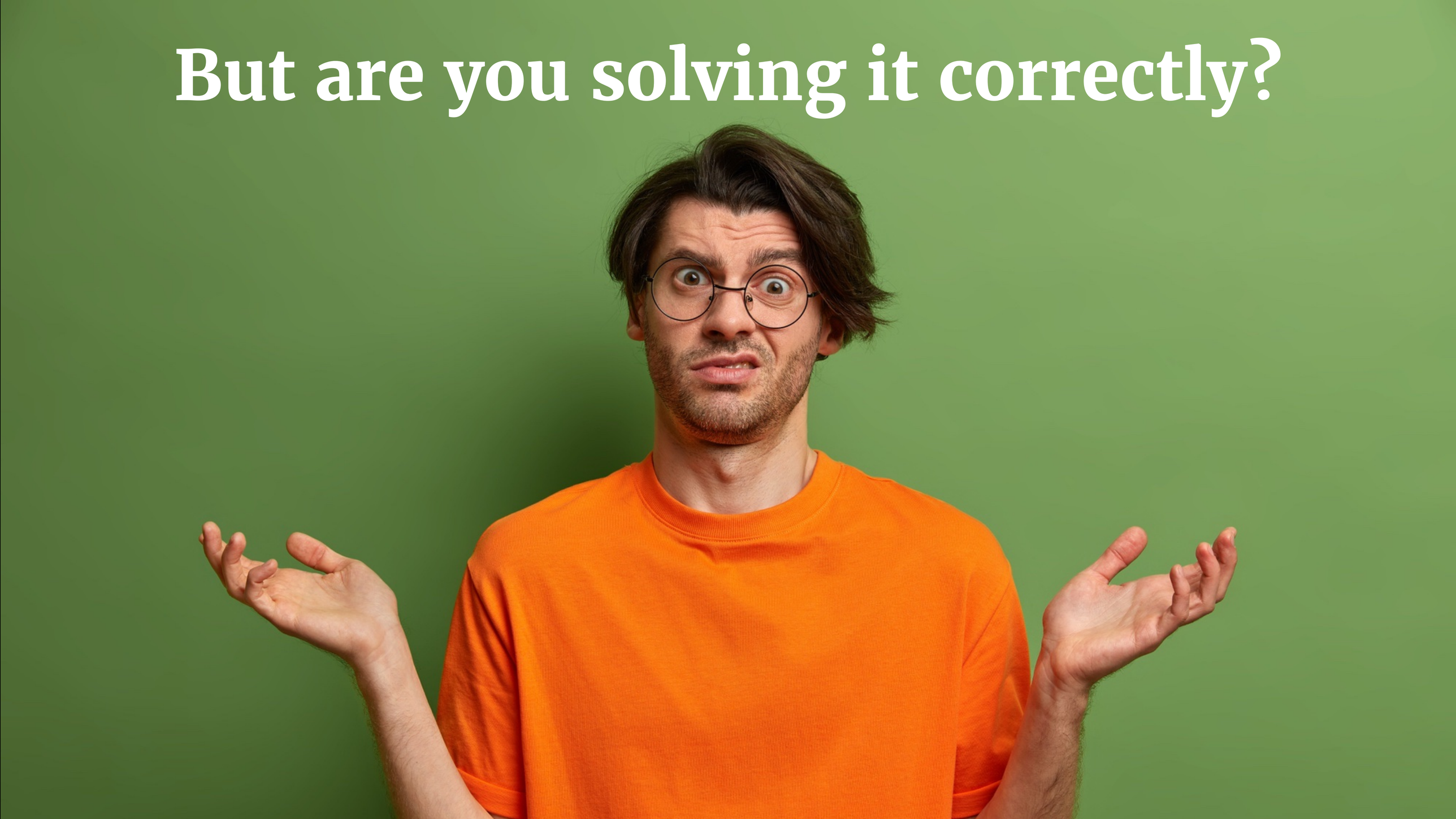


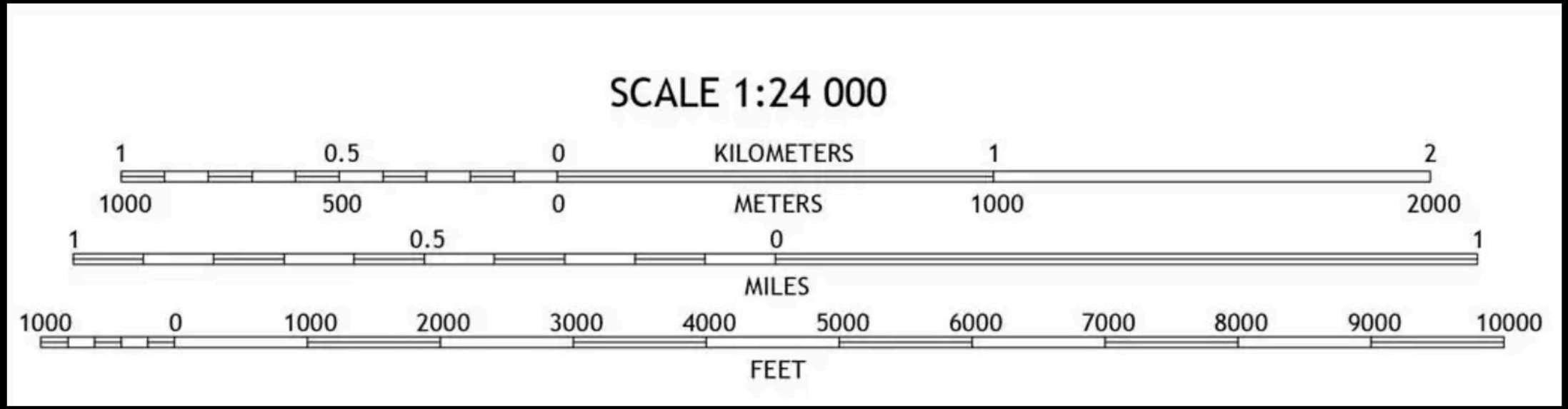
“Really interesting visual information is a little bit like a puzzle. You’re solving it.”

Rebecca Solnit

– Author of “Infinite City: A San Francisco Atlas.”

But are you solving it correctly?

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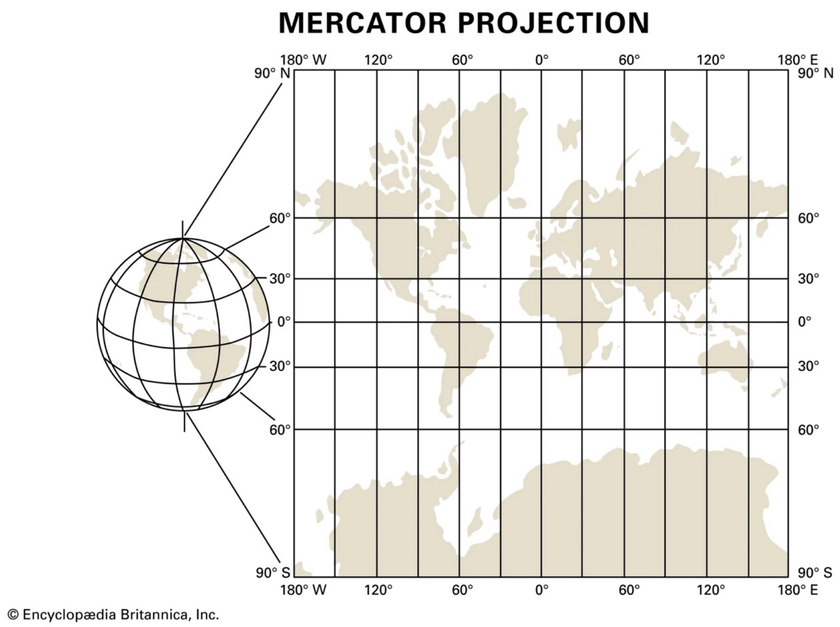
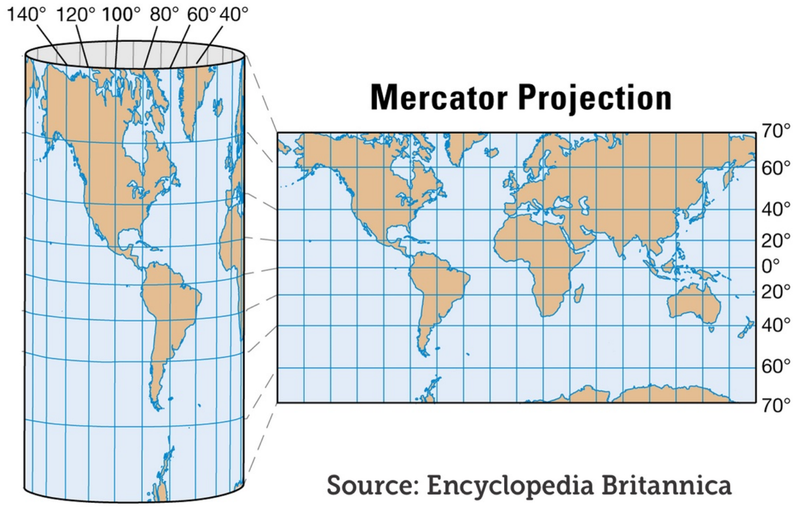
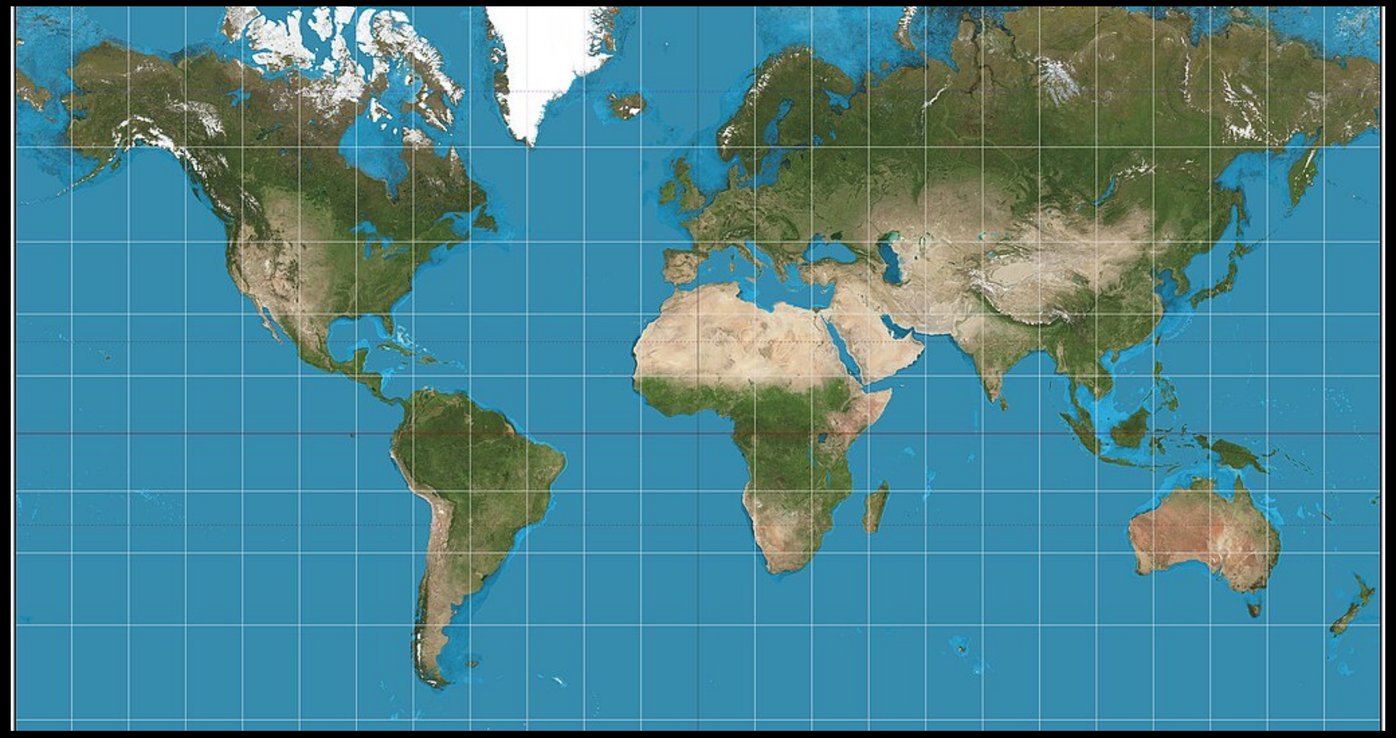
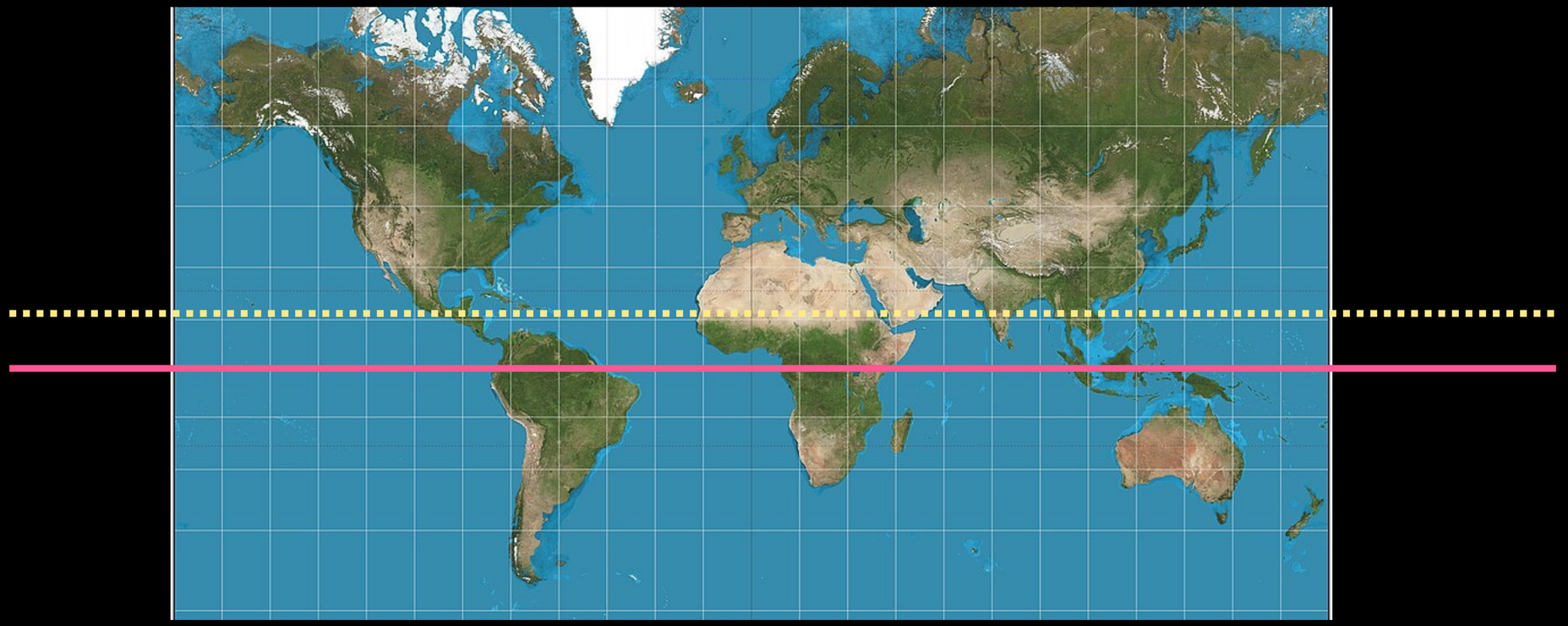
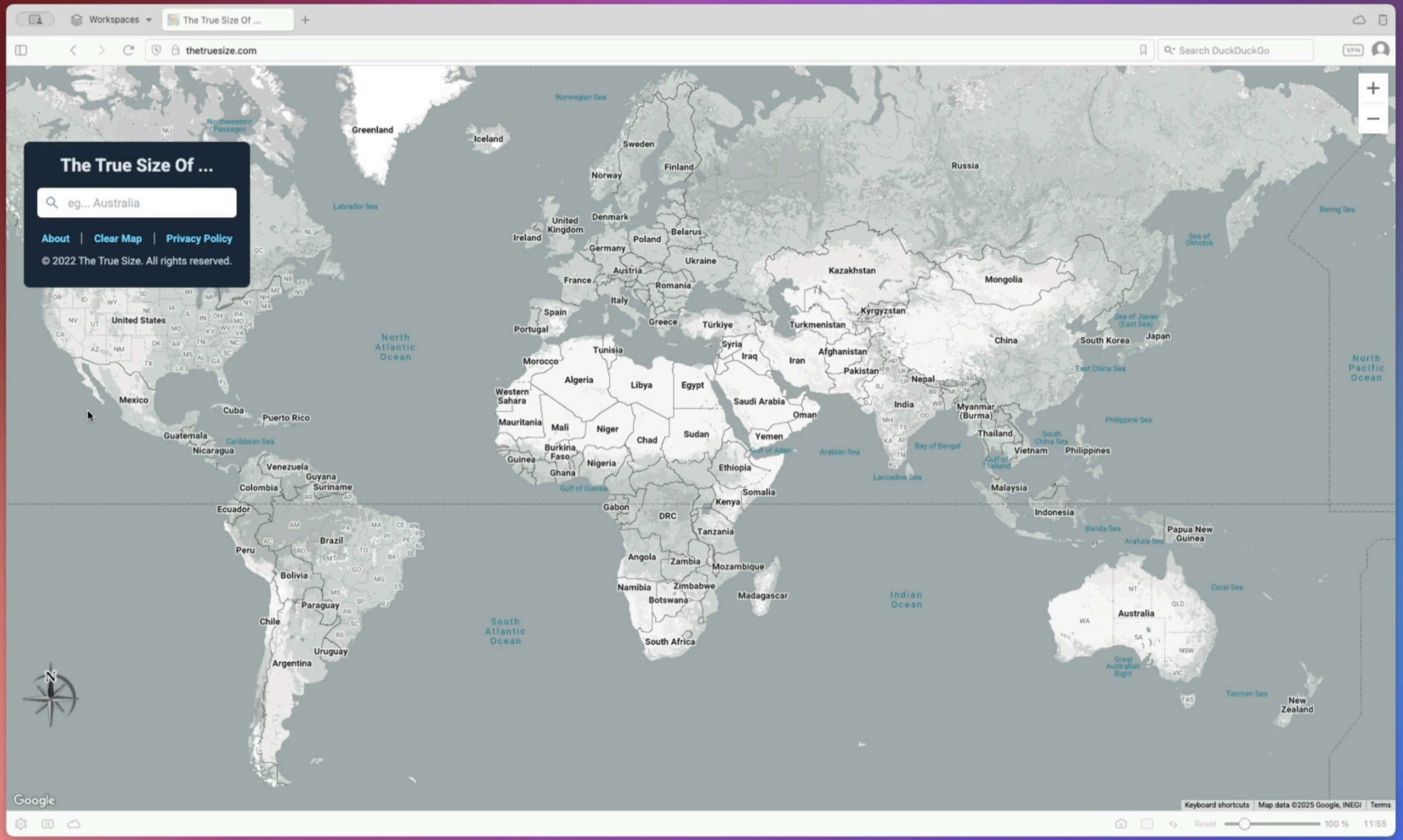




Cylindrical map projection



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Austria
Romania
Italy
Kazakhstan
Mongolia
Spain
Portugal
Greece
Türkiye
Kyrgyzstan
Turkmenistan
China
South Korea
Japan
Syria
Iraq
Iran
Afghanistan
Pakistan
Nepal
India
Myanmar (Burma)
Thailand
Vietnam
Philippines
Malaysia
Indonesia
Papua New Guinea
Australia
New Zealand
United States
Mexico
Cuba
Puerto Rico
Guatemala
Nicaragua
Caribbean Sea
Venezuela
Guyana
Suriname
Colombia
Ecuador
Peru
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Tunisia
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Egypt
Mauritania
Mali
Niger
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Sudan
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Guinea
Nigeria
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Saudi Arabia
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Oman
Gulf of Aden
Arabian Sea
Ethiopia
Somalia
Kenya
Gabon
DRC
Tanzania
Angola
Zambia
Mozambique
Namibia
Zimbabwe
Botswana
Madagascar
South Africa
North Atlantic Ocean
South Atlantic Ocean
Indian Ocean
North Pacific Ocean
Bering Sea
Sea of Okhotsk
Sea of Japan (East Sea)
East China Sea
Philippine Sea
South China Sea
Bay of Bengal
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11:55

If this happens to size, what then happens to distance?

6400 km
7200 km

Tomas Pueyo
@tomaspueyo

Subscribe

Here it is, comparing the most disadvantaged with the most advantaged. Africa is *wider than Russia*!
Source: axbom.com/world-map/

Readers added context they thought people might want to know

False. Russia is east-west 5,600 miles (9,000 km) north-south 1,500 to 2,500 miles (2,500 to 4,000 km). Africa is east-west 4,600 miles (7,400 km) north-south 5,000 miles (8,000 km). britannica.com/place/Africa britannica.com/place/Russia

Do you find this helpful? **Rate it**

ScafidiTravels @ScafidiTravels · Apr 17, 2023

My first interaction with Community Notes...& they're incorrect! Although the @Britannica entry does say Russia is 9,000km wide, I can find no way of measuring it that wide using @googleearth , even if you go from Kaliningrad to Cape Dezhnyov, or Lavry to the Kuril Islands...

Note

Tomas Pueyo @tomaspueyo · Apr 15

Here it is, comparing the most disadvantaged with the most advantaged. Africa is *wider than Russia*!
Source: axbom.com/world-map/

Show this thread

Currently rated helpful · Shown on Twitter · Apr 16

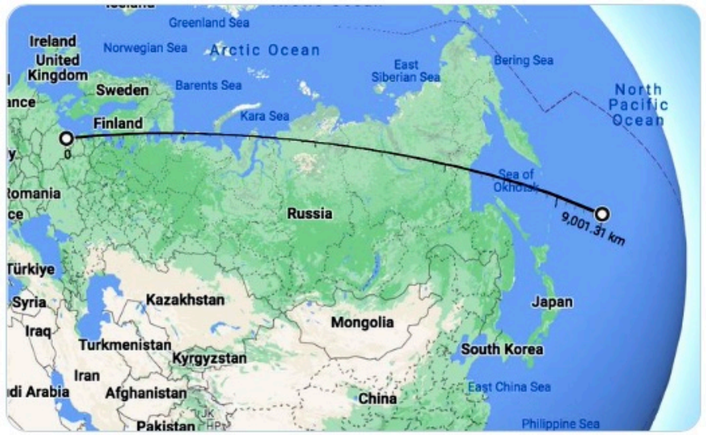
Directly addresses the Tweet's claim · Cites high-quality sources

False. Russia is east-west 5,600 miles (9,000 km) north-south 1,500 to 2,500 miles (2,500 to 4,000 km). Africa is east-west 4,600 miles (7,400 km) north-south 5,000 miles (8,000 km).
https://www.britannica.com/place/Africa
https://www.britannica.com/place/Russia

You rated this note as **Not Helpful.**

ScafidiTravels @ScafidiTravels · Apr 17, 2023

Here is what happens if we head 9000km east from Kaliningrad:



1 · 1 · 279

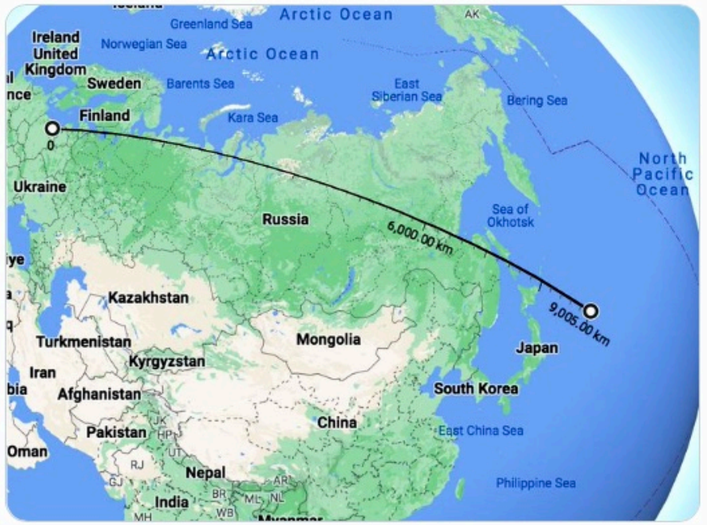
ScafidiTravels @ScafidiTravels · Apr 17, 2023

Here is what happens if you head east from Kaliningrad to Cape Dezhnyov, and continue to 9000km...

1 · 240

ScafidiTravels @ScafidiTravels · Apr 17, 2023

And here is what happens if we head 9000km from Kaliningrad to the Kuril Islands, and continue to 9000km...



1 · 245

ScafidiTravels @ScafidiTravels · Apr 17, 2023

[2/2] But if those are the new rules, then I'm measuring Africa as 10,500km wide, starting in Cabo Verde (an African country and member of @_AfricanUnion) and ending on the Mauritian island of Rodrigues, the easternmost point of Africa. 🤣

2 · 1 · 4 · 334

What is the spectacular lie in this map?

6400 km
7200 km

6400 km
7200 km

Path or polygon

Click points on the map to draw a path or polygo

Length
6,401.59 km

Heading
10.67°

Save to project

Iceland
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Poland
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Greece
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Egypt
Türkiye
Sudan
Syria
Iraq
Ethiopia
Saudi Arabia
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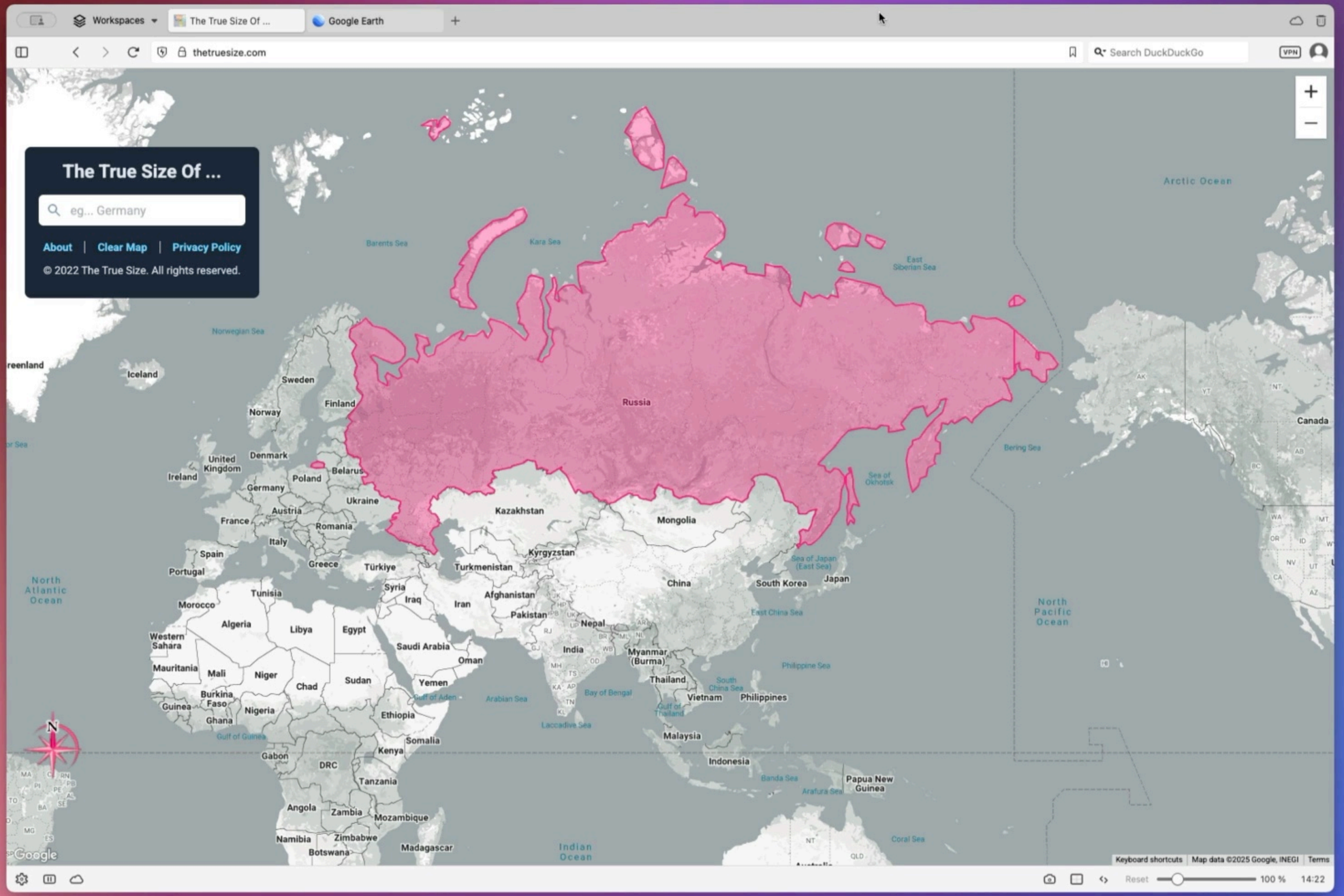
South Korea
Kyrgyzstan
Oman
Afghanistan

Layers

3D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Ireland
Denmark
Poland
Belarus
Germany
Ukraine
France
Austria
Romania
Italy
Spain
Portugal
Greece
Türkiye
Kazakhstan
Mongolia
Kyrgyzstan
Turkmenistan
China
South Korea
Japan
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North Atlantic Ocean
North Pacific Ocean
Syria
Iraq
Iran
Afghanistan
Pakistan
Nepal
India
Myanmar (Burma)
Thailand
Vietnam
Philippines
South China Sea
Philippine Sea
Tunisia
Morocco
Algeria
Libya
Egypt
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Oman
Yemen
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Bay of Bengal
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Mauritania
Mali
Niger
Chad
Sudan
Burkina Faso
Guinea
Nigeria
Ghana
Gulf of Guinea
Ethiopia
Somalia
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Malaysia
Indonesia
Gabon
DRC
Tanzania
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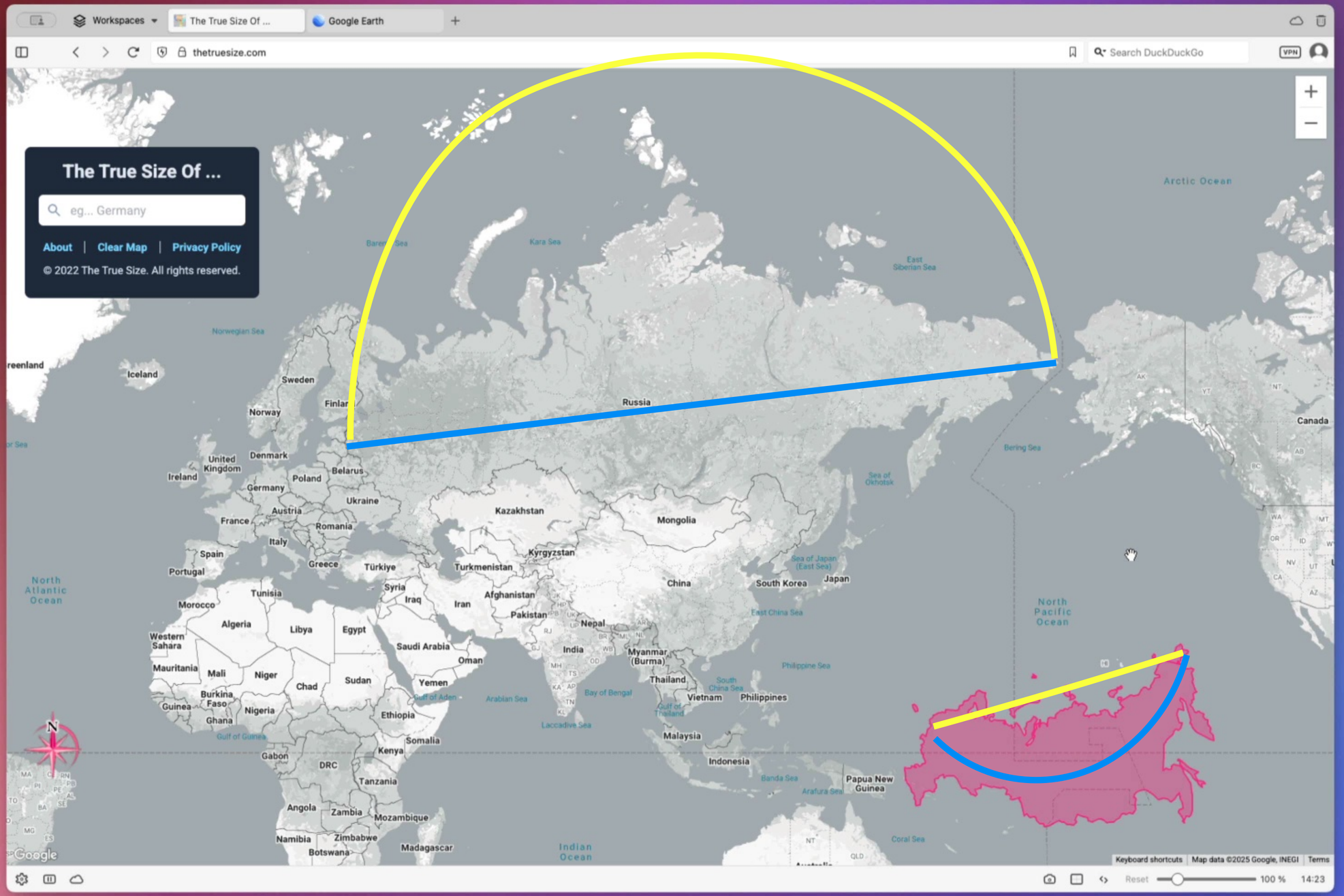
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Chad
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14:23

Path or polygon

Click points on the map to draw a path or polygon

Length
8,423.46 km

Save to project

Greenland
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United Kingdom
Norway
Sweden
Finland
Germany
Poland
Algeria
Italy
Niger
Libya
Ukraine
Chad
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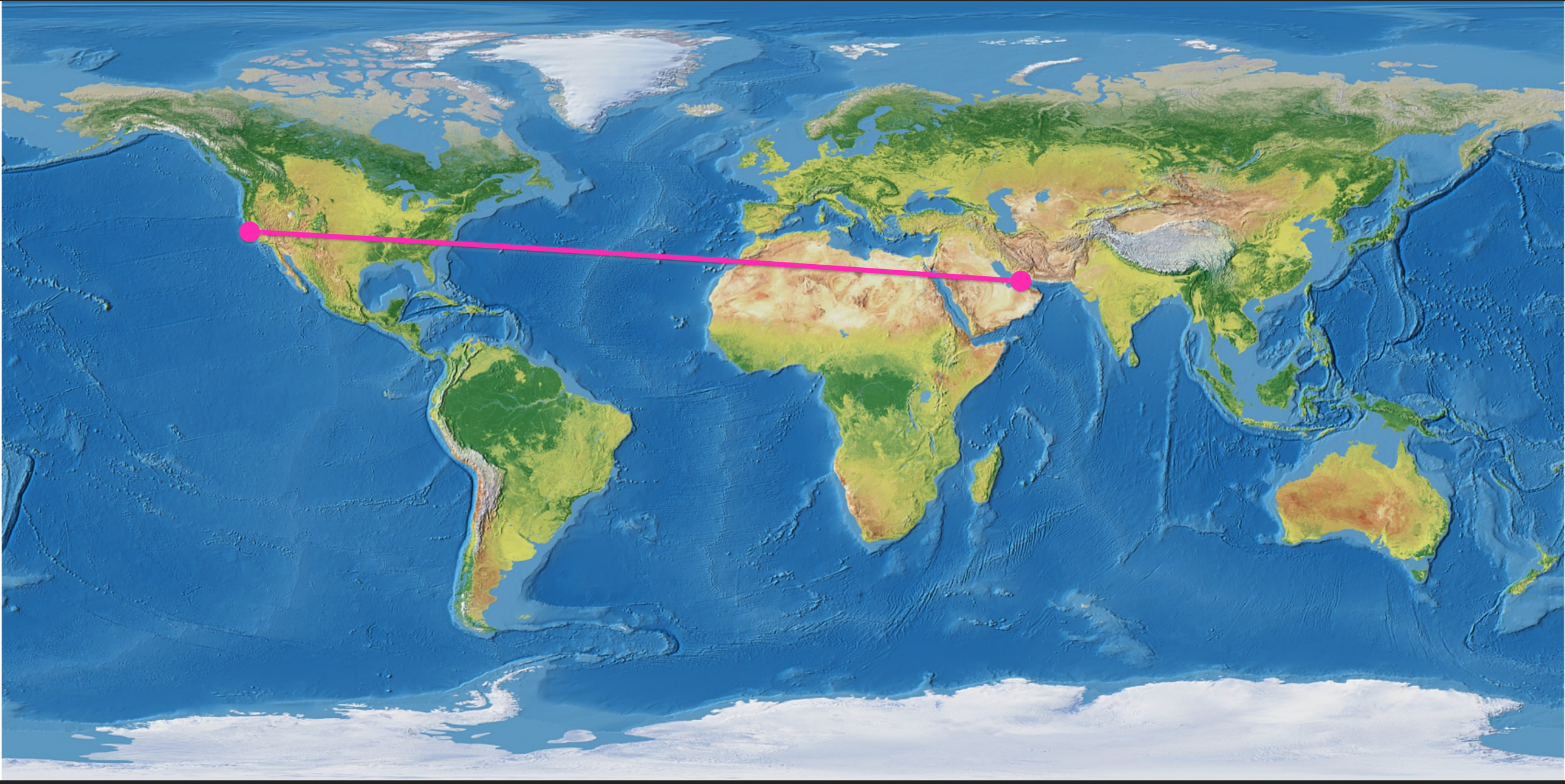
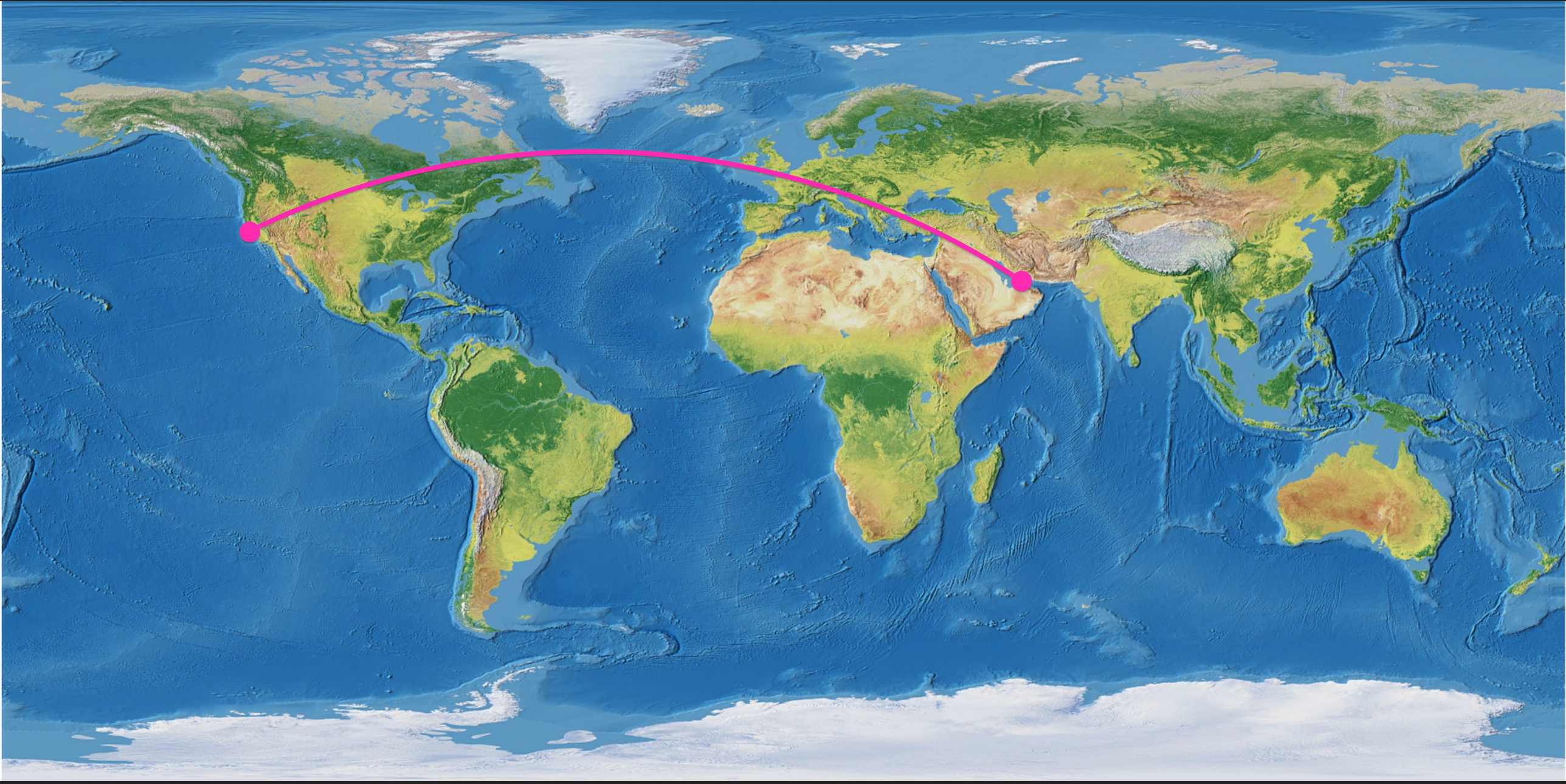
Japan

Layers

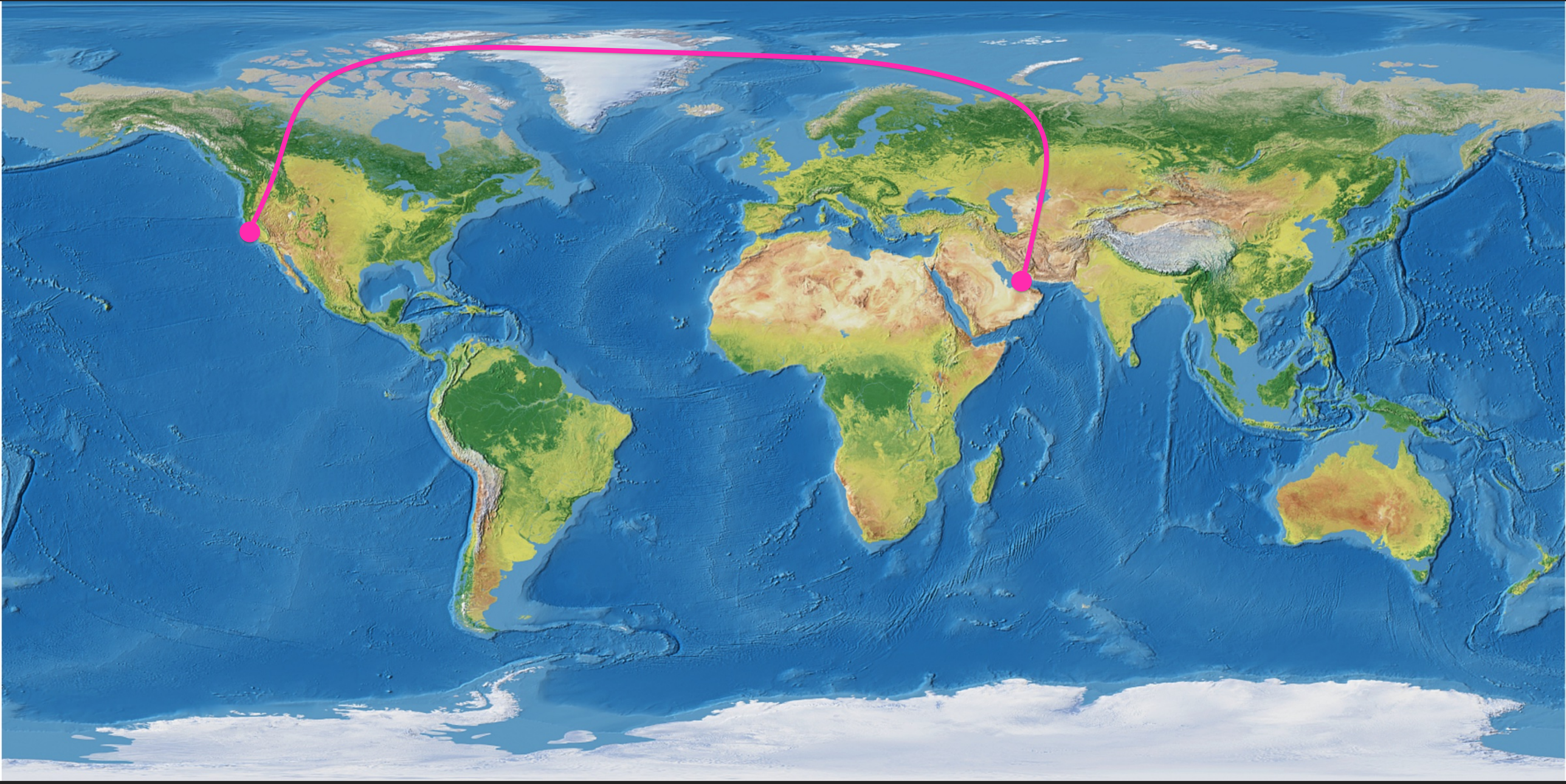
3D



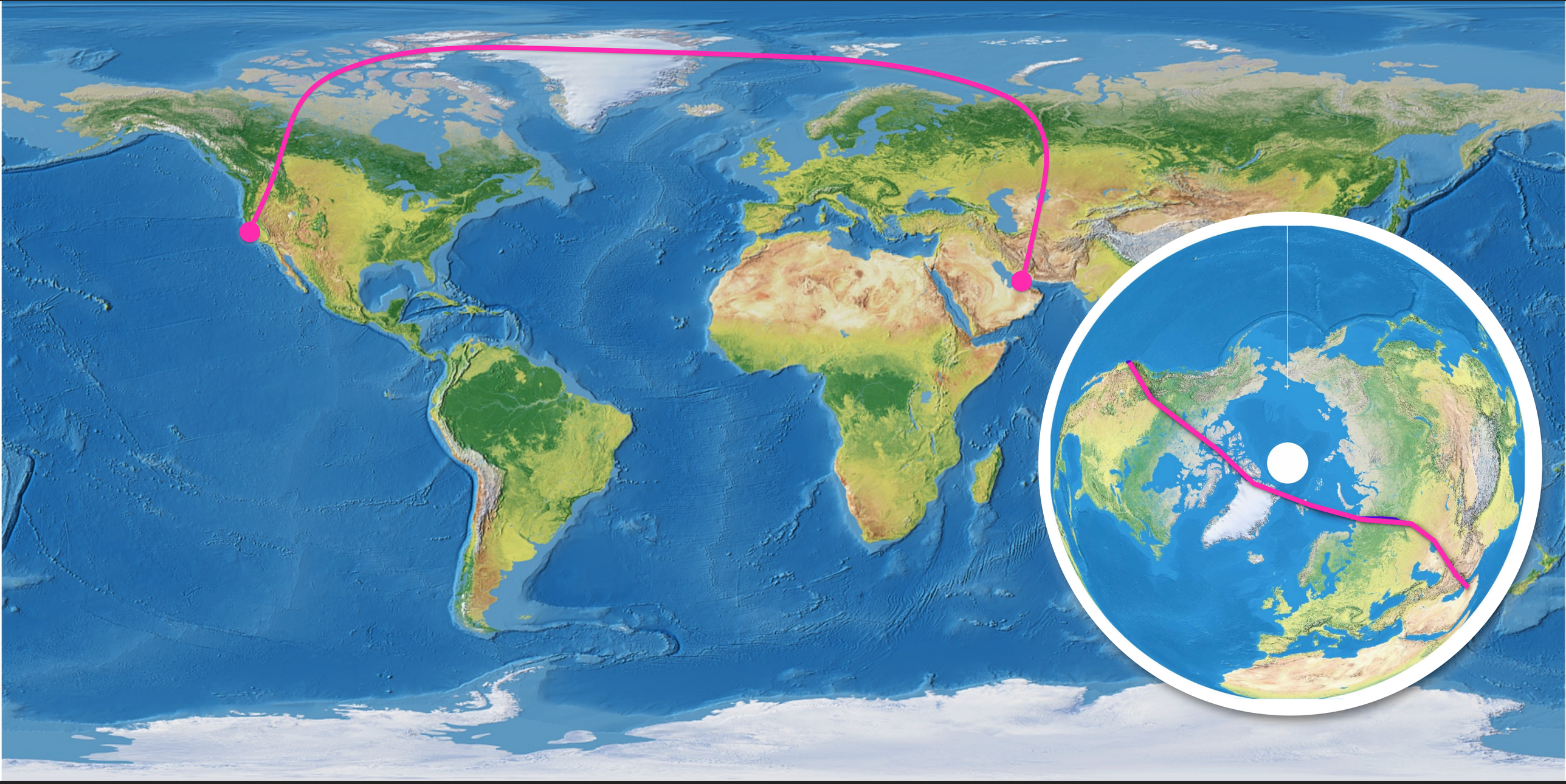
The route of Emirates flight EK225, Dubai to San Francisco



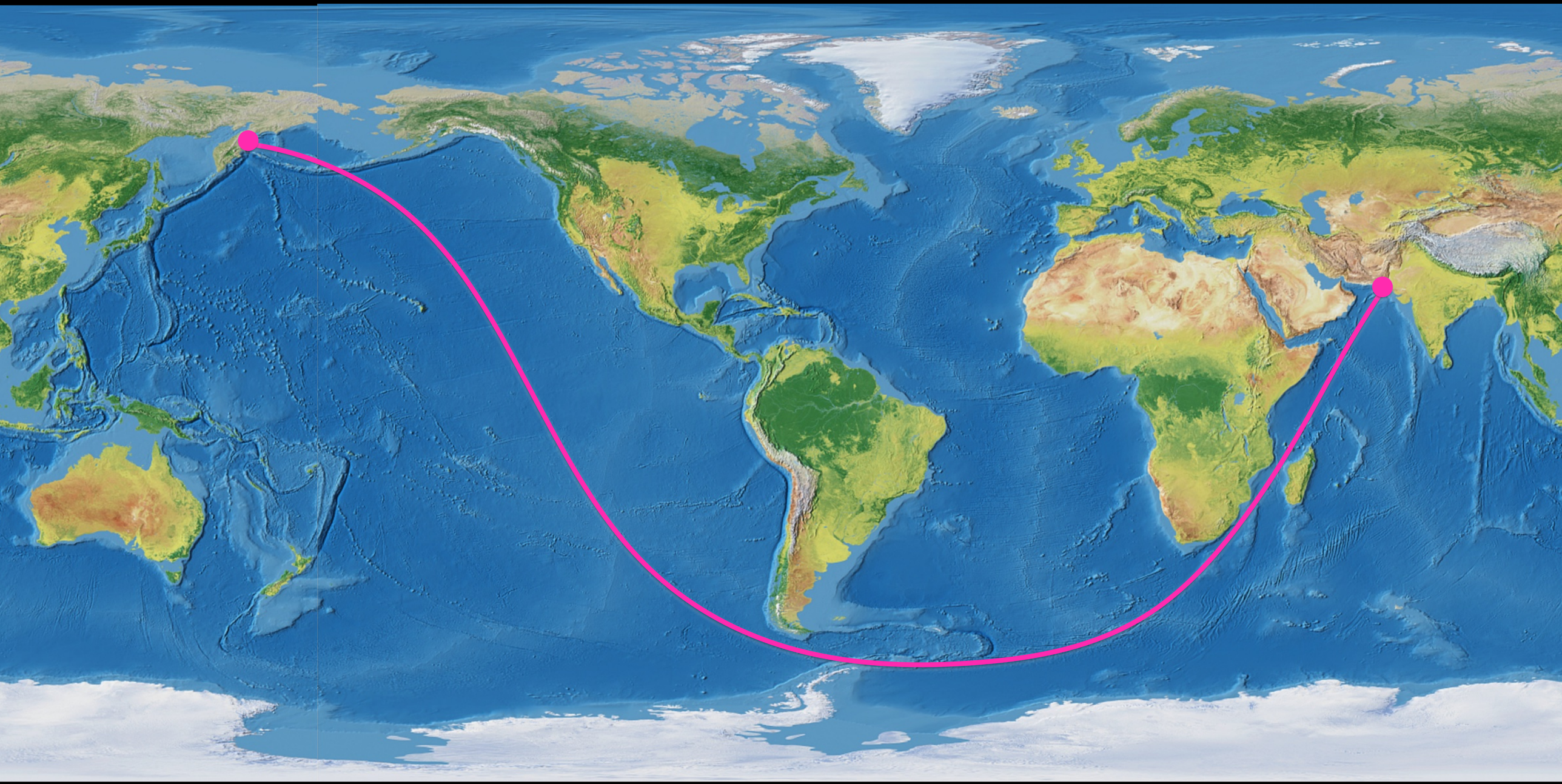
The route of Emirates flight EK225, Dubai to San Francisco



The route of Emirates flight EK225, Dubai to San Francisco



The route of Emirates flight EK225, Dubai to San Francisco



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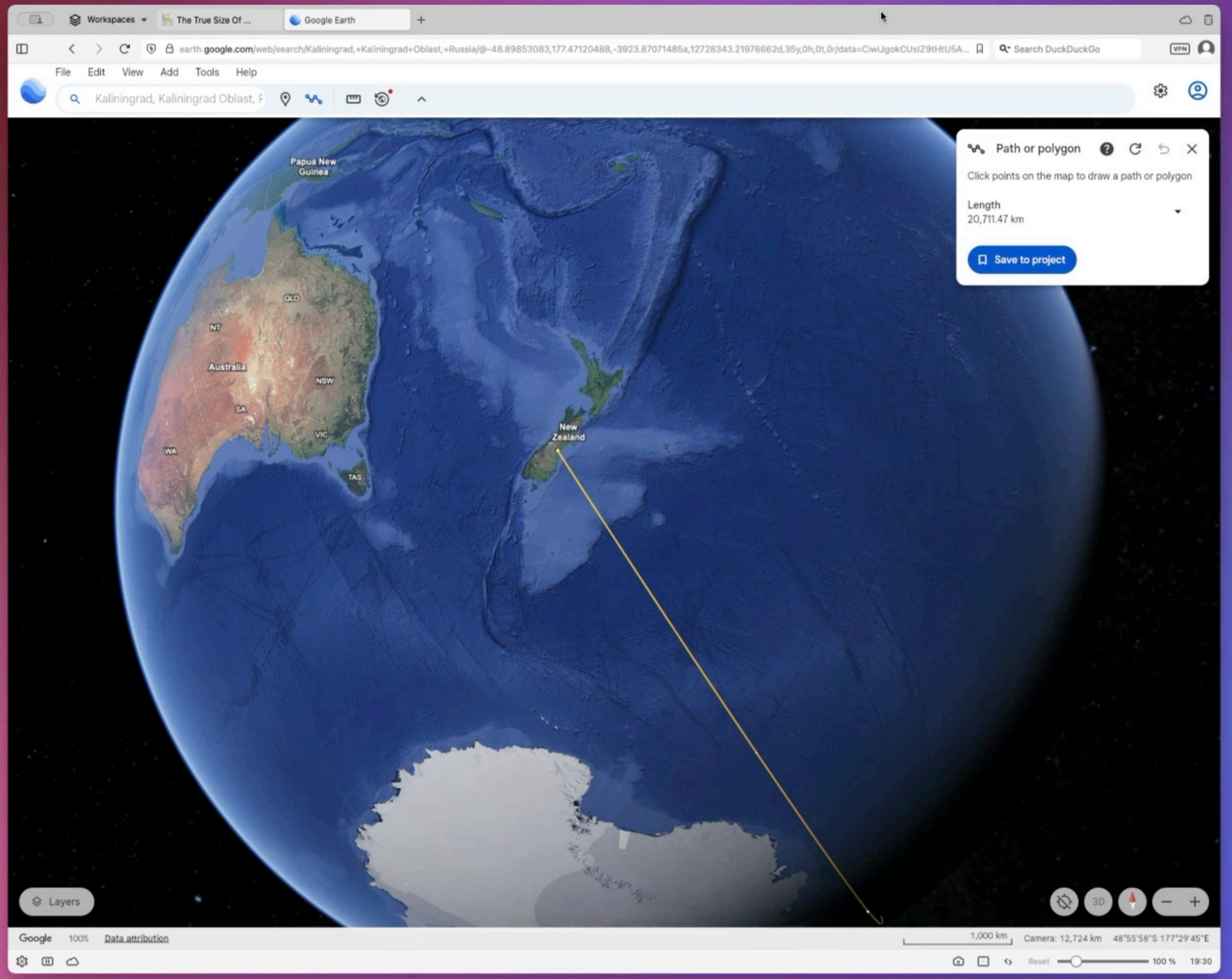
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Click points on the map to draw a path or polygon
Length
20,711.47 km
Save to project
Papua New Guinea
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NT
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VIC
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TAS
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1,000 km
Camera: 12,724 km
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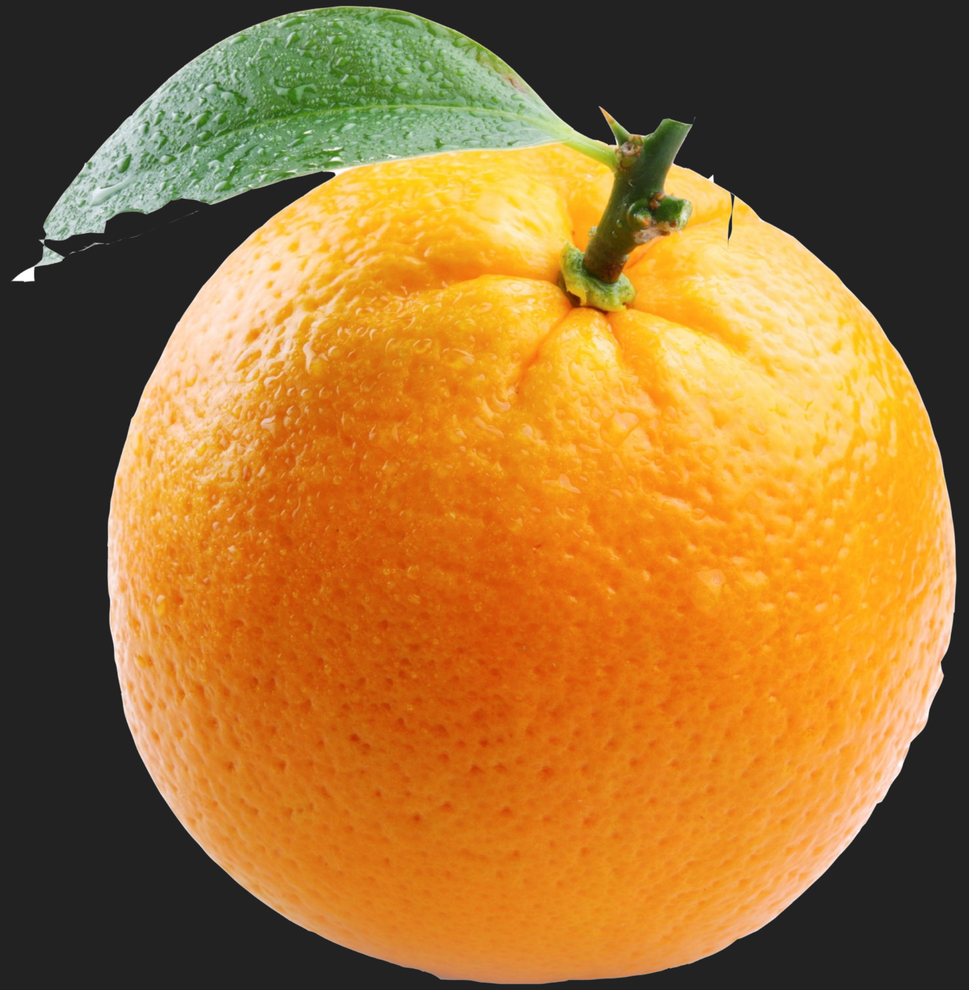
Disclaimer.

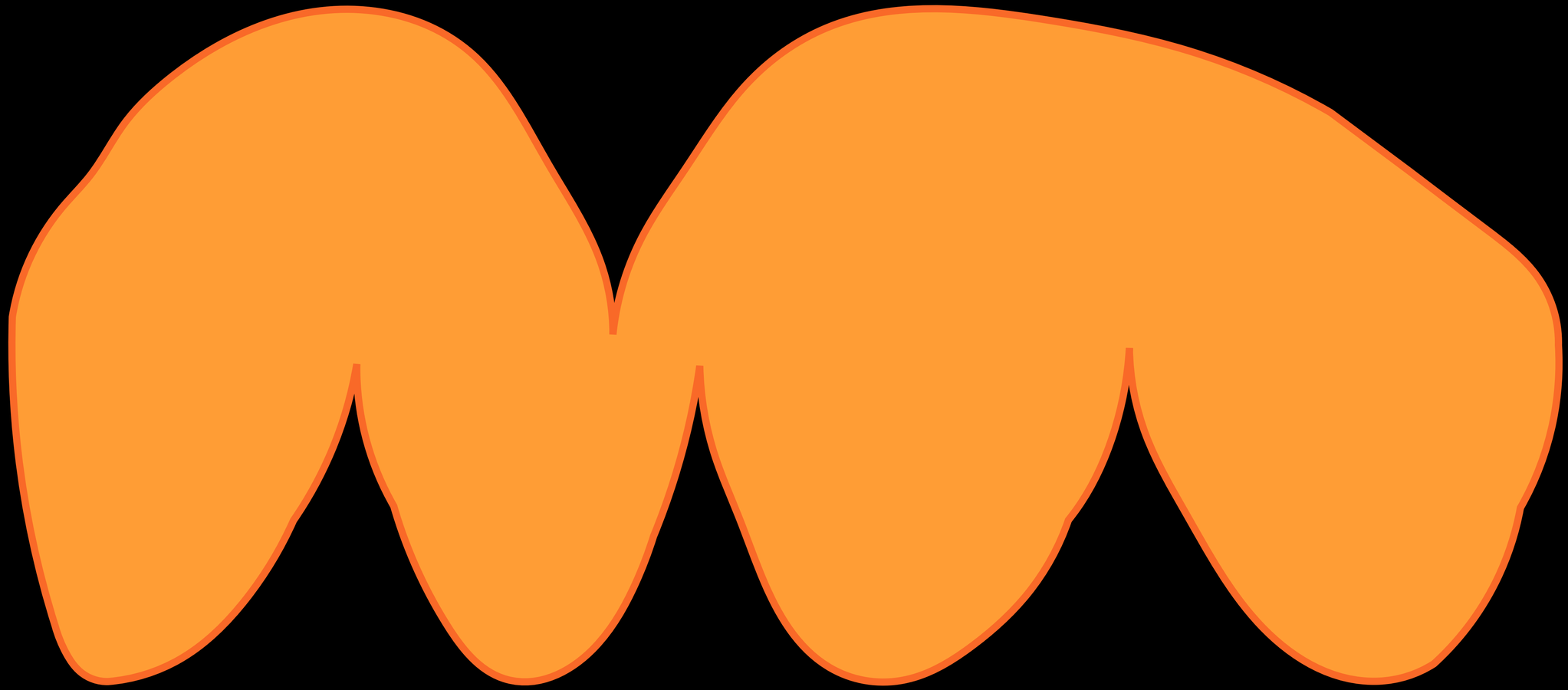
“The problem was approached as a purely mathematical exercise. The authors do not recommend sailing along the found paths.”



Do try this at home.

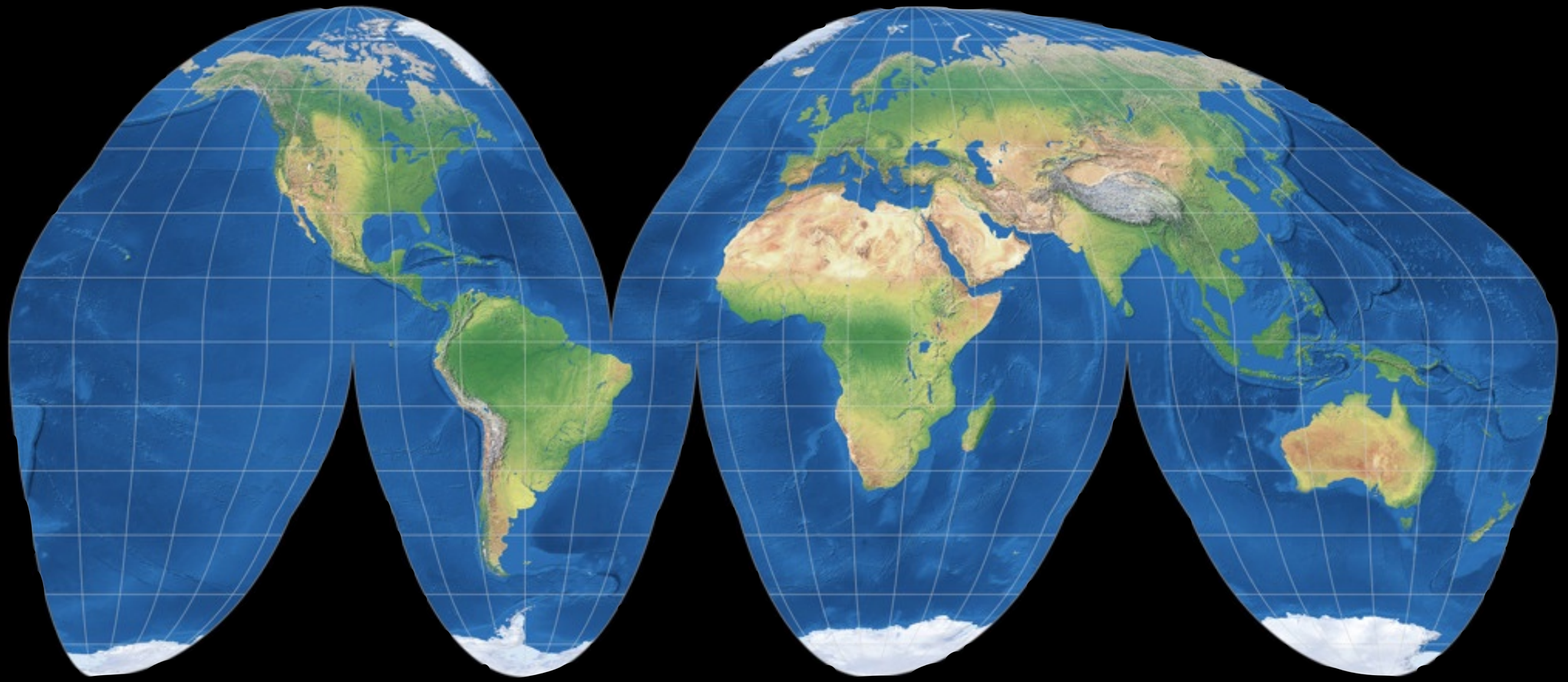
The video is without sound.

A Strange Map Projection (Euler Spiral) - Numberphile, with Hannah Fry

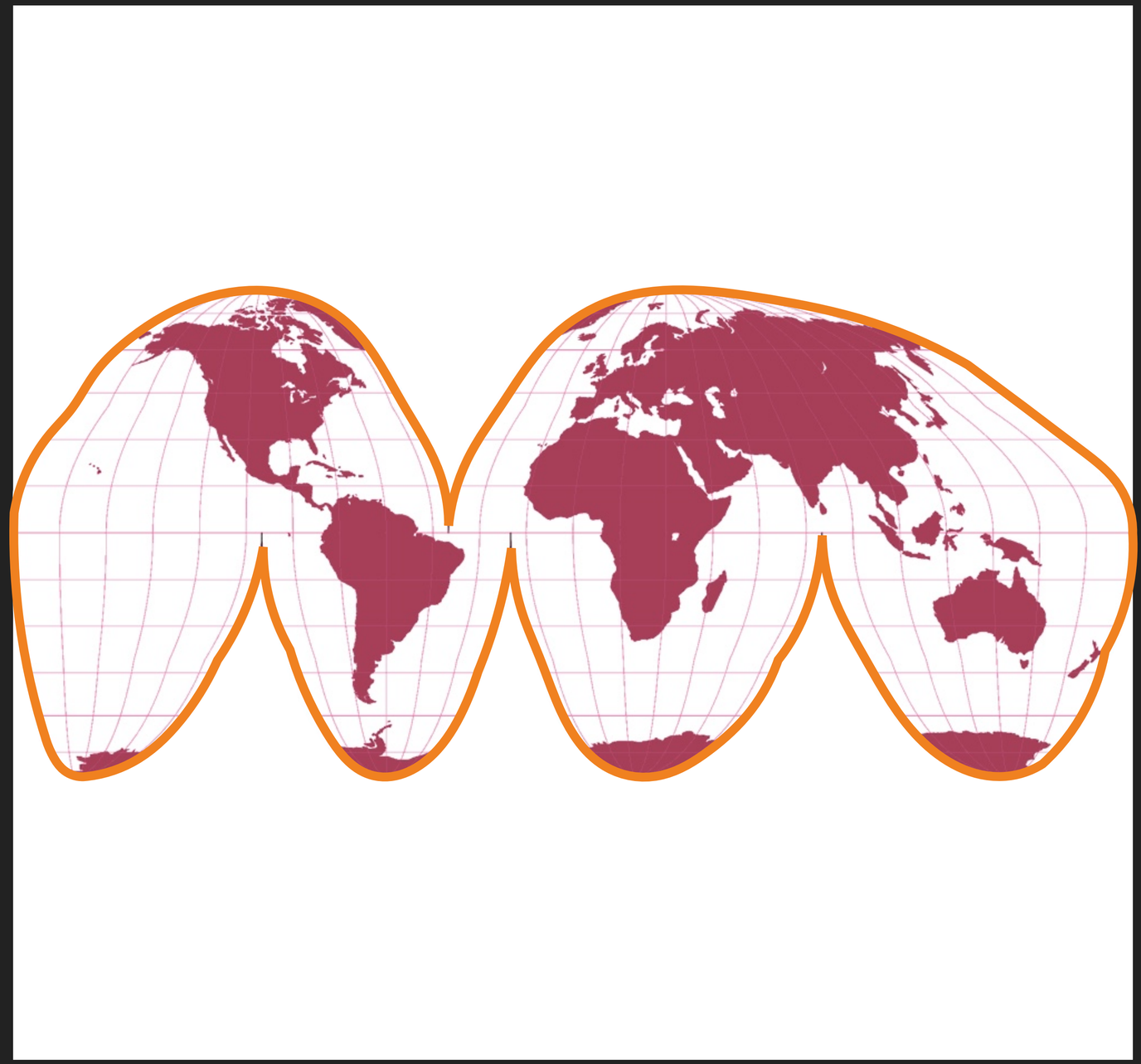


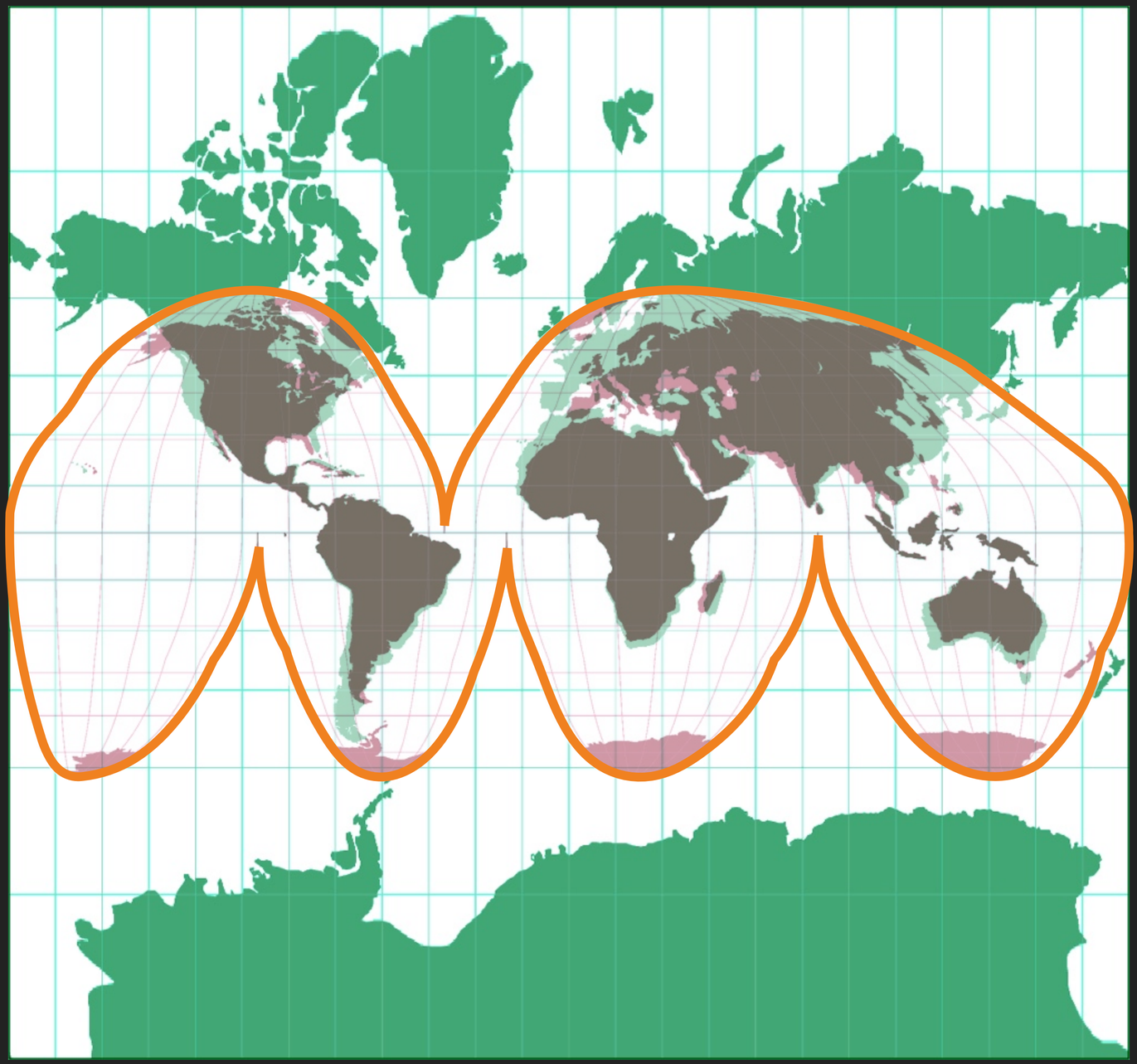
Goode homolosine projection

pseudocylindrical, equal-area



The orange-peel map

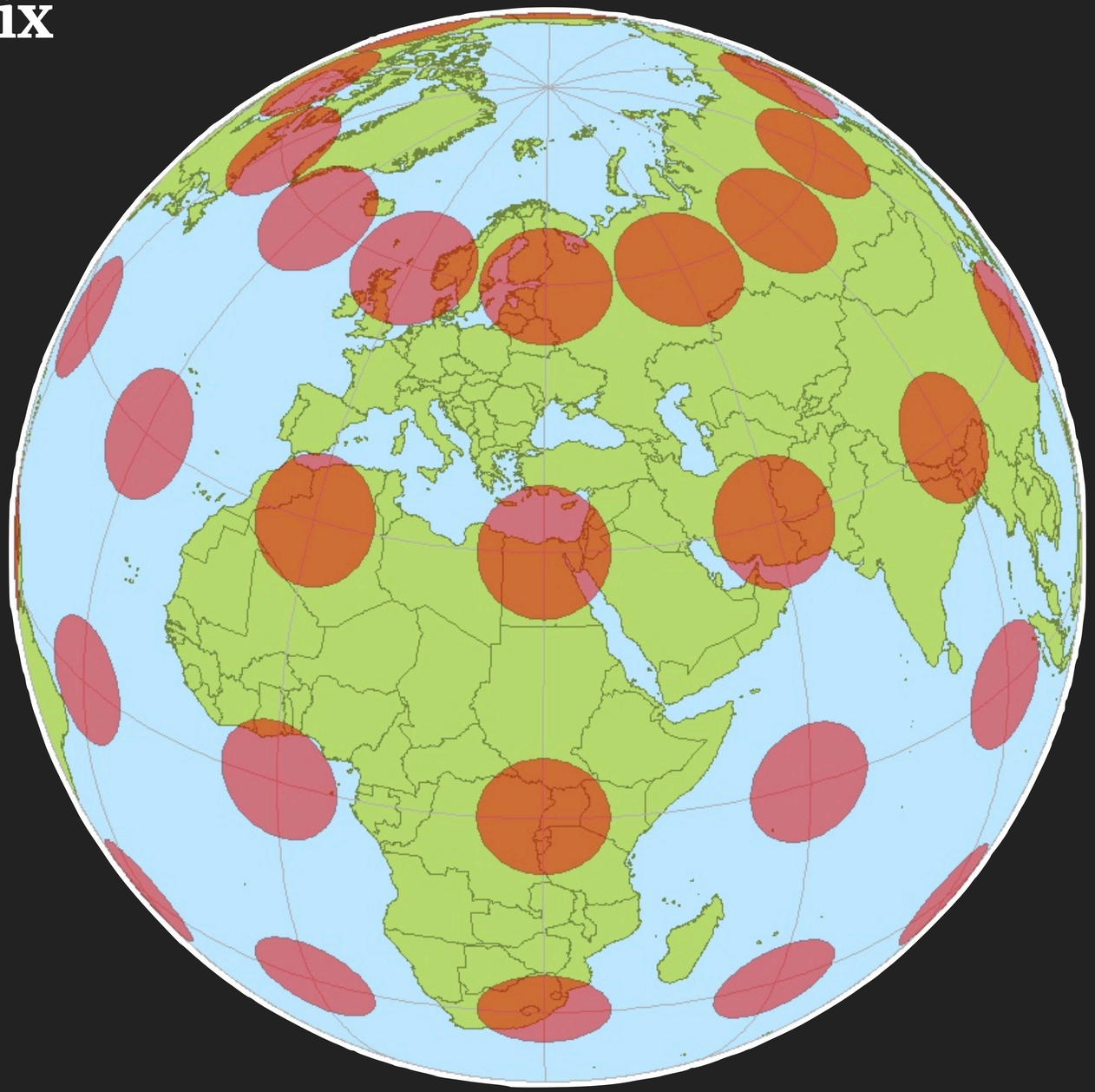


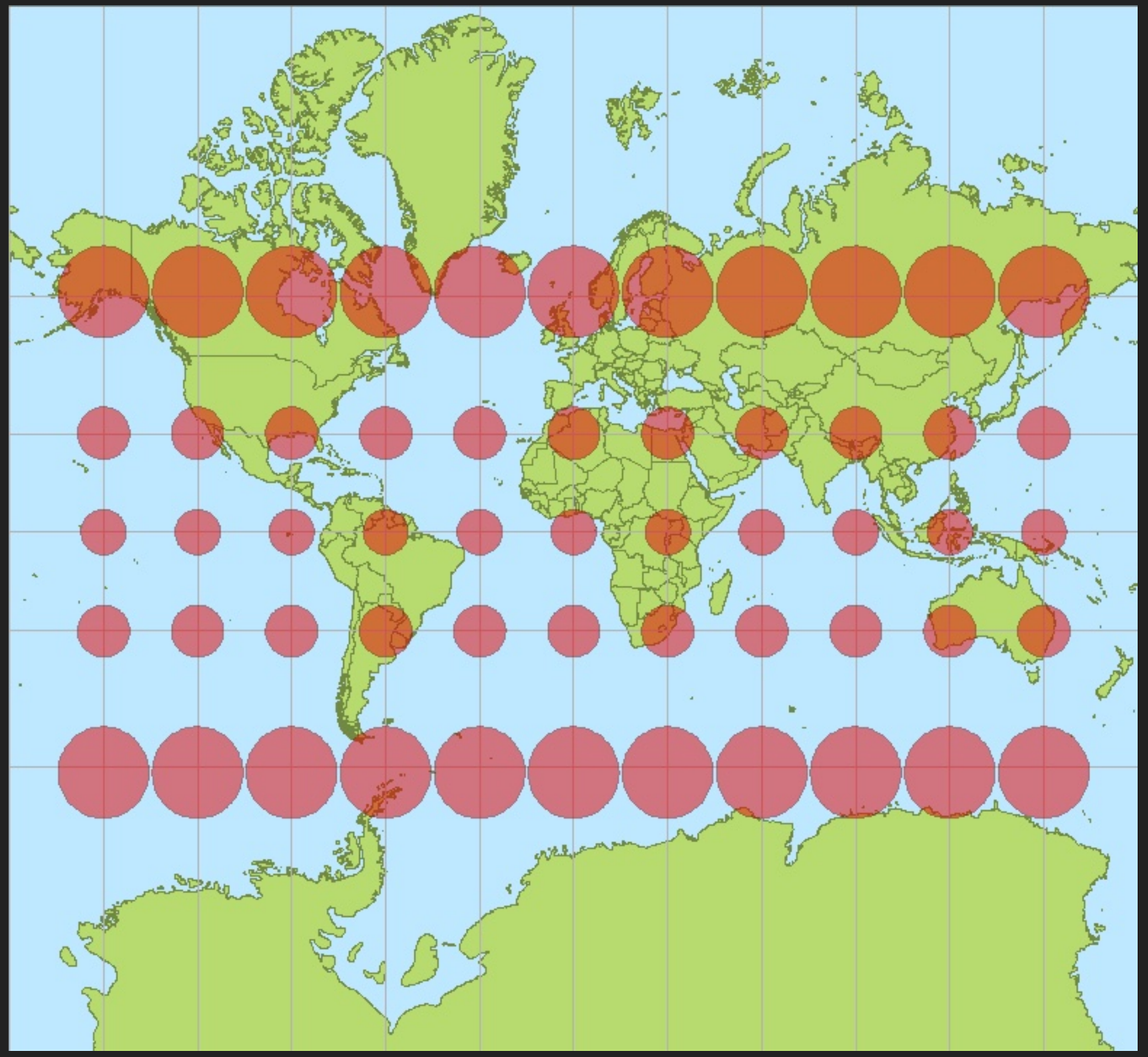


OBJECTS IN MIRROR ARE CLOSER
THAN THEY APPEAR

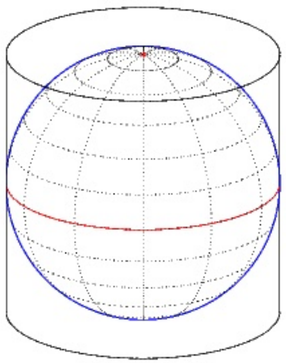
Tissot’s indicatrix

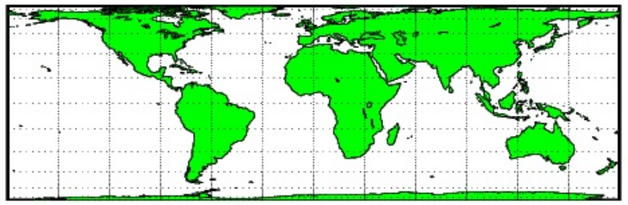
Globe



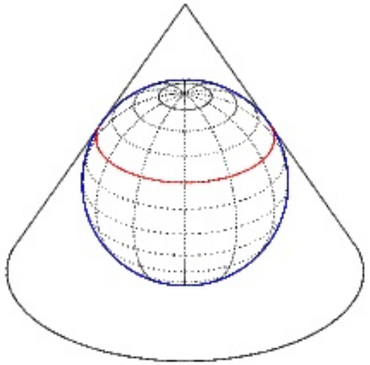


What are the options?

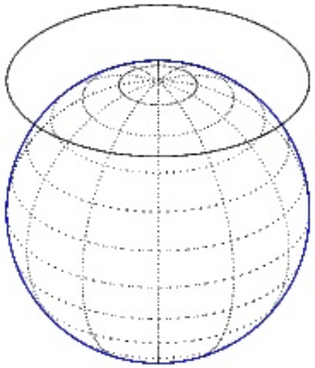


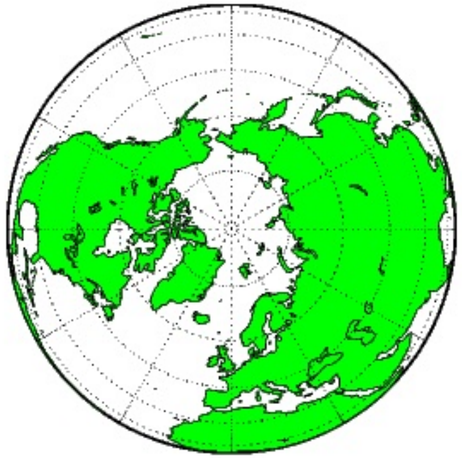


Cylindrical



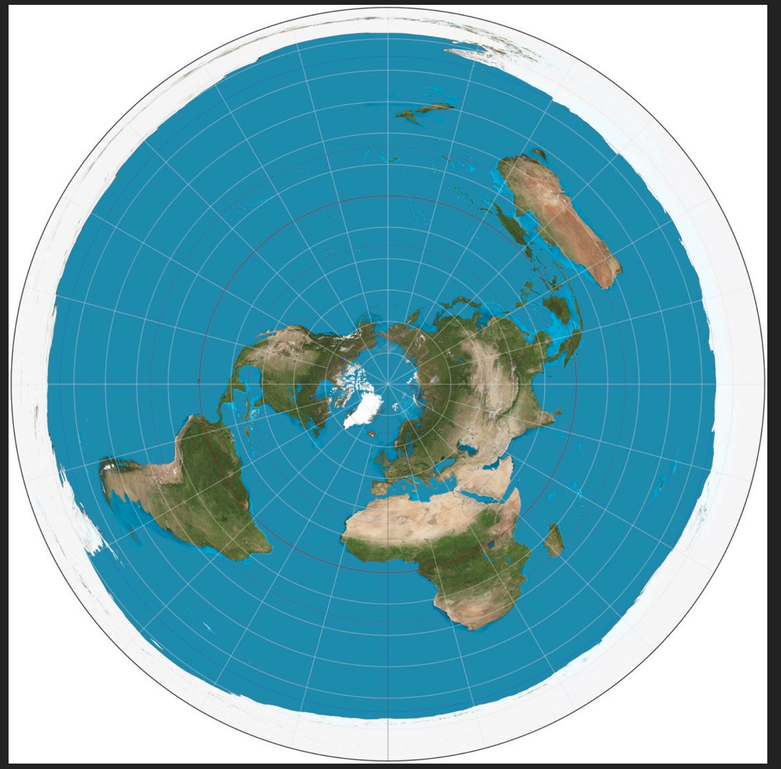
Conic



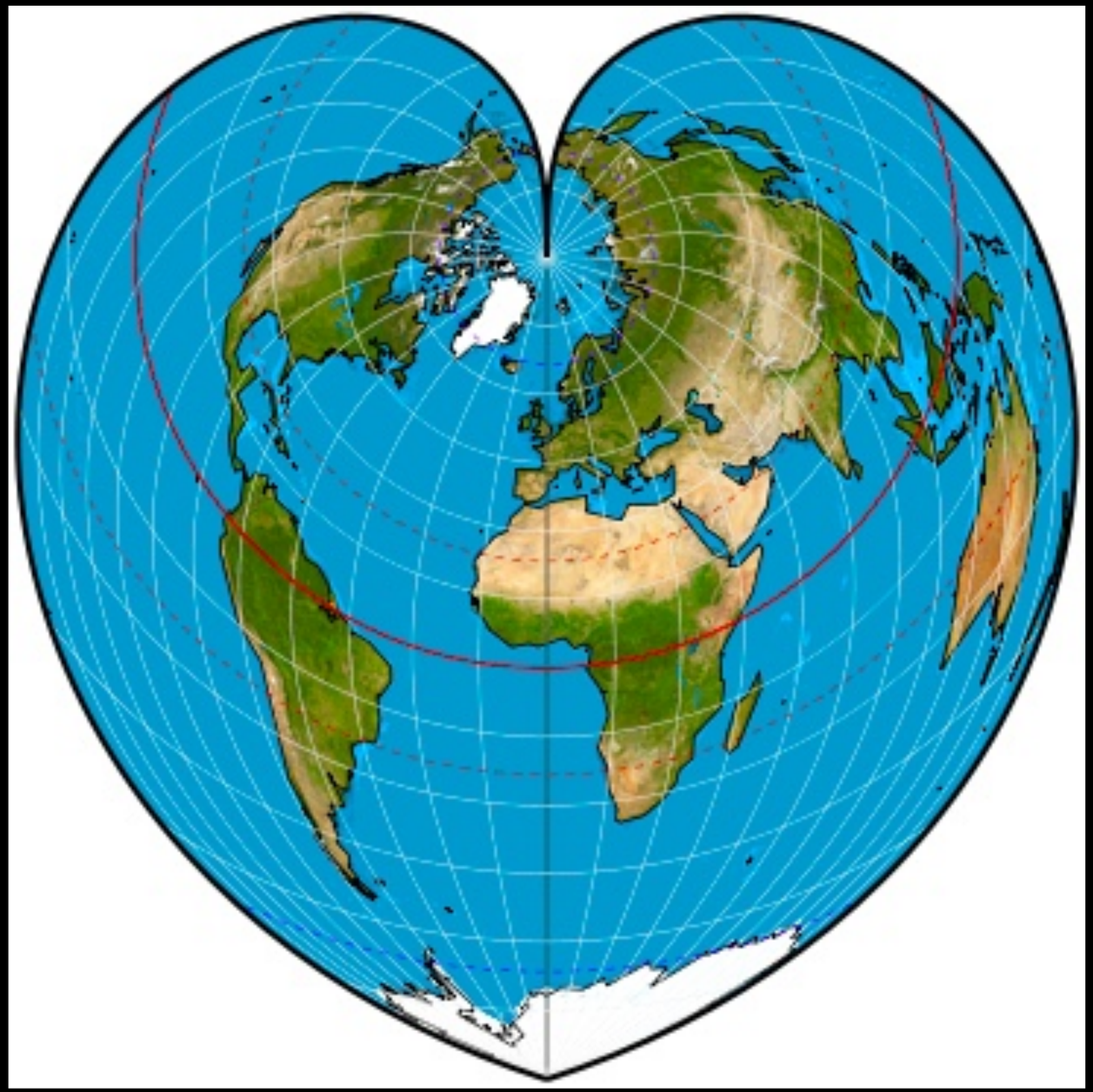


Azimuthal

https://www.mathworks.com/help/map/the-three-main-families-of-map-projections.html



Azimuthal

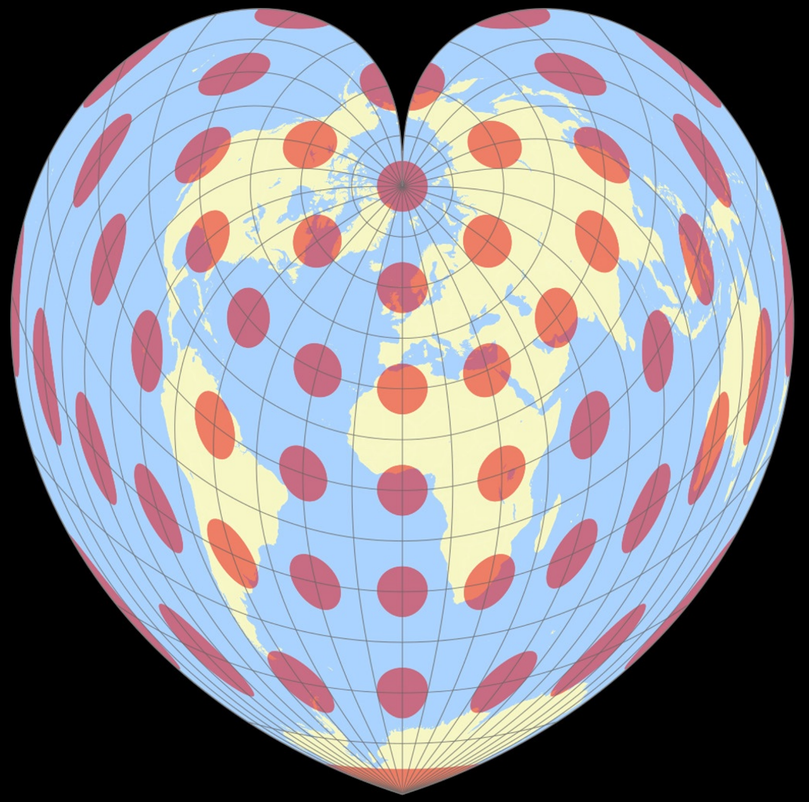


Stab-Werner projection

pseudoconic equal-area

Cordiform

‘emotions’



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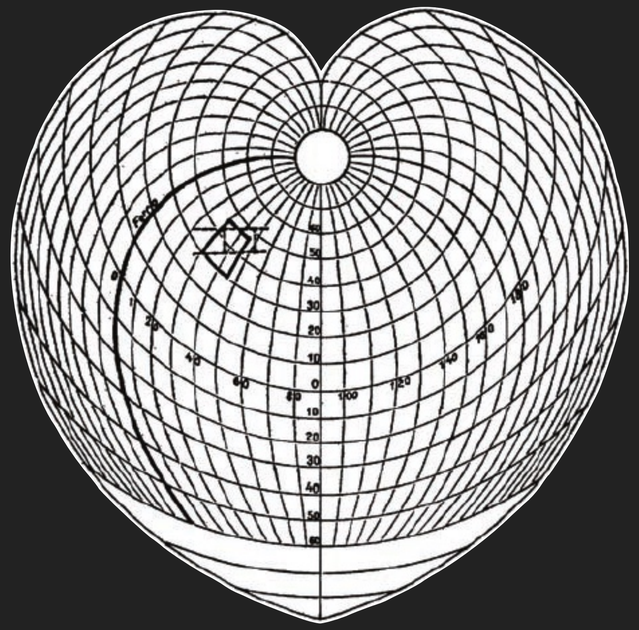
REGALI PORRO CAVTVM



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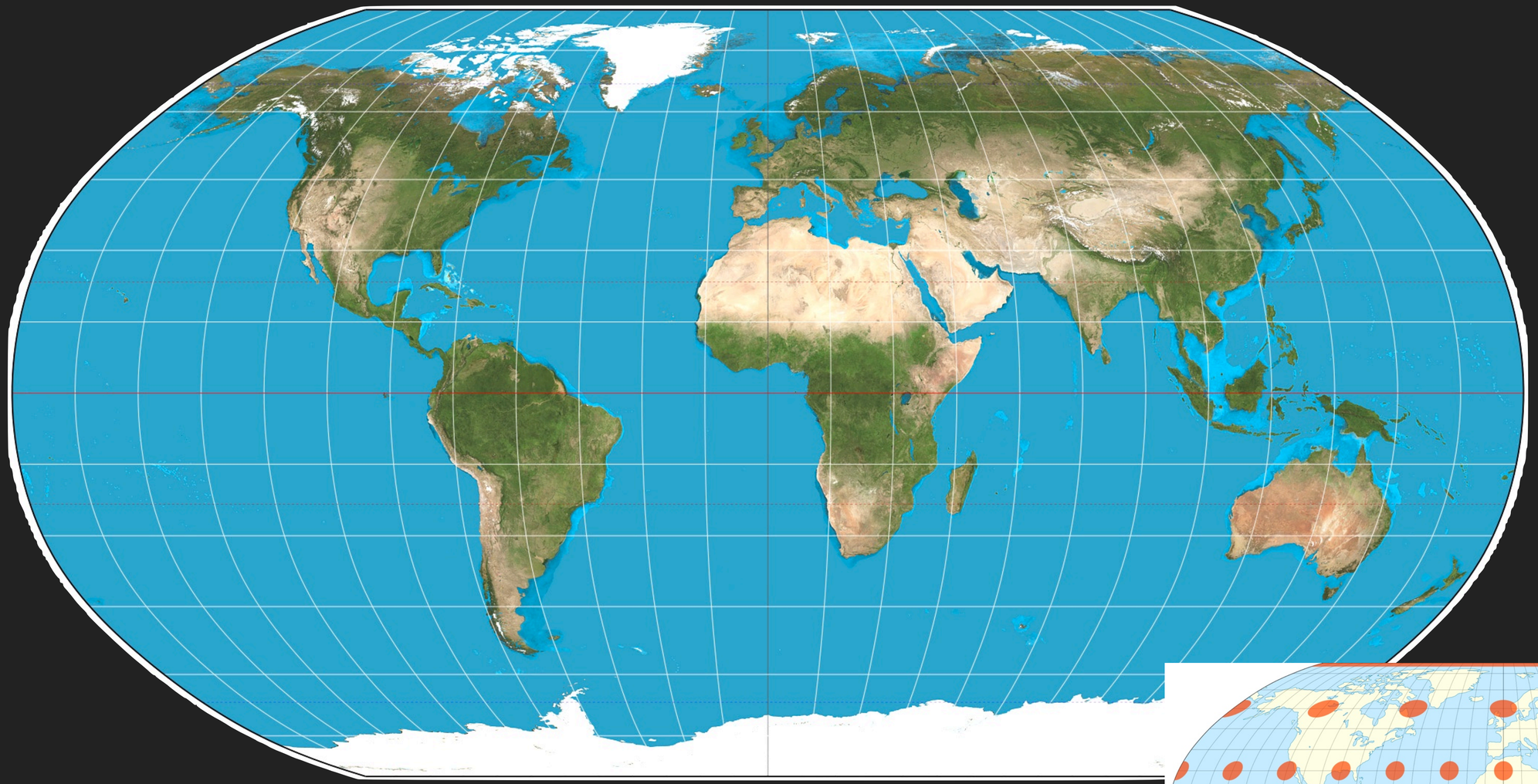
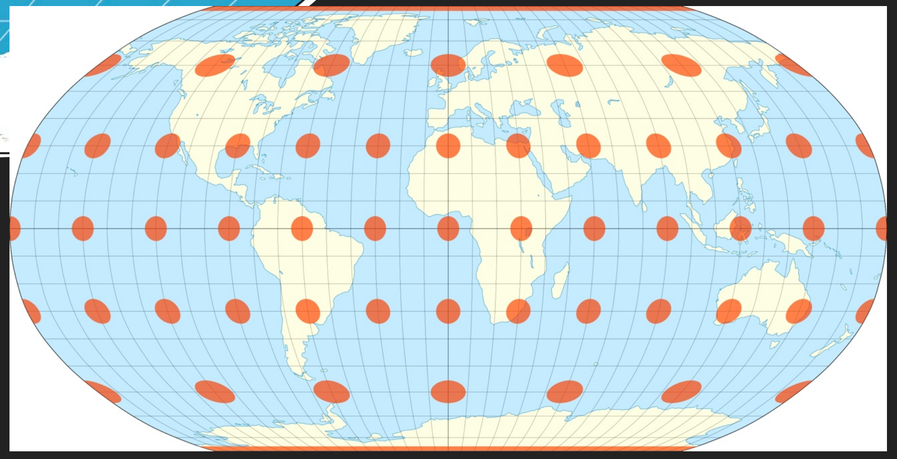
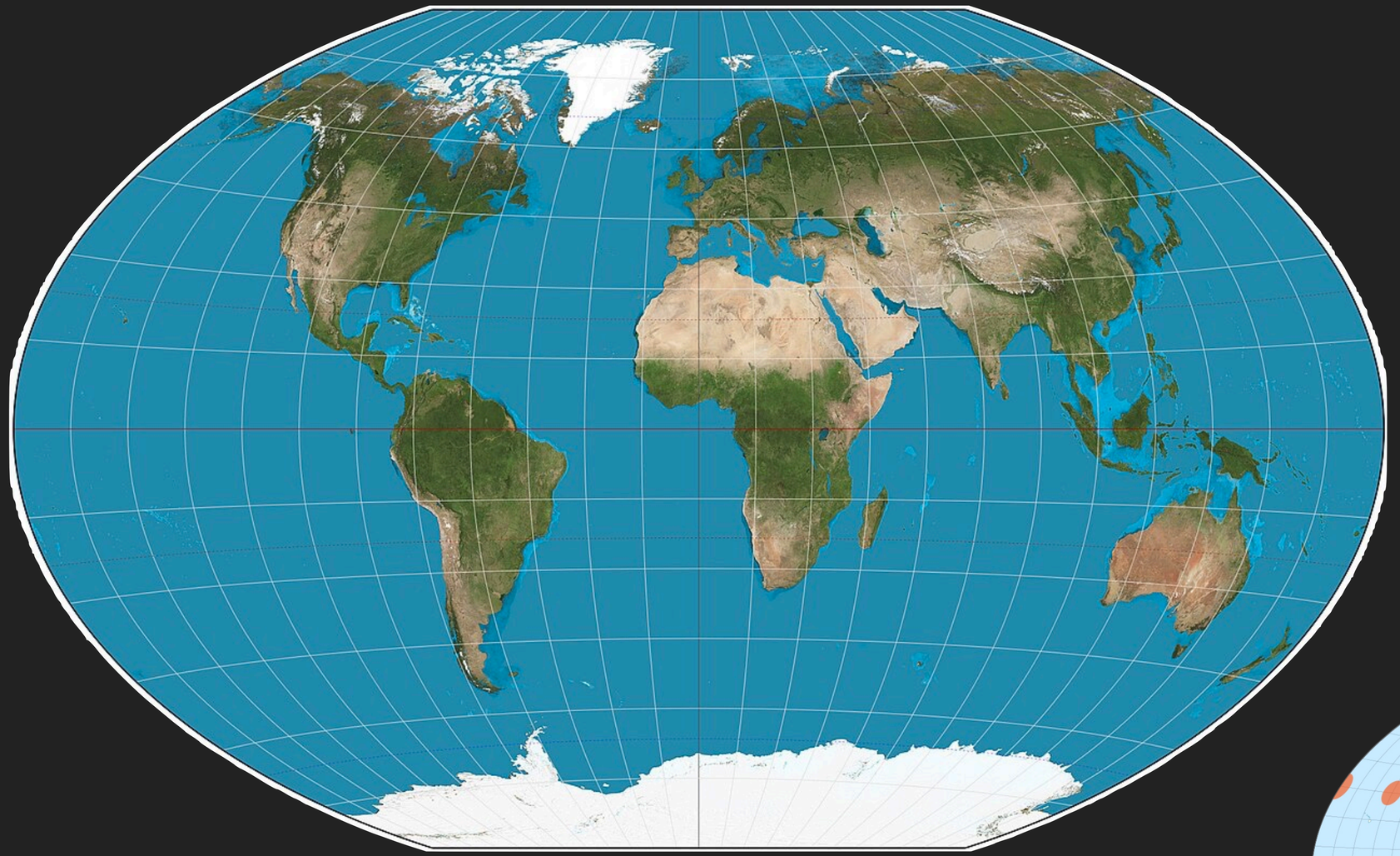




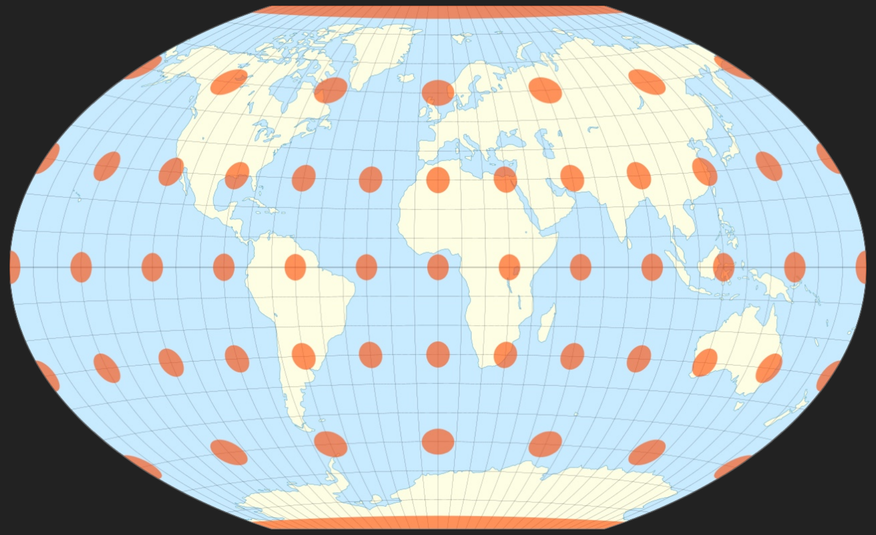
Robinson projection

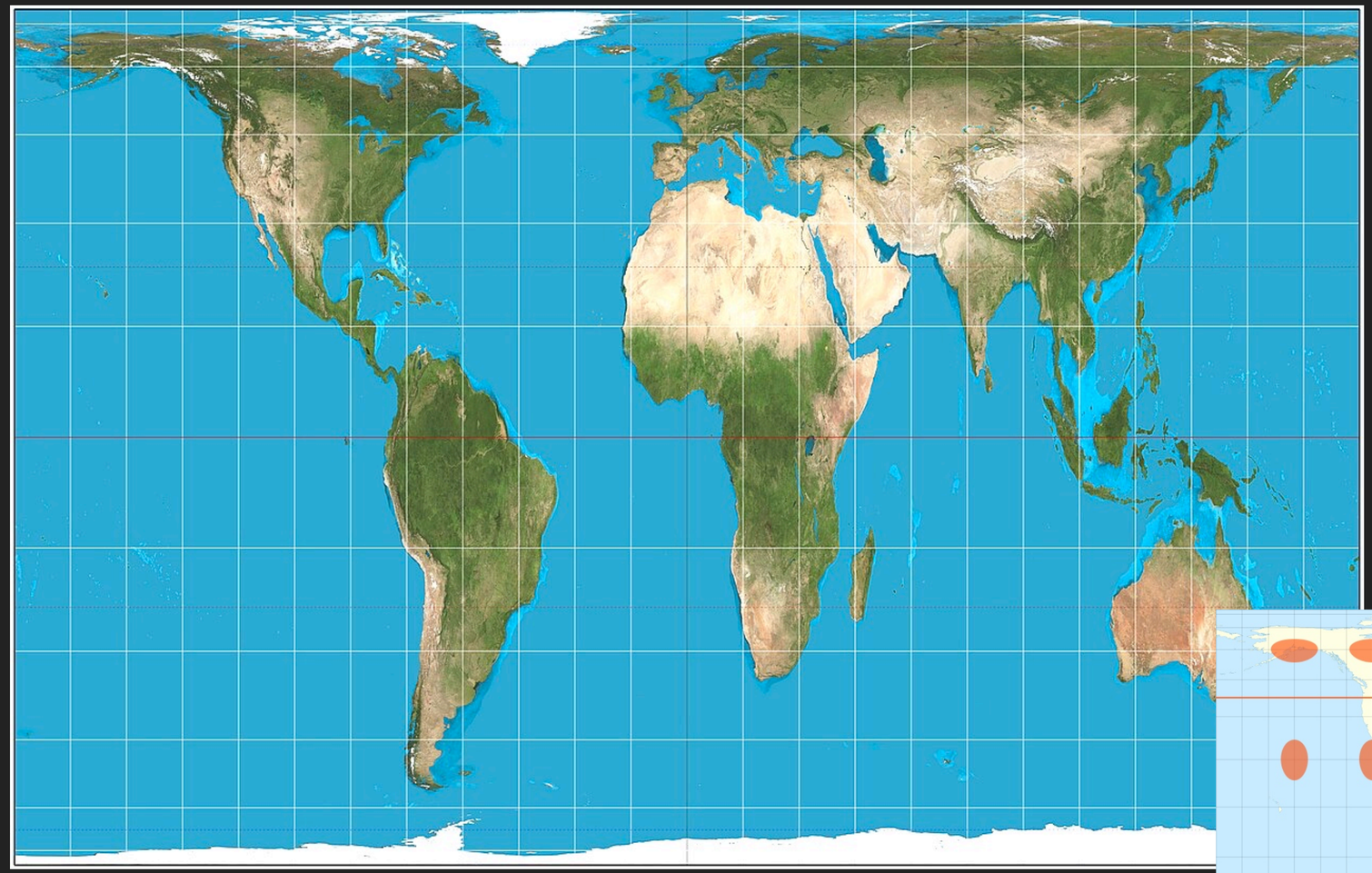
neither equal-area nor conformal
(a compromise)

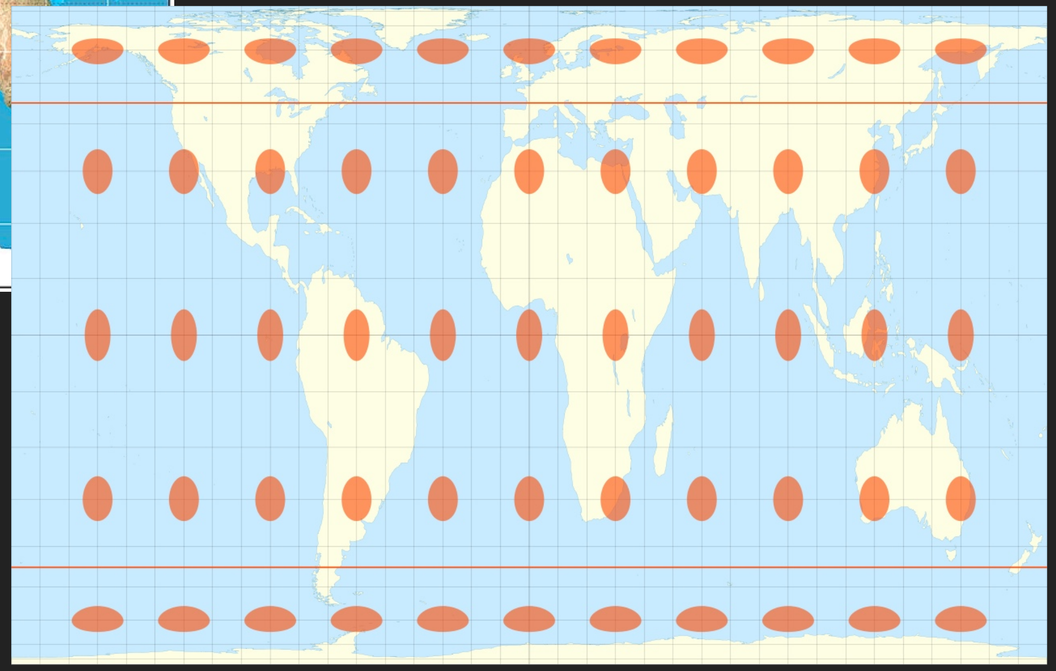


Winkel tripel projection

goal of minimizing three kinds of distortion:
area, direction, and distance





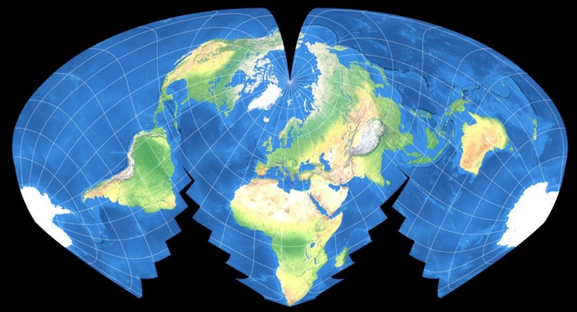


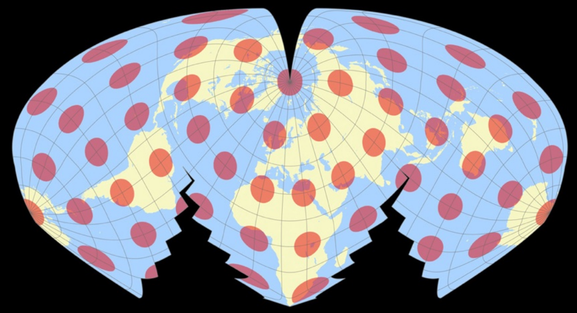
Gall–Peters projection

Cylindrical equal-area

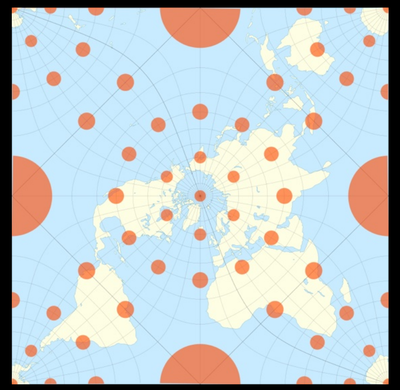
The Peters Projection.
PETERS PROJECTION MAP

Sinu-Mollweide

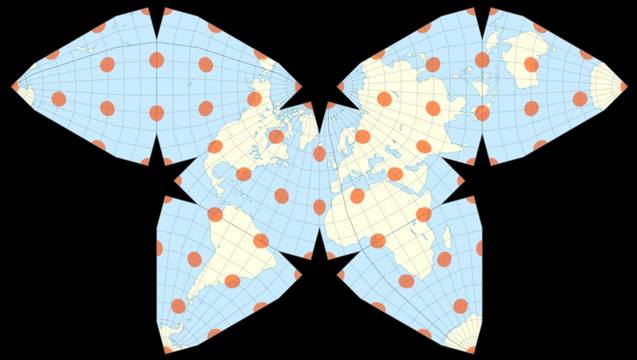




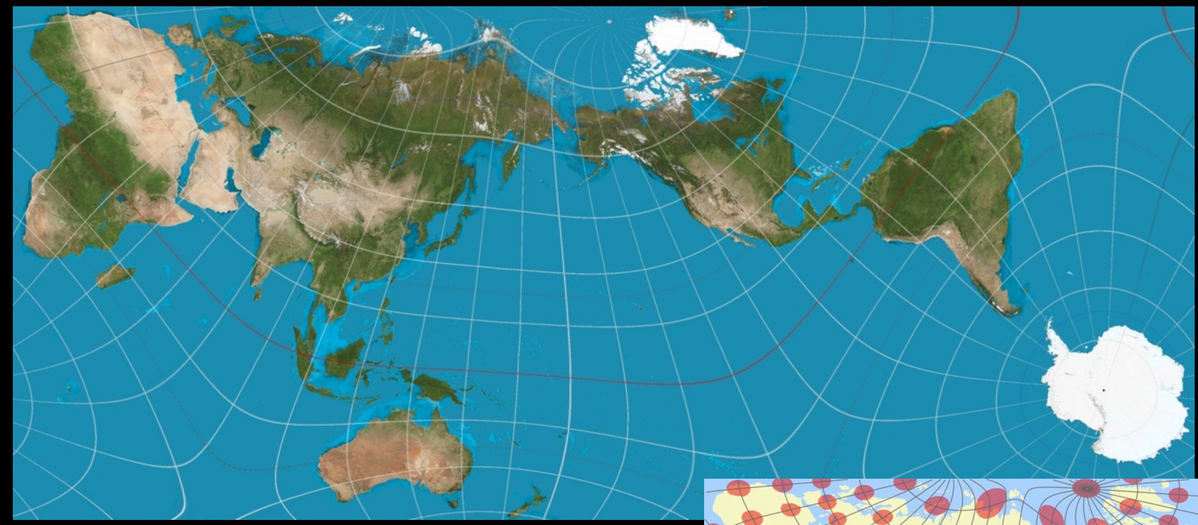
Peirce Quincuncial

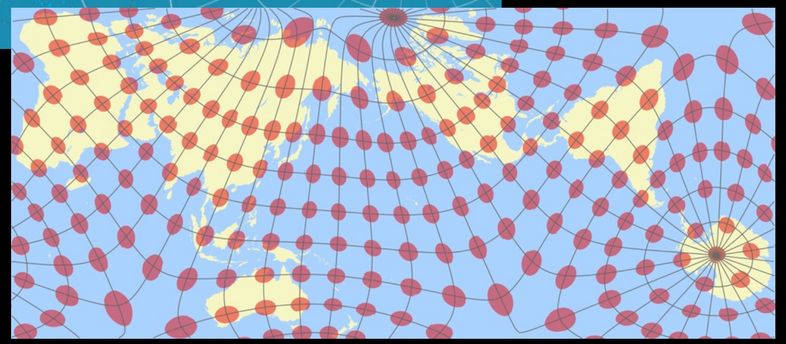


Waterman butterfly



The Authagraph

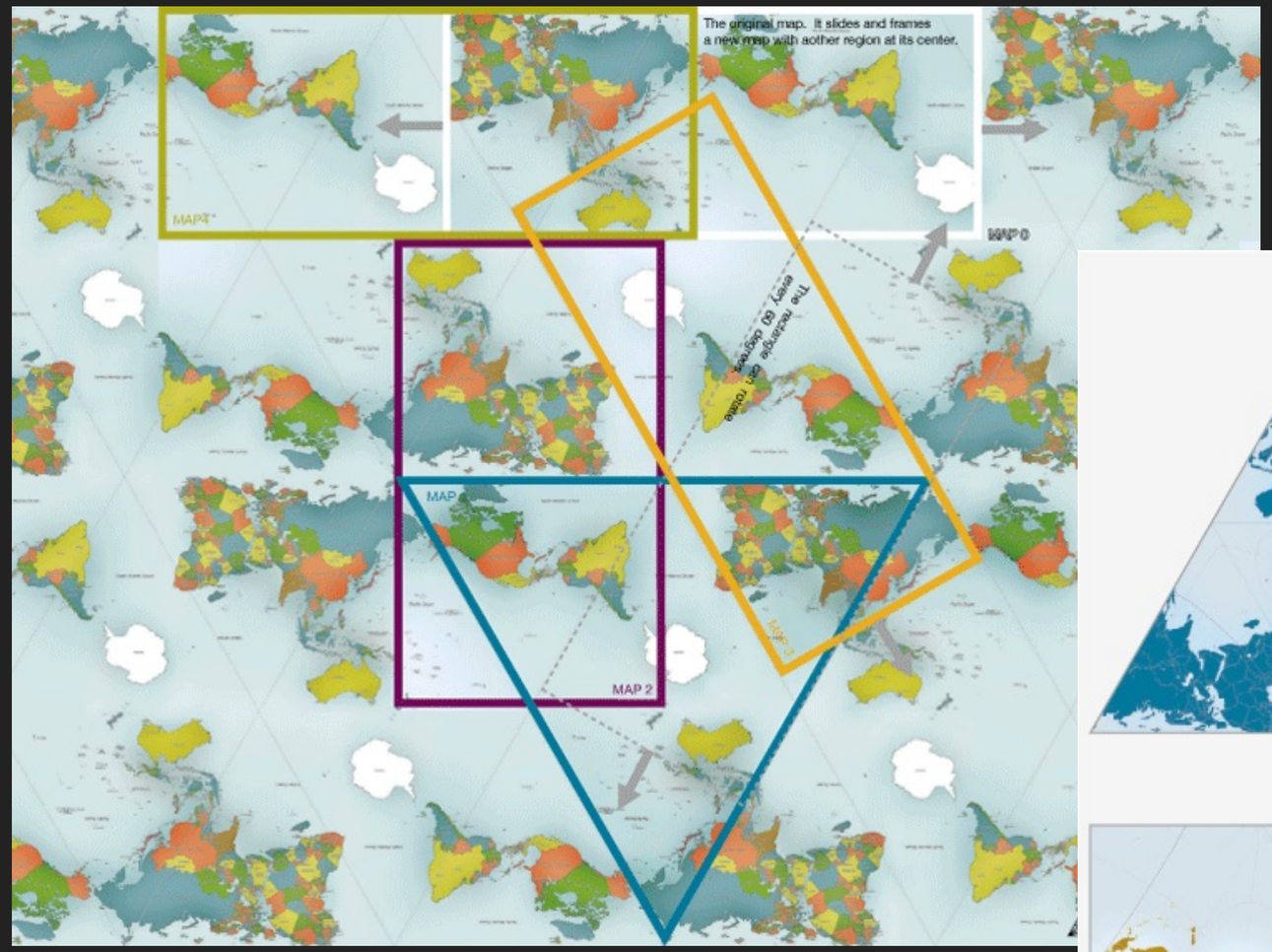


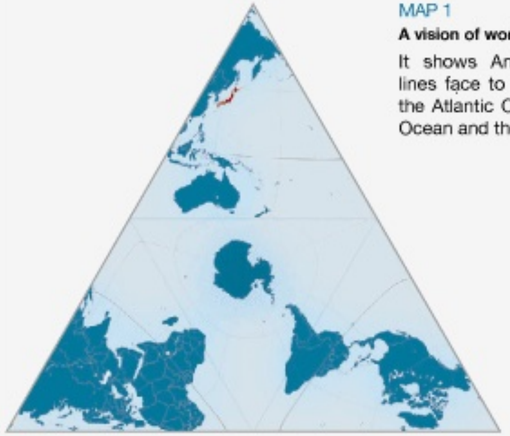


made by equally dividing a spherical surface into 96 triangles, transferring it to a tetrahedron while maintaining area proportions, and unfolding it in the form of a rectangle: it is a polyhedral map projection

Hajime Narukawa worked for 6 years on this map, and won the 2016 Good Design Awards - Grand Award.

https://curiosity.com/topics/the-authagraph-is-the-worlds-most-accurate-map-curiosity/





MAP 1

A vision of world from Antarctica

It shows Antarctica's coast-lines face to all three oceans, the Atlantic Ocean, the Pacific Ocean and the Indian Ocean.

MAP 2

A vision from the North Pole and the 1st meridian

It shows a layout which divides the world into new world below and old world above.

MAP 3

A vision of world from Brazil

It shows geographical relation with Brazil, half globe away from Japan.

MAP 4

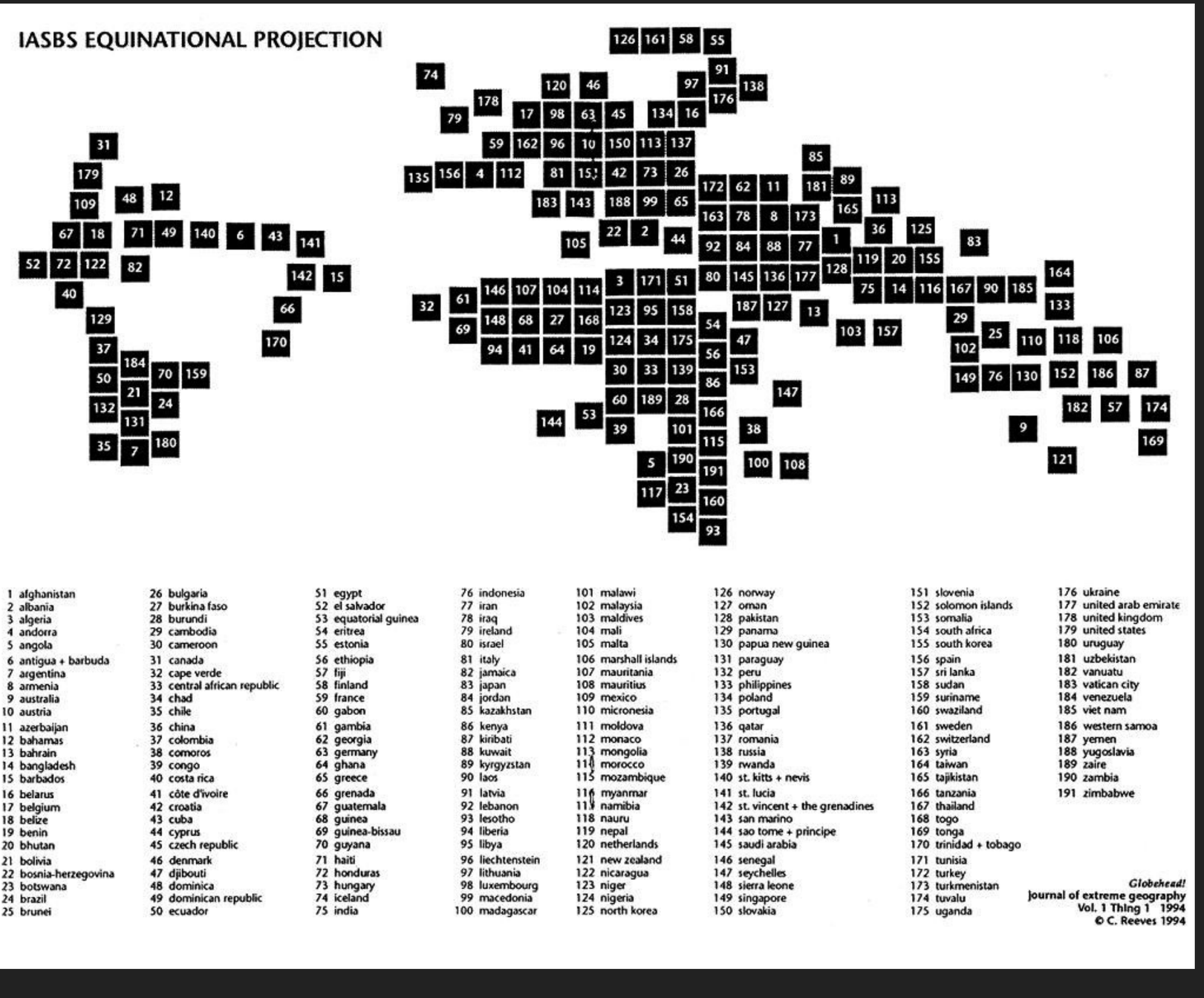
A vision of world from South Africa

It shows geographical relation with South Africa where an economy development, diamond and World Cup attracted a public attention.

AuthaGraph

The Authagraph map projection centered on Europe

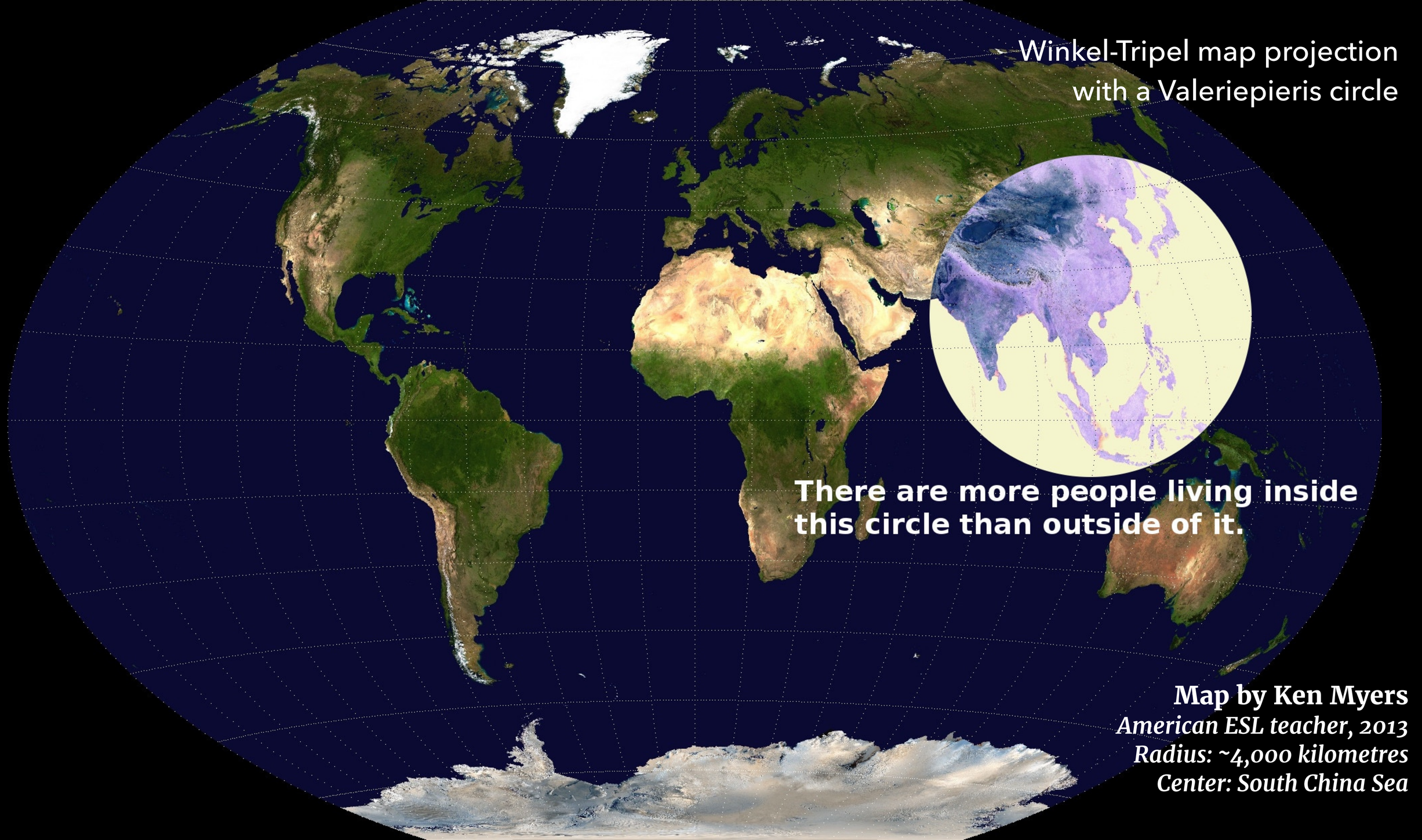
Has been reverse engineered.



From the short-lived Globehead! Journal of Extreme Cartography:

Catherine Reeves' Equinational Projection, allocates each nation the *exact same amount of space* by reducing them all, equally, to a simple square.

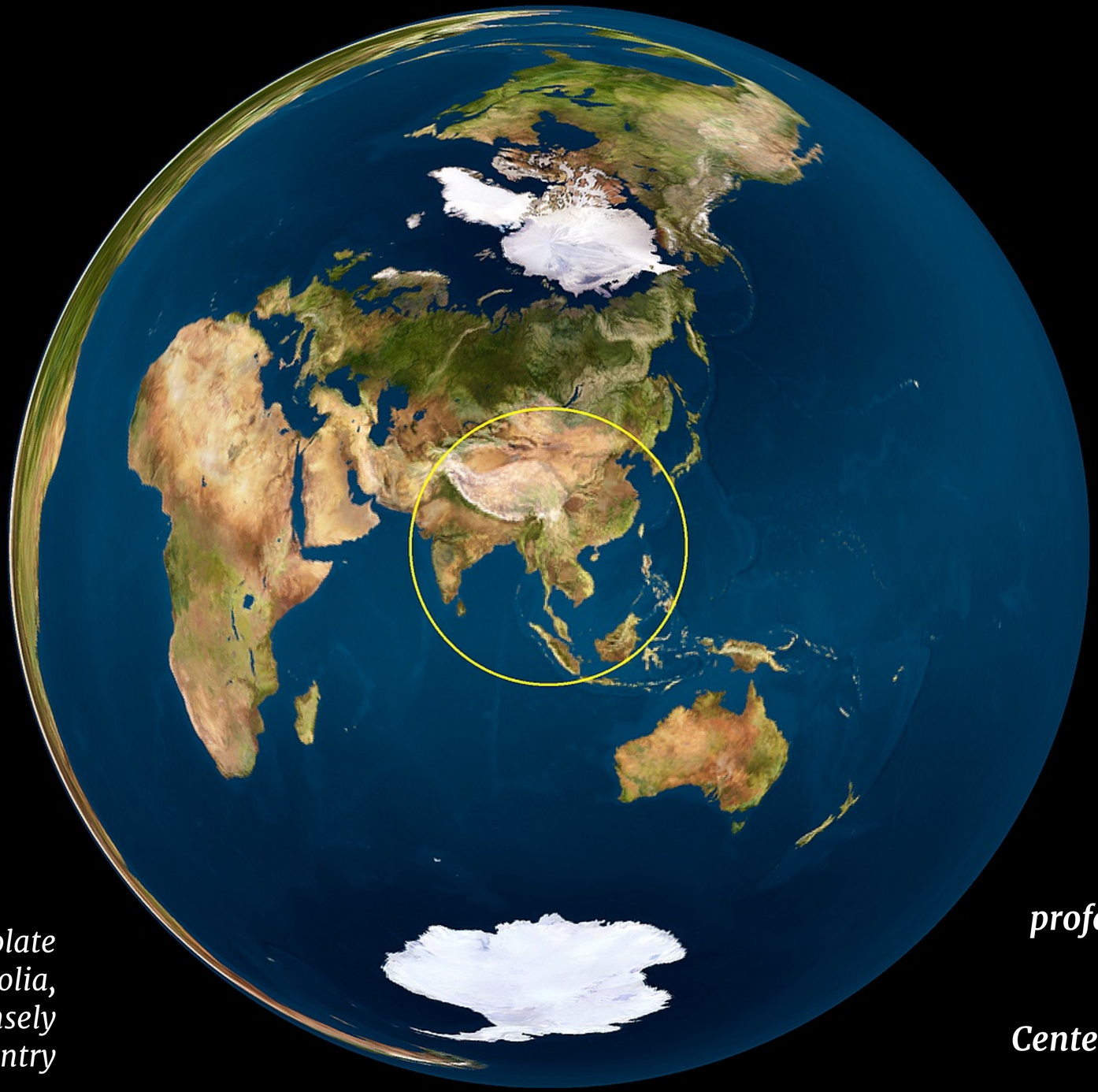
The UK is 178
The US is 179


Winkel-Tripel map projection
with a Valeriepieris circle
There are more people living inside
this circle than outside of it.
Map by Ken Myers
American ESL teacher, 2013
Radius: ~4,000 kilometres
Center: South China Sea

What is the spectacular lie in this map?

Map by Ken Myers
American ESL teacher, 2013
Radius: ~4,000 kilometres
Center: South China Sea

A proper circle.



*includes the Himalayas, desolate regions of Siberia, and Mongolia, the world's **least** densely populated country*

Map by Riaz Shah
professor at Hult International Business School.
Radius: ~3,300 kilometres
Center: Mong Khet in Myanmar

Some theories suggest that Australia is in fact Scooby-Doo

Resolution adopted by seven North American cartographic societies in 1989:

[W]e strongly urge book and map publishers, the media and government agencies to cease using rectangular world maps for general purposes or artistic displays.

Such maps promote serious, erroneous conceptions by severely distorting large sections of the world [...]”

You won’t
believe
what
happened
next.

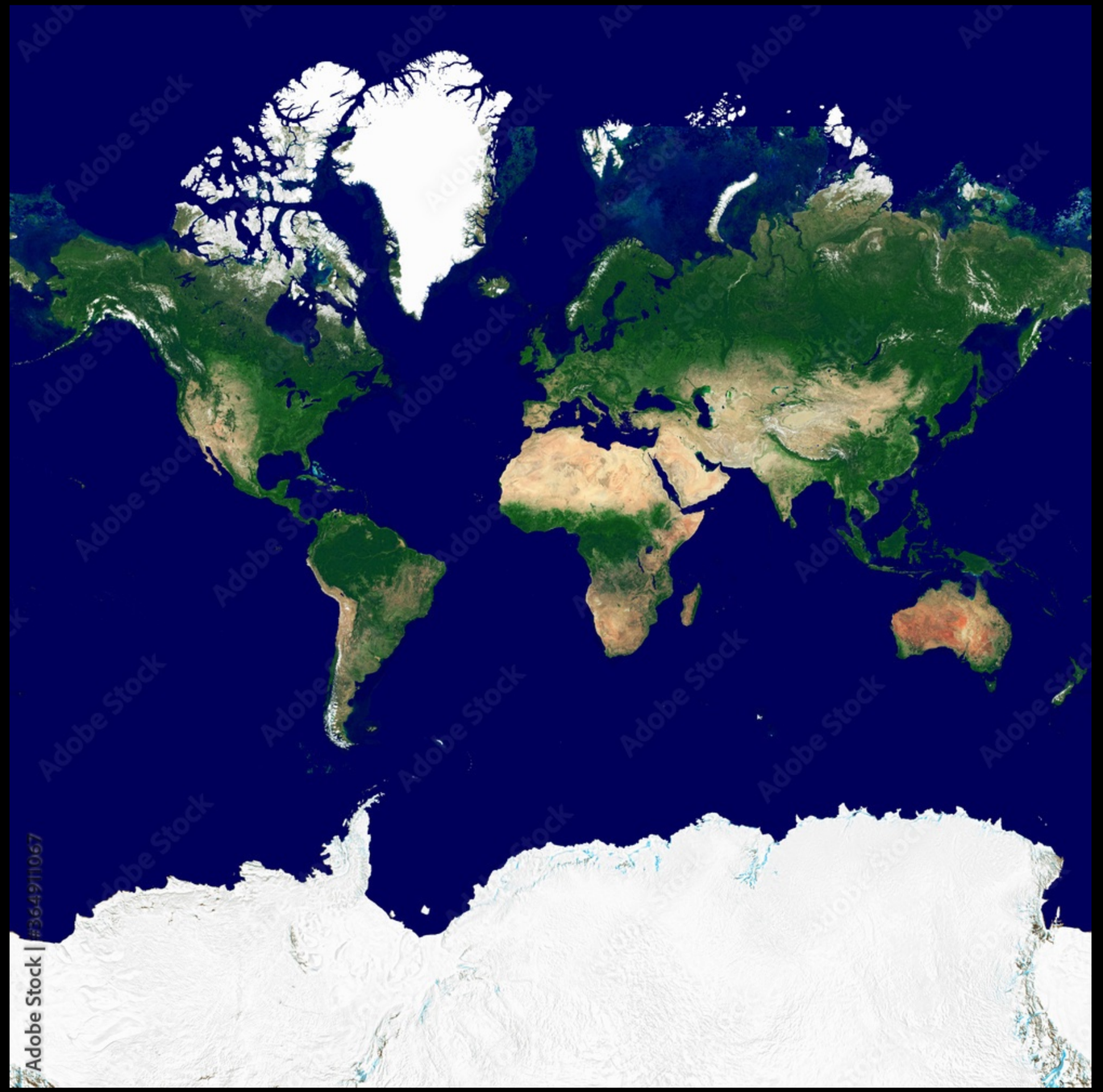
The Web Mercator

adopted by Google in 2005

also known as Google Web Mercator, Spherical Mercator, WGS 84 Web Mercator or WGS 84/Pseudo-Mercator

Spatial systems: EPSG 900913, 3857, 3785, 3587

Used by virtually all major online map providers



Geographic coordinates (longitude/latitude are defined on curved a 2D surface. This can be an ellipsoid (most data) or sphere (very rarely). Both projections can have an equation.

EARTH		PROJECTION/EQUATION		
Globe	+	*sphere*	=	*Conformal (correct angles)*
Ellipse	+	*ellipsoid*	=	*Conformal (correct angles)*
Ellipse	+	*sphere*	=	*Non-Conformal (wrong)*

“The Web Mercator is a mistake that got out of control.

It distorts *everything.”**

– Bojan Šavrič – cartographer, PhD in geography, author of projectionwizard.org

**shapes, angles, areas, distances, directions, rhumb lines, compass bearings, etceteras...*

Misalignments in WGS 1984

Use Literally Anything but Web Mercator [YouTube]

Not accepted by standardisation orgs

"We have reviewed the coordinate reference system used by Microsoft, Google, etc. and believe that it is technically flawed. **We will not devalue the EPSG dataset** by including such inappropriate geodesy and cartography."

Geodesy subcommittee of the OGP's Geomatics committee

The unofficial code EPSG:900913 came to be used.

EPSG Geodetic Parameter Dataset (also EPSG registry) is a public registry of geodetic datums and spatial reference systems. EPSG 1024–32767

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The unofficial
code EPSG:900913
came to be used.
GOOGLE
transliterated to
numbers

“[I]magine if all of Google's data and programming ability was suddenly in the hands of a Namibian agriculturalist, a Sahelian nomad or a Senegalese fisherwoman

– the maps they would conjure up would be completely different.

They might well prioritise *soil types* over Starbucks, *wells* over Walmarts and the *state of land degradation* over panoramic street views of American towns.”

– James Wan, The Guardian

With better ways to visualize the world humans are better equipped to address Earth’s challenges.
What would it take to do better?

Please pay a LOT of money to make the “top” world look smaller.
AND to confuse your constituents.

It’s a tough argument to make.

Would it be make maps more accurate?

Well yes

Would it be make maps more accurate?

Well yes

And no

A cartographer is also…

a designer.

with deadlines,
insufficient data,
cultural biases, a budget
– and an agenda.

Can be an agent of power.

For all maps, please ask...

Who made this tool, why and under what constraints?

Whose power is being wielded?

What is the data source and is it the right one for the job?

What is being left out, added or distorted?

What assumptions are being made and/or conveyed?

Who stands to lose from the use of this tool?

For all ~~maps~~, tools please ask...

Who made this tool, why and under what constraints?

Whose power is being wielded?

What is the data source and is it the right one for the job?

What is being left out, added or distorted?

What assumptions are being made and/or conveyed?

Who stands to lose from the use of this tool?

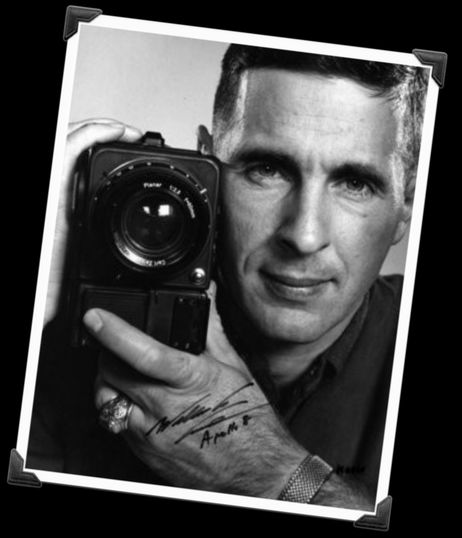
What did we learn today?

- **Hera Hussain** – participatory design, how do we give people more power over the maps they use?
- **Matt Jukes** – working in the open, be a superhero fan
- **Alex Blandford & Katherine Wastell** – change is hard,but you have the tools to make it happen
- **Dr Zeynep Engin** – it’s super important that we understand trustworthiness in human-machine collaborations
- **Ignacia Orellana & Clara Greo** – map the pain points to understand the costs
- **Claire Dellar** – imagine the potential of the 100% perspective to mapping!

"We set out to explore the moon and instead discovered the Earth."

William Anders

– Astronaut who took the Earthrise photograph in 1968 together with Jim Lovell and Frank Borman



The Earth is flat.

I have acted as if the Earth is flat when I have *underestimated* how much flat maps distort the world.

Maps need lines.

Maps need lines.

And you need to understand what the lines say.

Understanding what the lines say will help us all take better care of our home.

Choosing new lines when you talk about the world can help you talk about it differently.

You can start changing the world today. Truly and literally.

Thank you.

You can start changing the world today. Truly and literally.

Thank you.

Slides, links, videos, references and more:

axbom.com/cdmaps