The Globe

**The Globe** is a three-dimensional scale <u>model of Earth</u> (also called **geographical globe** or **terrestrial globe**).

- The <u>**earliest known example**</u> of the terrestrial globe was constructed **by Crates of Mallus** (who lived on the territory of modern-day Turkey) in the **mid-2nd century BC**.

- The <u>**oldest surviving terrestrial globe**</u> is the **Erdapfel** ("earth apple"), created in **1492** by Martin Behaim in Nuremberg, Germany. Overlaid with a meticulously painted map, it shows an enlarged Eurasian continent, an oversized Japan and an empty ocean between Europe and Asia.

- The world's <u>**largest geographical globe**</u> is the **Unisphere** in Queens, New York (12-story high!).
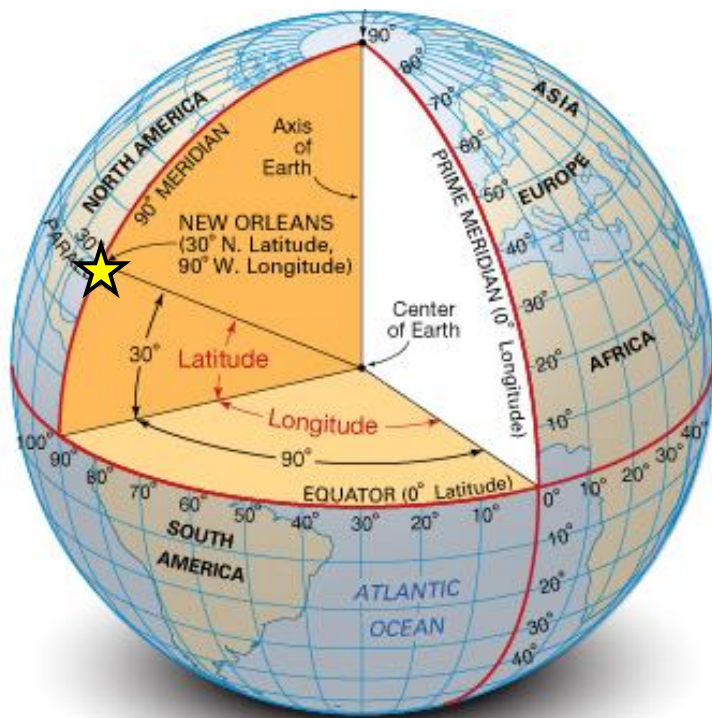

Erdapfel
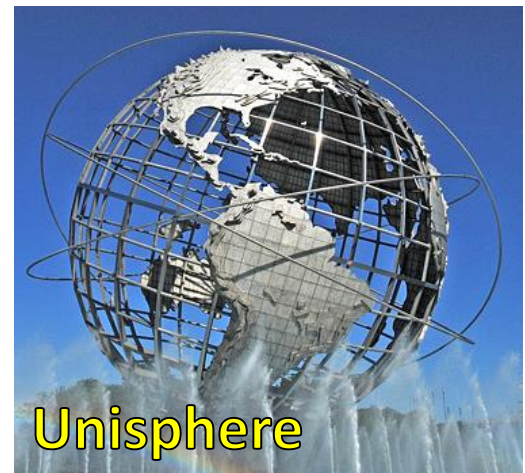
Unisphere

Coordinates on the Globe

- **Every <u>location</u> on Earth's surface can be specified by a set of numbers and letters using a <u>geographic coordinate system</u>.**

- **A common choice of coordinates is latitude and longitude, forming the *grid system*, and elevation.**
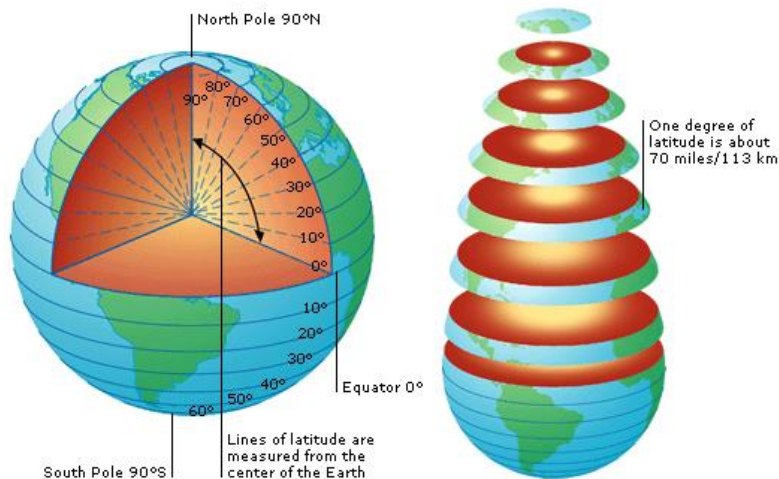

New Orleans, N30° W90°

Washington DC, N39° W77°

Latitude and Longitude

Latitude and longitude are measured in degrees (°) with submultiples of minutes (') and seconds (").

Latitude lines (parallels) run horizontally. They are parallel to and an equal distance from each other.


Zero degrees latitude is at the Equator. The latitude directions are <u>North (+)</u> and <u>South (-)</u>. North Pole is 90°N, South Pole is 90°S. Each degree of latitude corresponds to approximately 70 miles (113 km).

Longitude lines (meridians) run vertically, perpendicular to the Equator. They meet at the Poles and are spaced widest at the Equator.
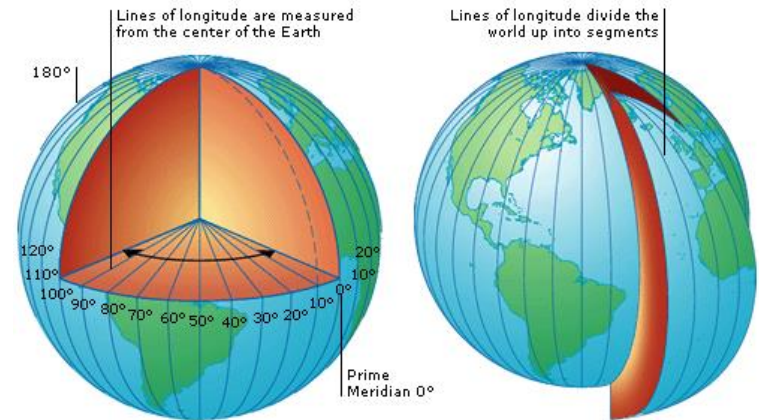
Zero degrees longitude is called the Prime Meridian (goes through Royal Observatory, Greenwich, UK). The longitude directions are <u>East (+)</u> and <u>West (-)</u>.
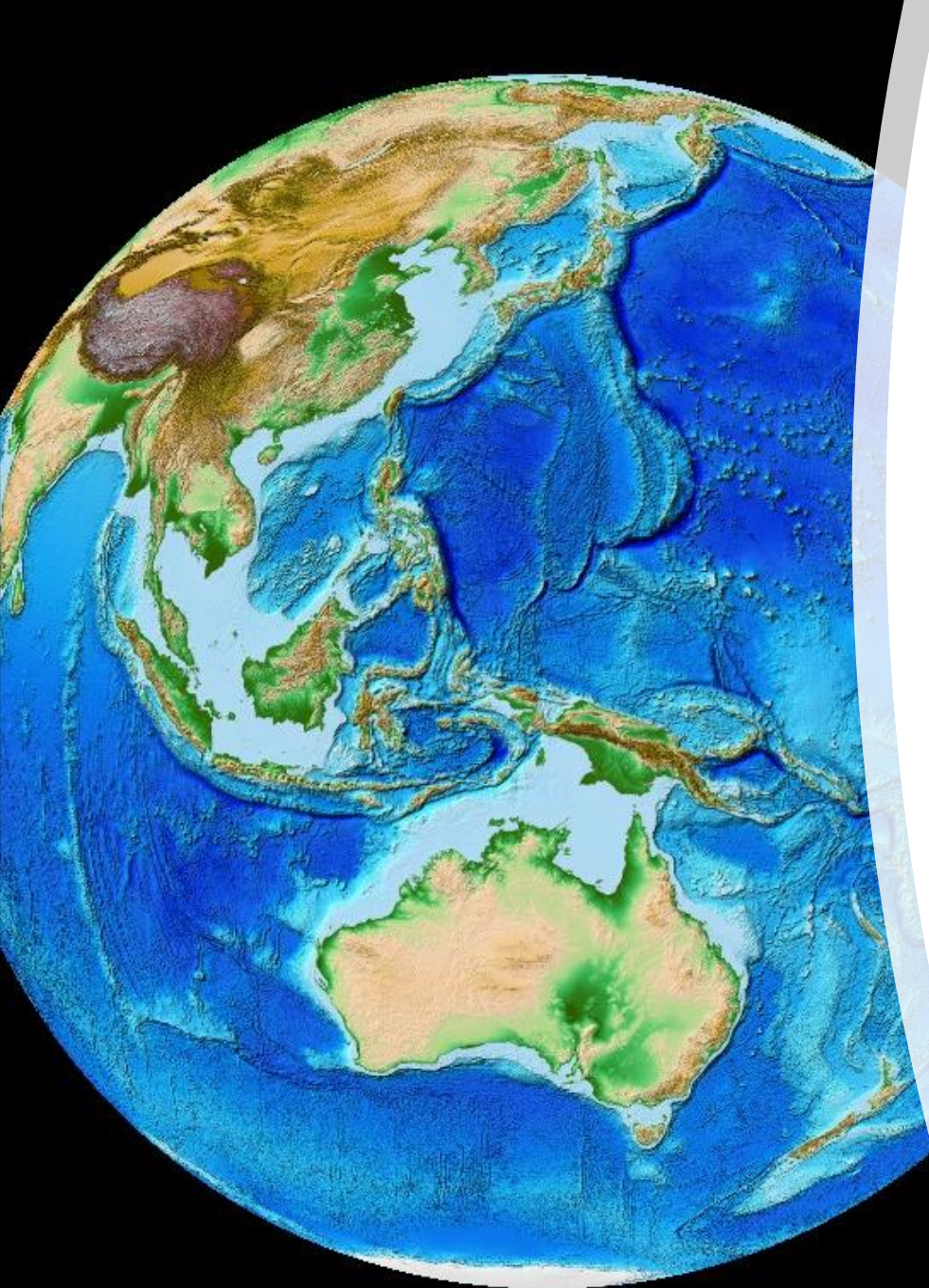
The elevation

of a geographic location is its height above (or below) a fixed reference point, most commonly the Earth's sea level.

- **The term "elevation" is mainly used when referring to points on the Earth's surface.**

  - **"Altitude" is used for points above the surface (an aircraft in flight or a spacecraft in orbit).**

    - **"Depth" is used for points below the surface.**

From Globe to Map

- A <u>map</u> is a graphic <u>representation</u> of geographic <u>information</u> on a <u>flat surface</u>.

- **Transferring** information <u>from the spherical</u>, or ball-shaped, surface of Earth <u>onto a flat</u> piece of paper is called **projection**.
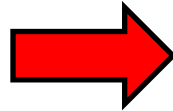
A <u>globe</u>, a spherical model of Earth, **accurately represents** the shapes and locations of the continents.
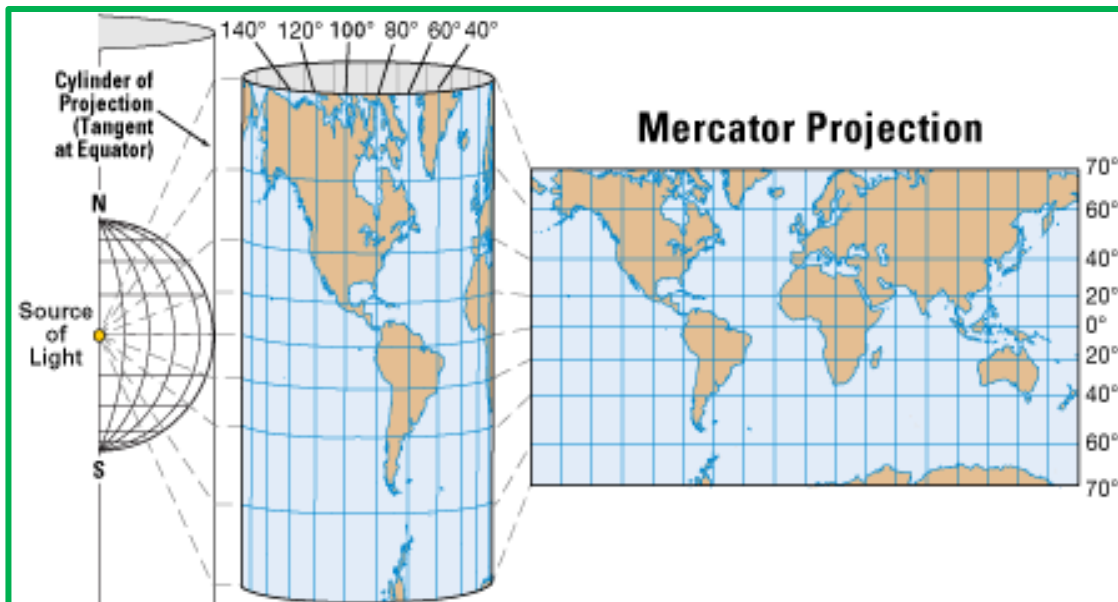
What about a <u>map</u>?

How do you…

(UN)WRAP IT?
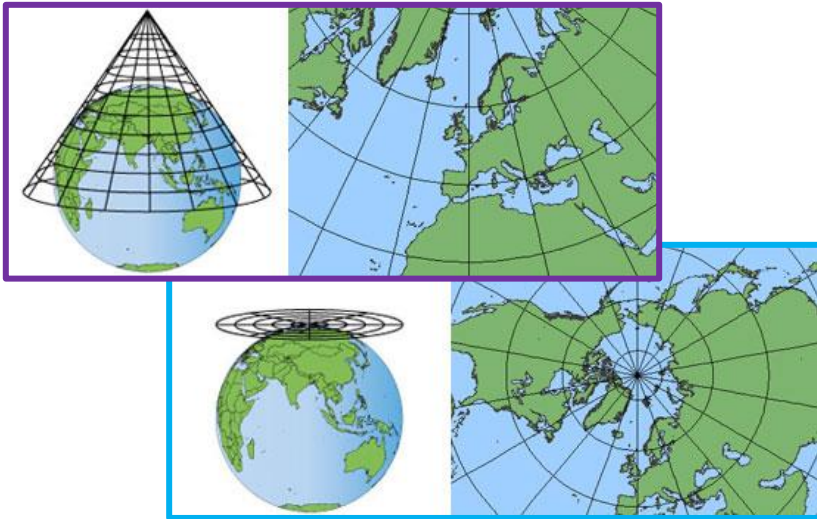
Map Projections

Projection is a **major challenge** for cartographers. Every map has some sort of **distortion**: it can retain *either* **the correct sizes** of landmasses *or* **the correct shapes** of very small areas, **but not both**.


- **Cylindrical** (Mercator): projection onto a *tube* that is wrapped around the globe and touches it along one line, most often the Equator (the regions **near the Equator** are the **most accurate**, regions **near the poles** are the **most distorted**).

More Map Projections

- **Conical**: projection on a flattened cone, with curved lines of latitude and straight meridians (great for mapping mid-latitudes, for example the US Map).

- **Planar**: projection onto a plane with a single point of contact (most accurate at that point; often used for maps of one of the poles).

- **Interrupted**: "orange-peel map" equal-area projection (preserves area measure, generally distorting shapes).

- **Winkel-Tripel**: compromise projection; it minimizes all three kinds of distortion - area, direction and distance.
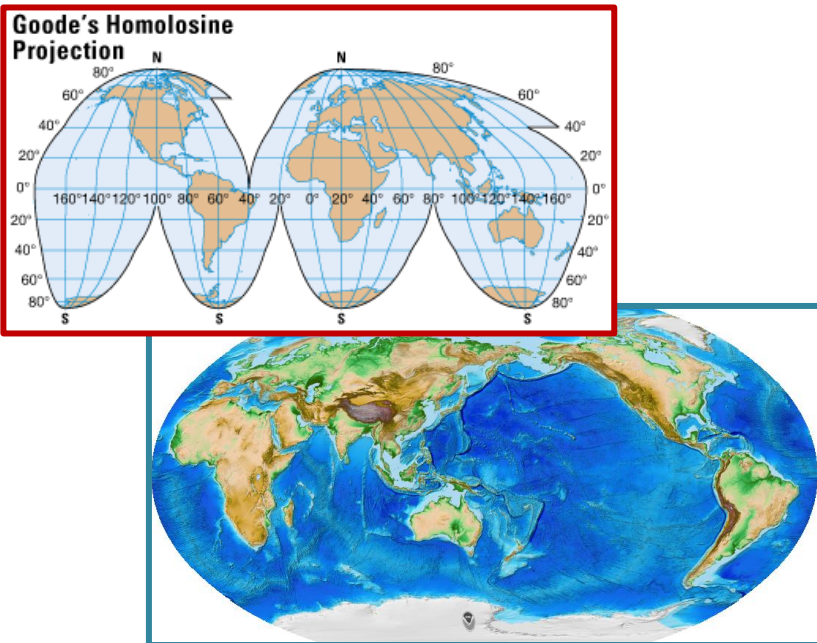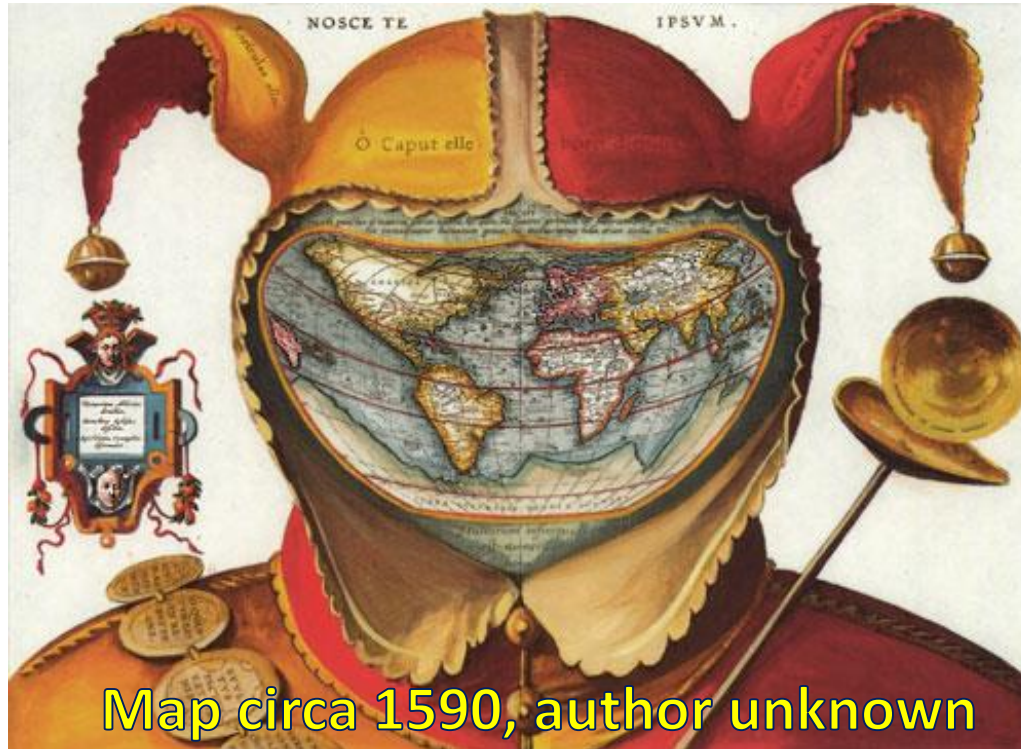
1679 Mercator Map of the World
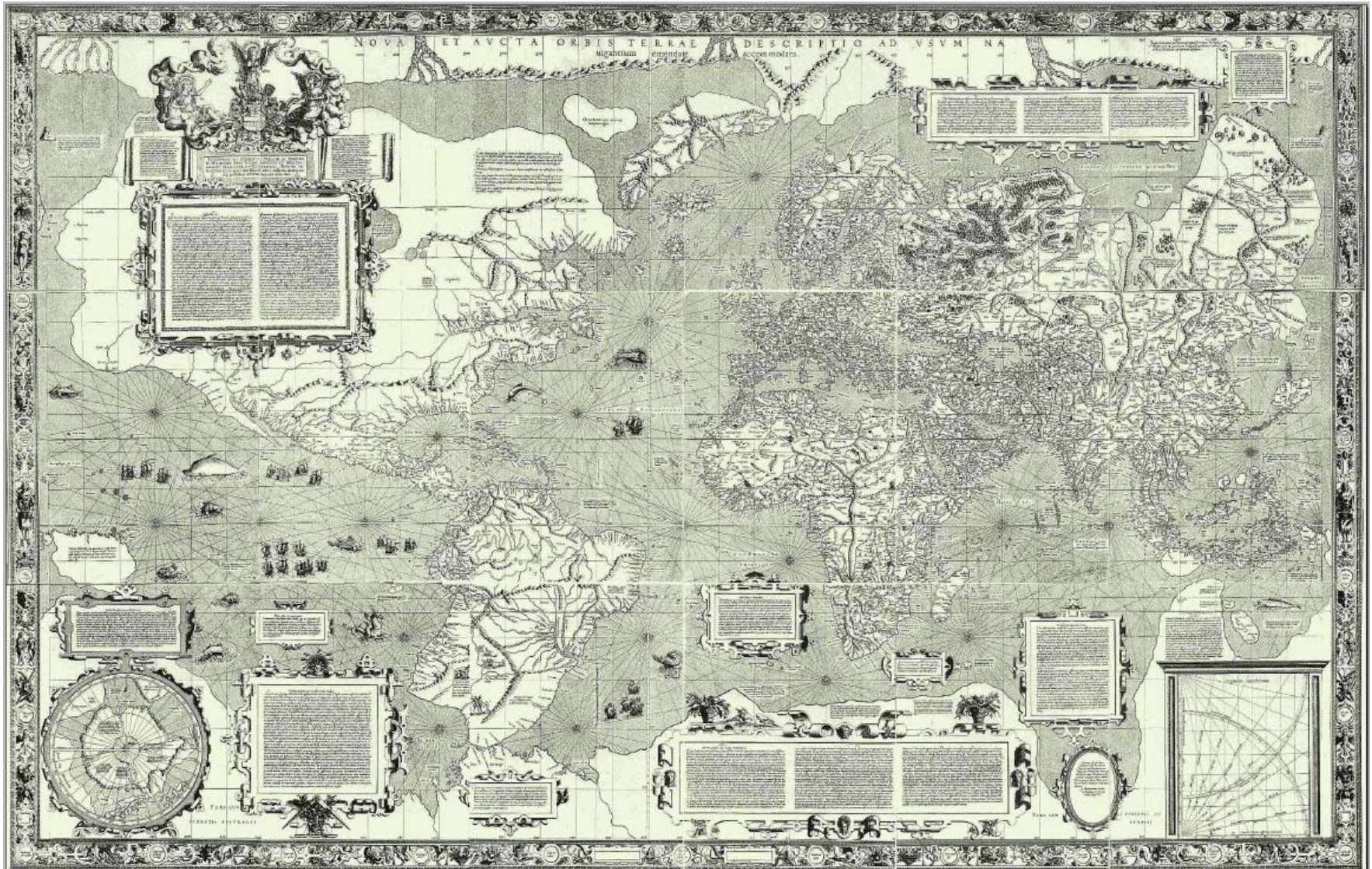
The Fool's Cap World Map

Are maps <u>realistic representations </u>of the actual world?

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Map circa 1590, author unknown

Not really!

A map can display *only* a *few selected features*, usually in *highly symbolic styles*.

All maps are estimations, generalizations, and interpretations of true geographic conditions, made according to certain basic assumptions which are not always true or verifiable.