

Spatial Reference Frames let us pinpoint locations on our planet while knowing that the Earth is ...

1. Round not flat
2. Constantly in motion with respect to plate tectonics

They take into account the shape and motion of the Earth by defining **positions (coordinates) and their rate of change (velocities)**.

I. POSITION is defined by a Coordinate system

For X, Y and Z values to make any sense, the starting point (0,0,0) from which they originate must be clear.

A. There are 3 types of coordinate systems

□□ **1. Geocentric coordinate system** – origin is at the center of the Earth. This is strictly theoretical and not commonly used.

□□ **2. Geographic coordinate system** – Latitude and Longitude (X,Y) originate from the Prime Meridian and Equator. Elevations (Z) measured heights at high and low tide are often described as mean sea level (MSL).

□□ **3. Projected (or Cartesian) coordinate systems** portray our round Earth on flat maps while minimizing distortion. They are the focus here.