

Capt. Johnson Adjetey
MASTER MARINER, MBA (UK)

LECTURER

REGIONAL MARITIME UNIVERSITY

THE SHAPE OF THE EARTH

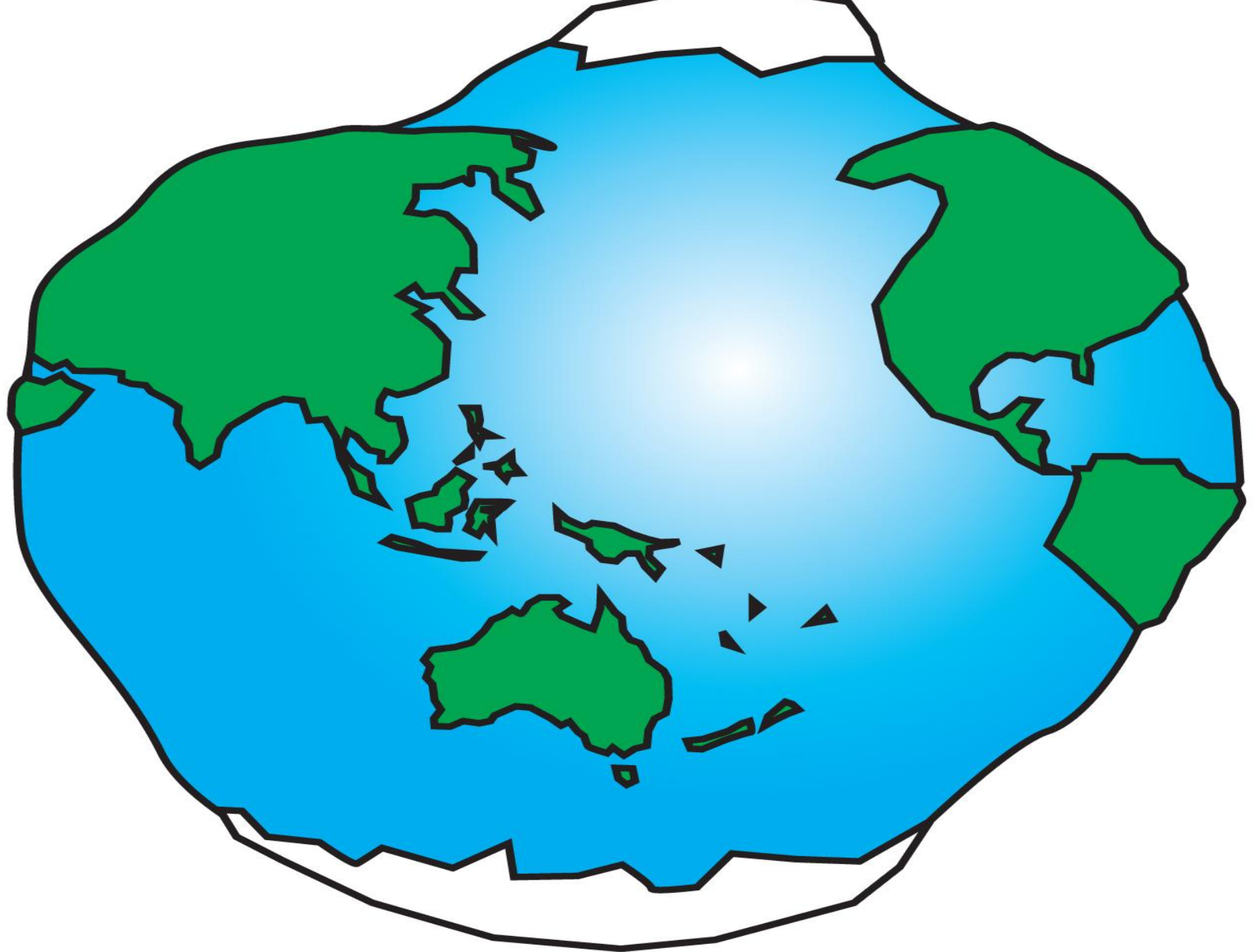
- When you hear “size and shape of the earth,” it sounds simple enough but then you start hearing that height doesn't necessarily mean height. You hear terms such as “geopotential” in relation to the variation of gravity. You read about the “geoid of 2003” and “ellipsoid” heights. At this point your brain starts to melt and you turn catatonic. Just tell me the GPS coordinates and elevation! FOR NAVIGATION.

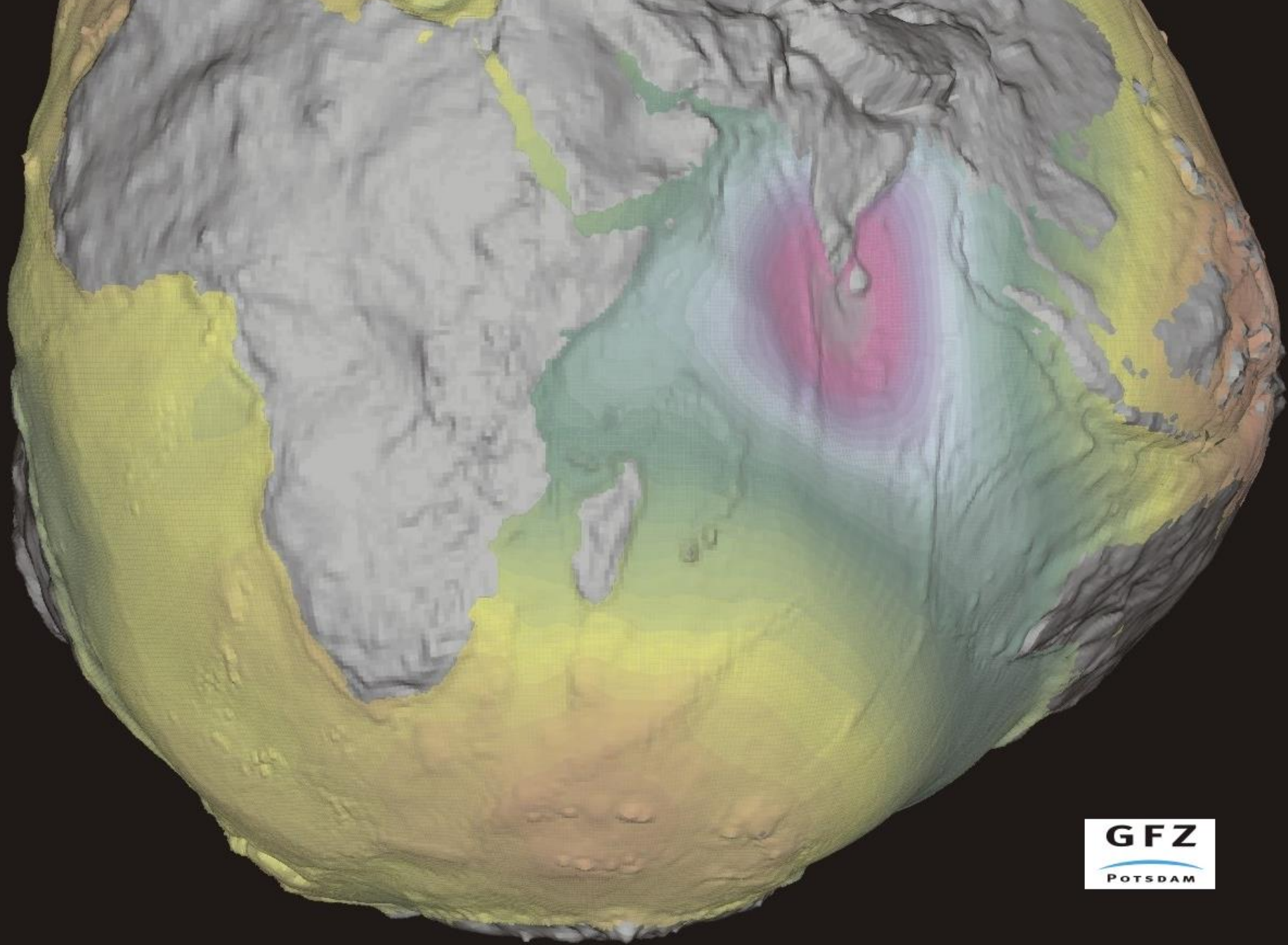
The Earth's True Shape

- The Earth is not a perfect sphere. Due to its rotation, the Earth (like all rotating planets) has a slightly distorted shape. The rotational momentum tends to force the matter to bunch up in the middle. In the case of the Earth, this "middle" is the equator.

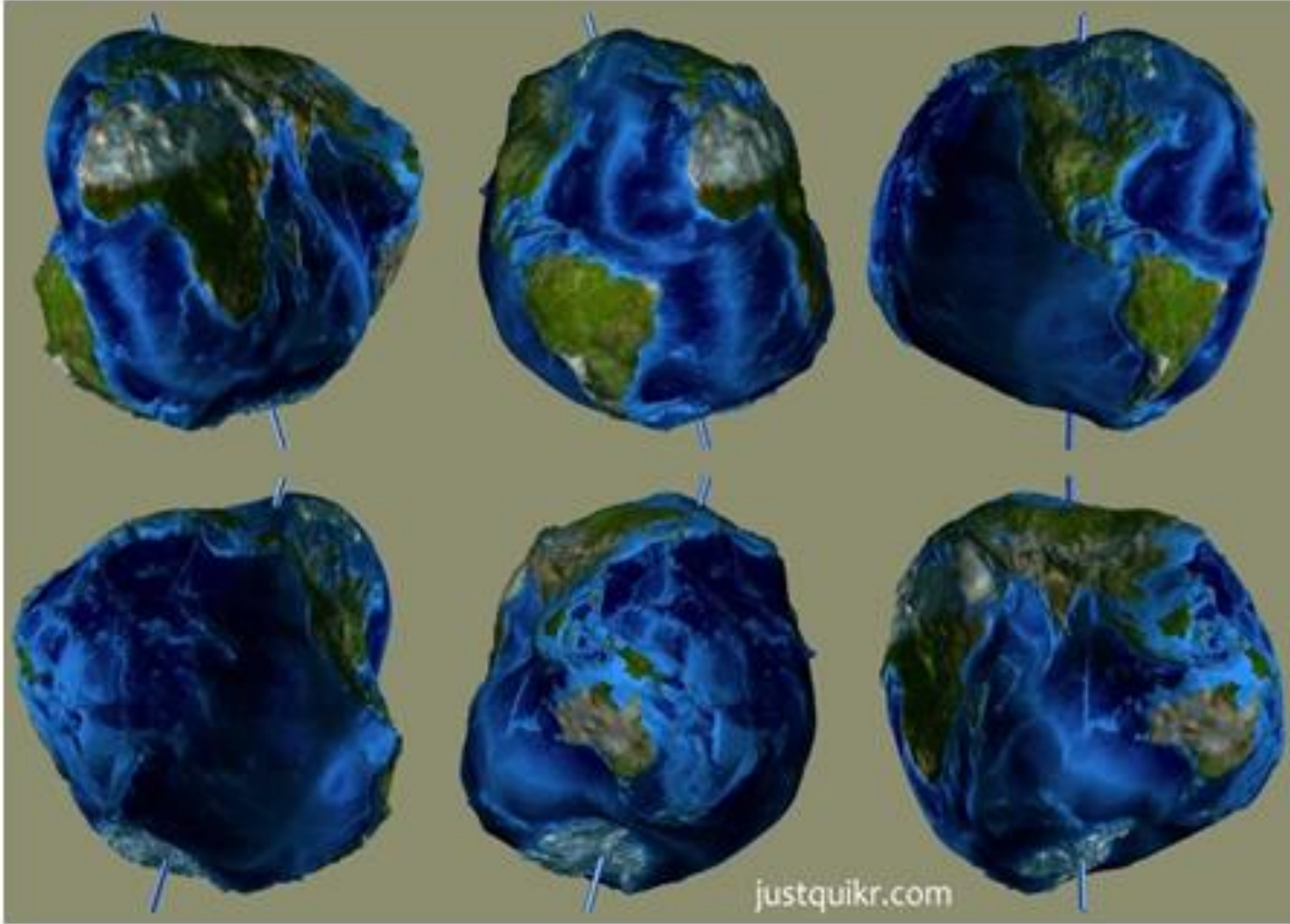
THE SHAPE OF THE EARTH

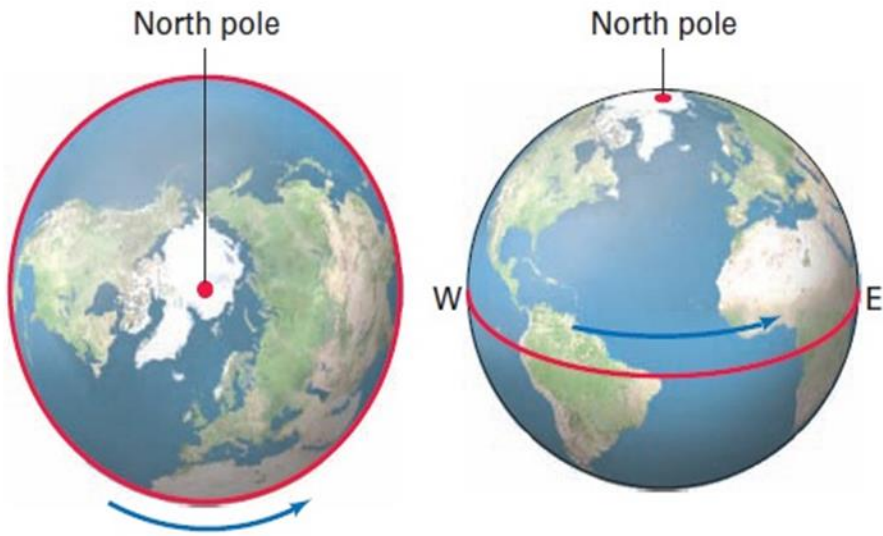




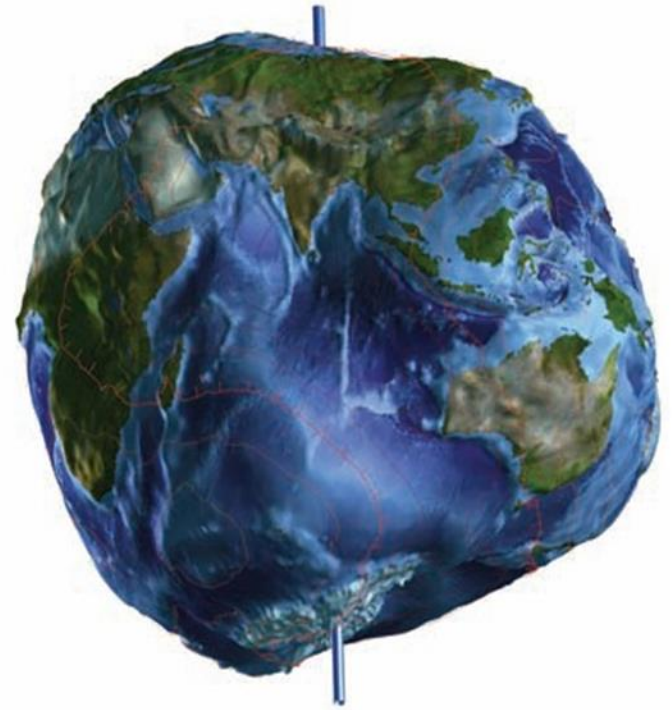








The direction of rotation of the Earth can be thought of as **A** counterclockwise at the North Pole, or **B** from left to right (eastward) at the equator.



C This is a greatly exaggerated geoid, in which small departures from a sphere are shown as very large deviations.

Forces That Shape Our
Earth:
Weathering
And
Erosion

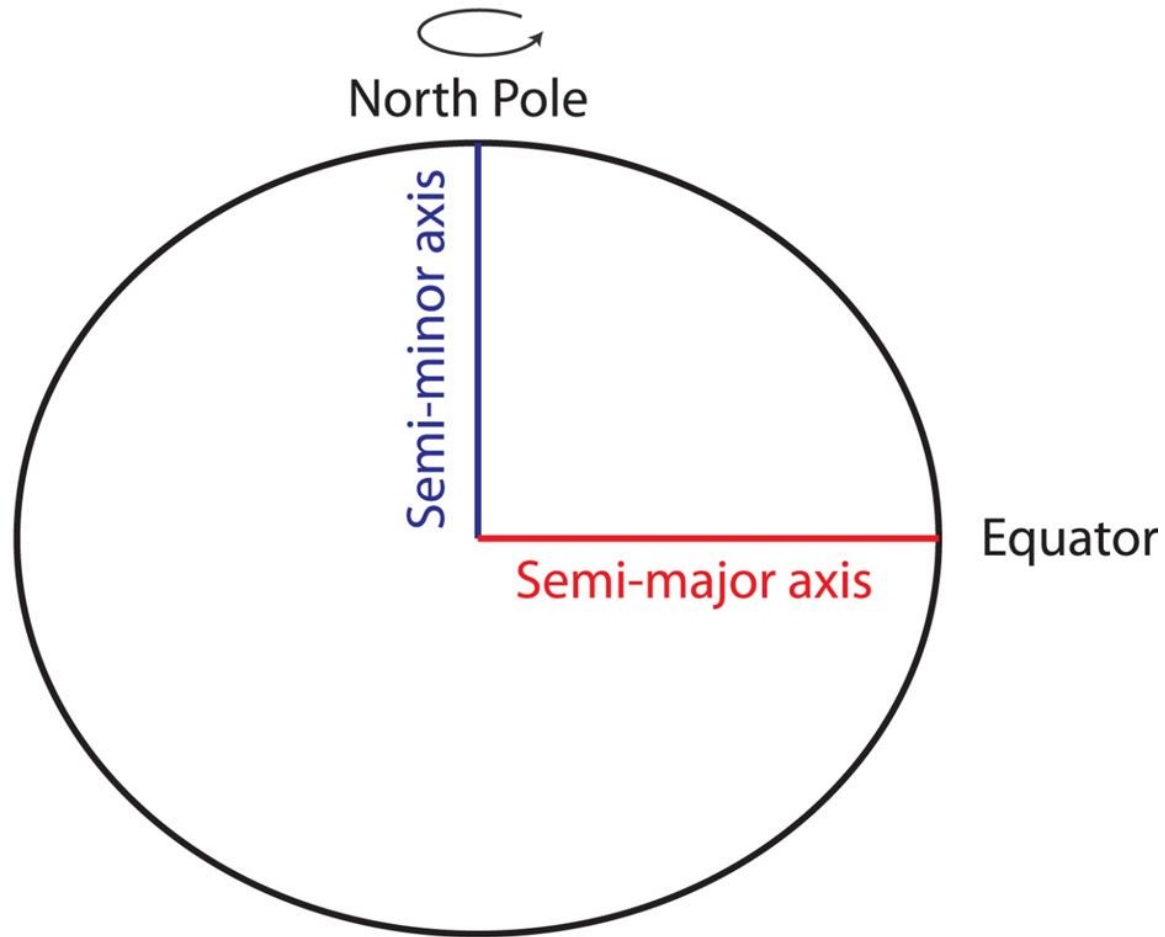


Processes responsible for determining the shape of the Earth, constellation of the Continents, and large natural disasters (Earthquakes, Volcanic eruptions, and Tsunami) are controlled by Plate Tectonics and the internal structure of the Earth

Models of the Earth

The diameter from the North Pole to the South Pole (the shortest diameter) is approximately 12,714 km. The equatorial diameter (the longest diameter) is approximately 12,756 km. This is not a big difference, but it does make the Earth not quite a sphere. The flattening factor: 298.257223563

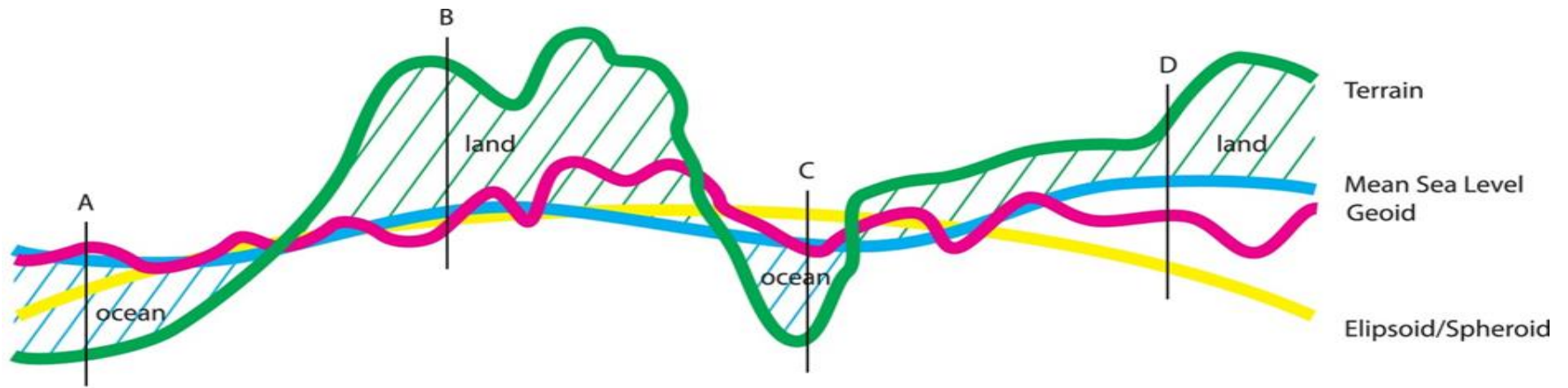
Earth's measurements



In summary - there are four surfaces that geodesists study:

- » the Ellipsoid/Spheroid
- » the Geoid
- » Mean Sea Level
- » the Terrain
- It is important to recognise that the relationship between these four surfaces is not always the same. Rather, as this diagram indicates, they 'wobble' around each other.

Earth's Four surfaces



A

- Geoid
- Mean Sea Level
- Elipsoid/Spheroid
- Terrain

B

- Terrain
- Mean Sea Level
- Elipsoid/Spheroid
- Geoid

C

- Elipsoid/Spheroid
- Mean Sea Level
- Geoid
- Terrain

D

- Terrain
- Mean Sea Level
- Geoid
- Elipsoid/Spheroid

The Earth's True Shape - Its Terrain

- Of course the Earth isn't just ocean (Mean Sea Level). Much of the land masses are well above the sea level (e.g. Mount Everest is over 8,000 metres above Mean Sea Level), while in the ocean it is well below sea level (e.g. the Mariana Trench is over 11,000 metres below Mean Sea Level).

TIDE

WHY LEARN TIDE?

THROUGH INTRACOA

ES, BAYS, AND HARBOUR

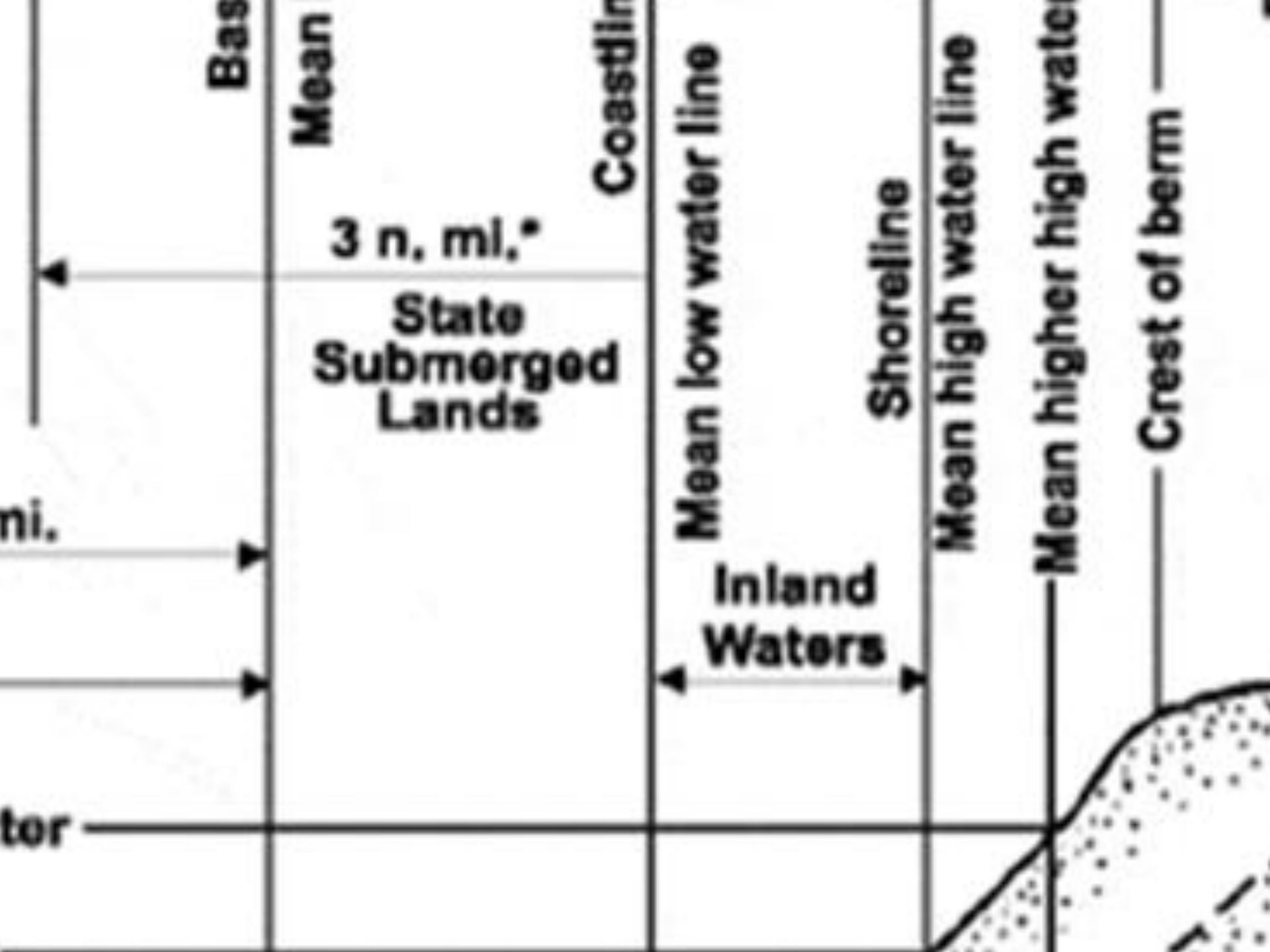
HARBOUR ENGINEERING

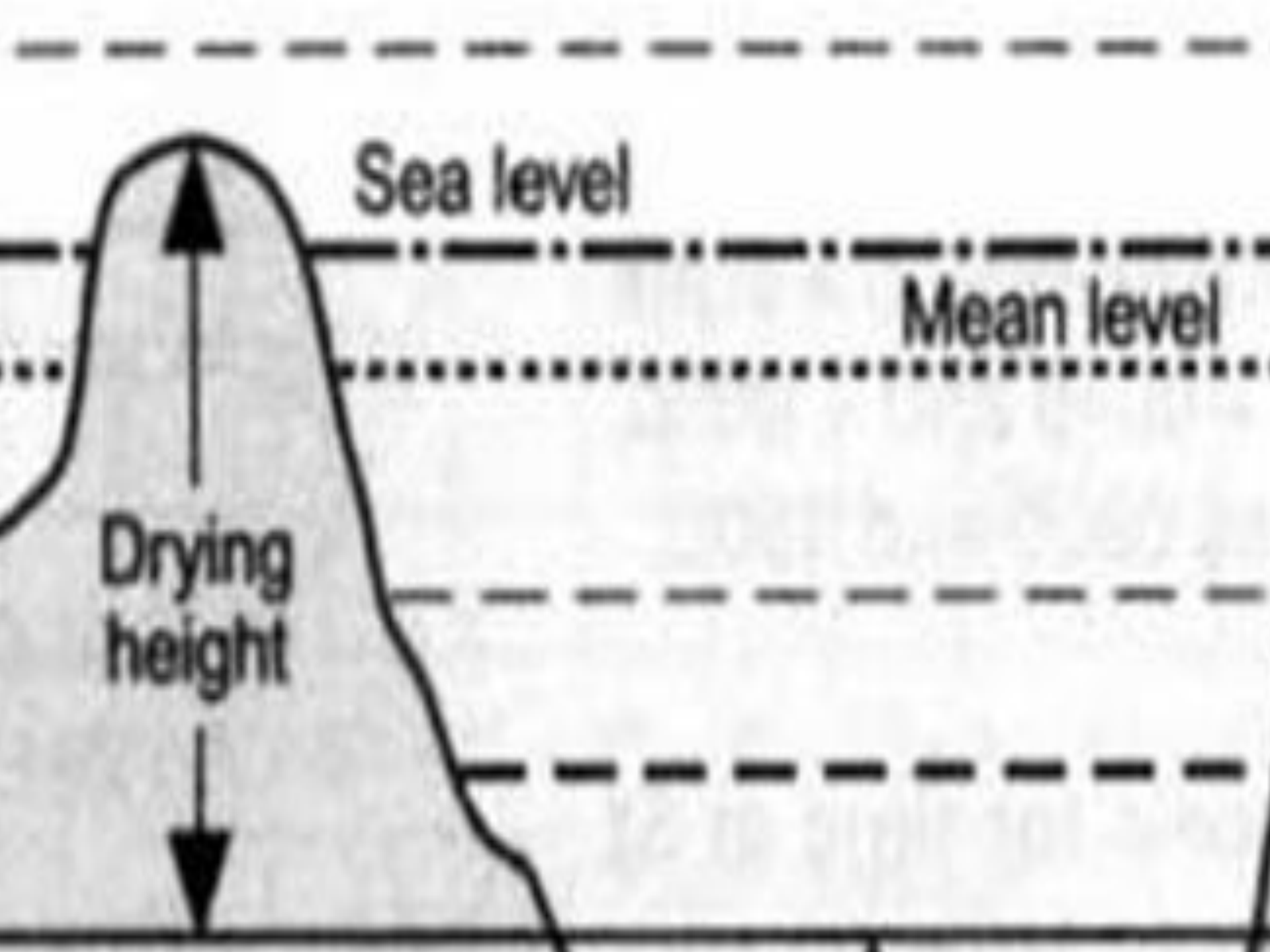
E OF TIDAL CHANGES THAT

BIOLOGICAL, CHEMICAL, A

RINE ENVIRONMENT.

GLOBAL CHANGE IN SEA







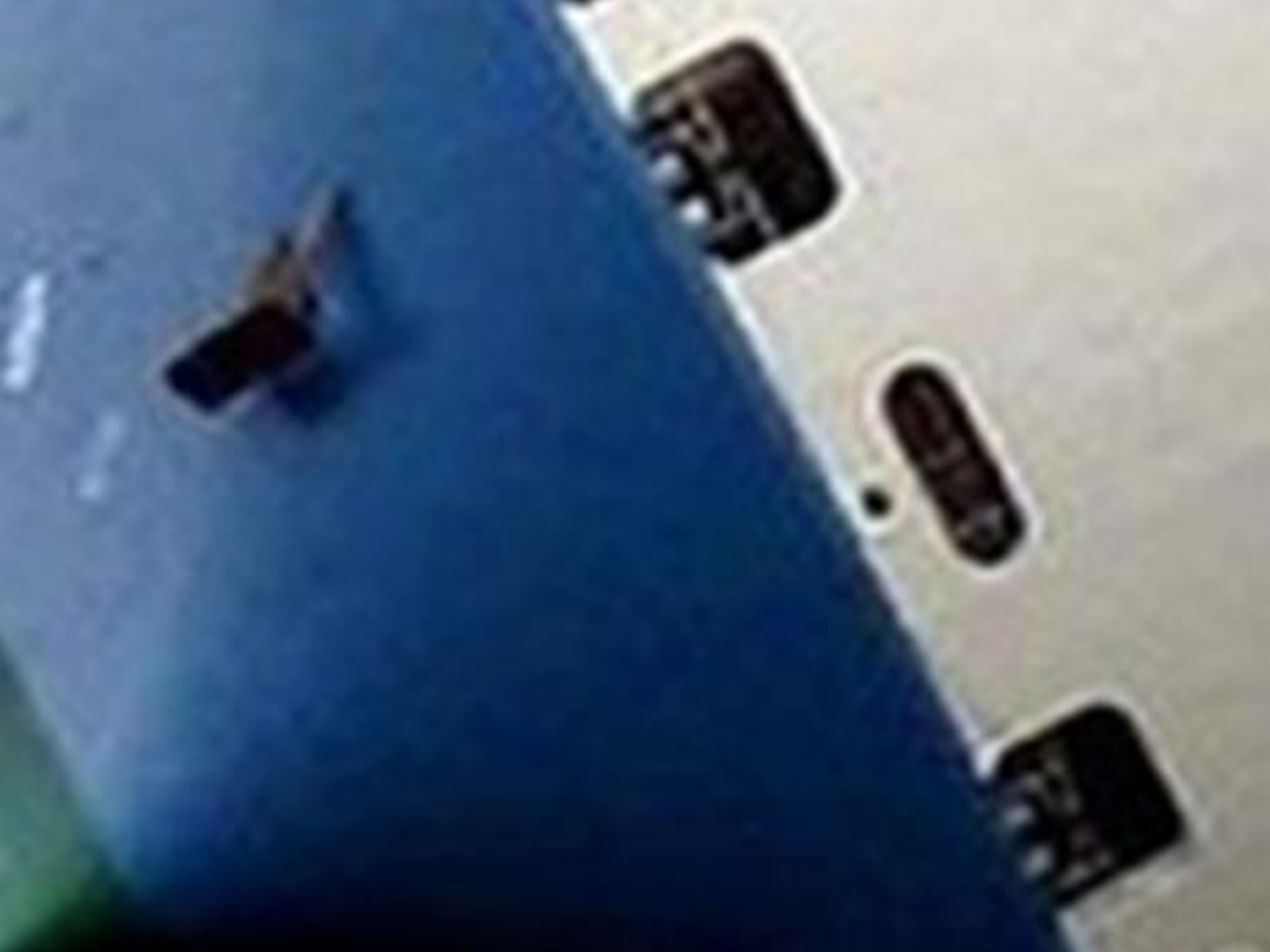
Height of tide

Dry











COSTA CONCORDIA



22:00 (UT
capsizing

**Giglio
Porto**

Green Light
Red Light



ENGLAND – DOVER

LAT 51°07'N LONG 1°19'E

S AND HEIGHTS OF HIGH AND LOW WATERS

FEBRUARY

	Time	m
16	0224	1.9
	0802	5.8
W	1507	1.6
	2041	5.8

17	0341	1.5
	0910	6.1
TH	1626	1.3
	2144	6.1

MARCH

	Time	m
1	0200	2.4
	0737	5.1
W	1436	2.2
	2014	5.3

2	0312	2.1
	0845	5.4
TH	1539	1.9
	2112	5.4

	Time	m
16	0209	1.9
	0758	5.6
TH	1457	1.8
	2033	5.7

17	0333	1.6
	0909	6.0
F	1622	1.4
	2155	6.0

	Time	m
1	0334	1.9
	0855	5.6
SA	1559	1.8
	2115	5.7

2	0425	1.6
	0935	6.0
SU	1648	1.4
	2155	6.0



How the Moon Affects the Ocean Tides - Tides and the Moon - CharlieDeanArchives - Archival Footage [360p].mp4



TURBULENCE

BOTH WIND AND TIDAL SET
MIX



Two container ships collide on Suez Canal [360p].webm



Two container ships collide on Suez Canal [360p].webm



Radioactive



Corrosive



Marine pollutant



Miscellaneous



Explosive



Explosive



Flammable gas

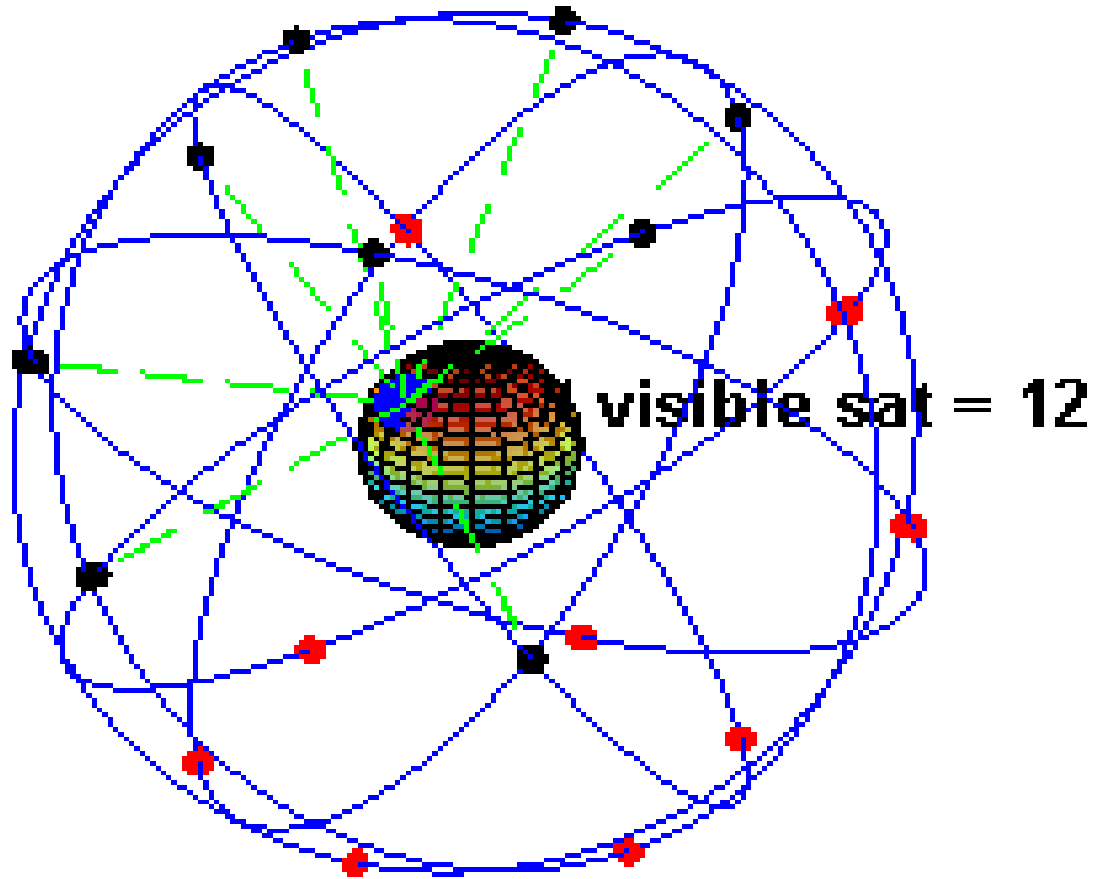


Non-flammable
compressed

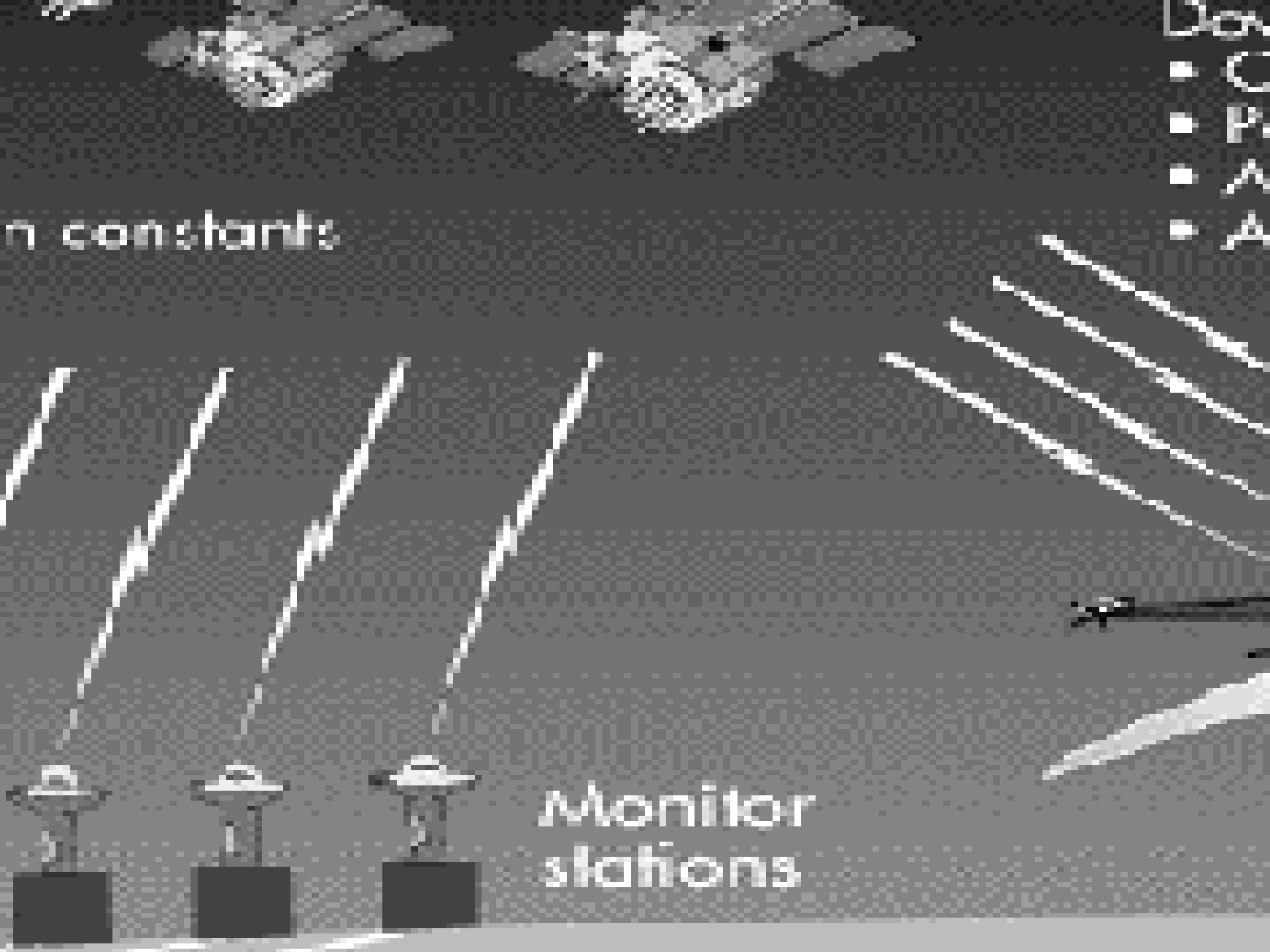




GPS Satellites in their orbits



n constants:



CARGO WORK

HYGROSCOPIC AND NON HYGROSCOPIC
CARGOES

TEMPERATURE, HUMIDITY AND
VENTILATION

DRAFT SURVEY

RELEVANCE OF DOCK AND SEA
WATER DENSITY.

USE OF HYDROMETER AND
THERMOMETER