

2. Shape, dimensions and motions of the Earth

Shape and dimensions of the Earth

Yet in ancient times, people knew the Earth had a **globular shape** (Aristotle, Ptolemy).

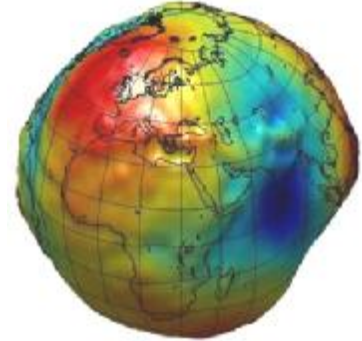
The Earth revolves around the Sun and rotates around its own axis. These 2 basic Earth's motions cause the **centrifugal force** which flattens the Earth on poles and inflates on the Equator.

The theoretical model of the Earth's shape is called **Geoid**. This model is the closest to the real shape of the Earth.

A little bit easier is **Spheroid** - mathematical model of the Earth.

average radius = approx. 6372 km
radius (poles) = 6357 km
radius (equator) = 6378 km
the length of equator = 40,000 km
area of the Earth = 510 mil. km²

Figure 1: Geoid



Globe is the simplest model of our planet (e.g. usage – School Globe of the World)

There is an **unequal amount of solar radiation** going onto the surface as a result of the Earth's globular shape. The highest amount of this is on the Equator and it decreases towards the poles. The consequence of this is the creation of **climatic regions and vegetation zones**.

Earth's motions

1. **Revolution around the Sun** – 365 days 5 h 48 min 46 sec (tropical year)

The Earth revolves around the Sun in **ellipse trajectory**. The speed of revolution and the distance from the Sun is not constant. The highest speed is in **perihelion** (the closest distance to the Sun) and vice-versa in **aphelion**.

The Earth is not perpendicular to its **revolution plane (ecliptic)** but has an angle of 66°30'. That's why the Equator has an angle with the ecliptic 23°30' at the point of **summer and winter solstice** - both of the **Tropics** (Cancer, Capricorn).

2. **Rotation around own axis** - 23 h 56 min 4 sec (sidereal day), 24 h (solar day)

The Earth rotates from the West to the East. It is constant angular speed of 15° is 1 hour.

24 time zones were created as a result of this.

GMT – Greenwich Meantime

CET – Central European Time

EET – Eastern European Time (in Slovakia during summer = seasonal time).

Keywords

globular shape, axis, centrifugal force, pole, equator, geoid, spheroid, globe, solar radiation, climatic region, tropical year, trajectory, perihelion, aphelion, revolution plane/ecliptic, spring/autumn equinox, summer/winter solstice, tropic of Cancer/Capricorn, sidereal day, solar day, angular speed, time zone, GMT, CET, EET

Figure 2: Spheroid

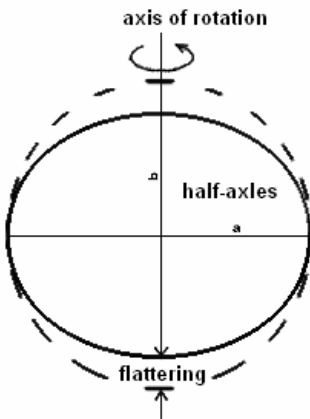


Figure 3: Comparison of real Earth's surface, geoid and spheroid

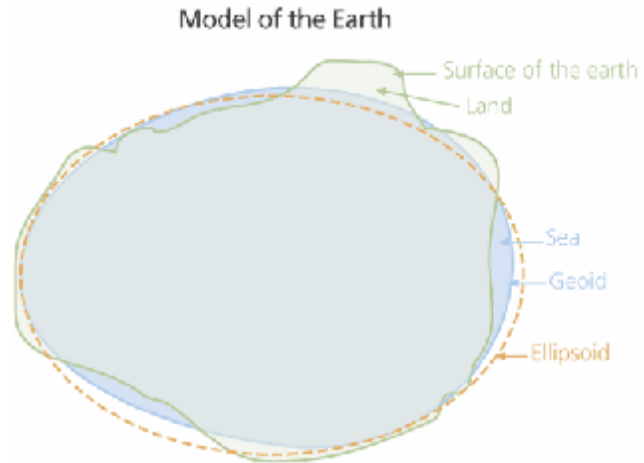


Figure 4: Revolution of the Earth around the Sun

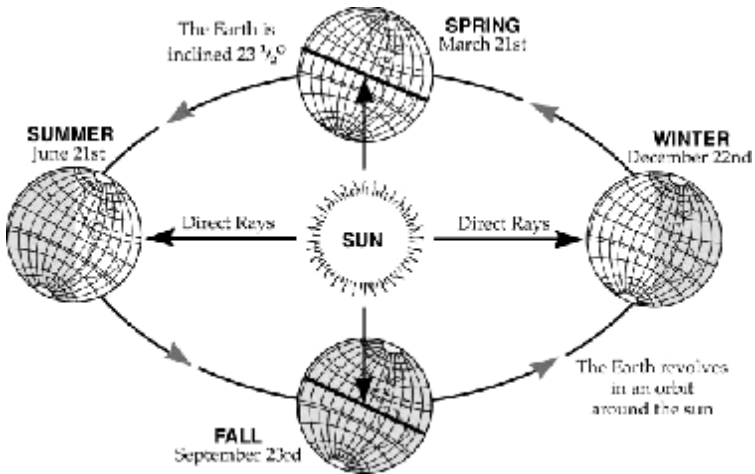


Figure 5: Rotation of the Earth

