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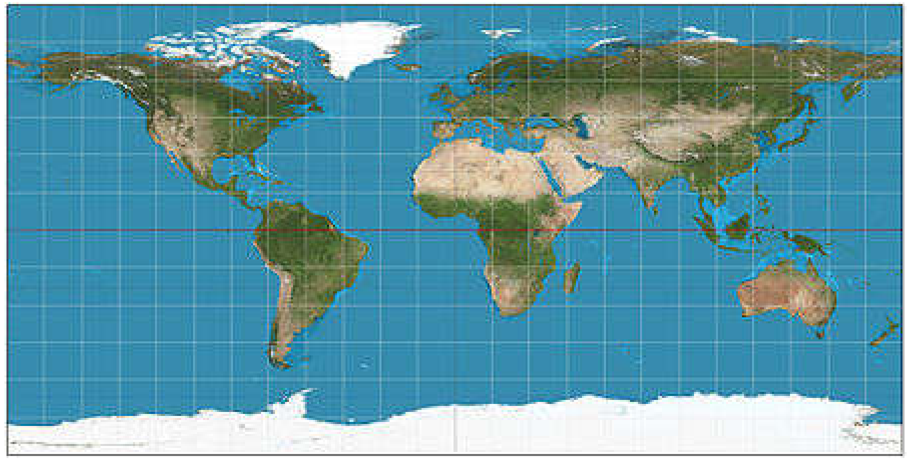
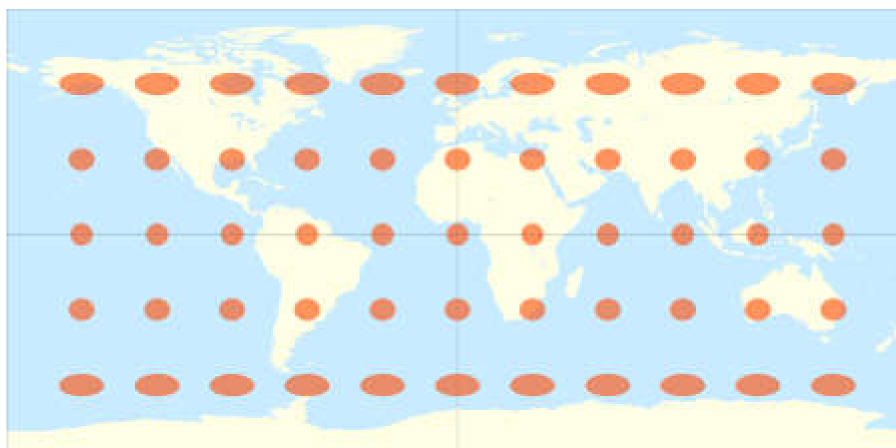
Equirectangular projection



Equirectangular projection of the world; the standard parallel is the equator (plate carrée projection).



The equirectangular projection with Tissot's indicatrix of deformation

The **equirectangular projection** (also called the **equidistant cylindrical projection**, **geographic projection**, or **la carte parallélogrammatique projection**, and which includes the special case of the **plate carrée projection** or **geographic projection**) is a simple map projection attributed to Marinus of Tyre, who Ptolemy claims invented the projection about AD 100.[1] The projection maps meridians to vertical straight lines of constant spacing (for meridional intervals of constant spacing), and circles of latitude to horizontal straight lines of constant spacing (for constant intervals of parallels). The projection is neither equal area nor conformal. Because of the distortions introduced by this projection, it has little use in navigation or cadastral mapping and finds its main use in thematic mapping. In particular, the plate carrée has become a standard for global raster datasets, such as Celestia and NASA World Wind, because of the particularly simple relationship between the position of an image pixel on the map and its corresponding geographic location on Earth.

Contents

Definition

The forward projection transforms spherical coordinates into planar coordinates. The reverse projection transforms from the plane back onto the sphere. The formulae presume a spherical model and use these definitions:

λ is the longitude of the location to project;
φ is the latitude of the location to project;
φ_1 are the standard parallels (north and south of the equator) where the scale of the projection is true;
λ_0 is the central meridian of the map;
x is the horizontal coordinate of the projected location on the map;
y is the vertical coordinate of the projected location on the map.

Forward

$$x = (\lambda - \lambda_0)\cos\varphi_1$$
$$y = (\varphi - \varphi_1)$$

The ***plate carrée*** (French, for *flat square*), is the special case where φ_1 is zero. This projection maps x to be the value of the longitude and y to be the value of the latitude, and therefore is sometimes called the latitude/longitude or lat/lon(g) projection or is said (erroneously) to be “unprojected”.

While a projection with equally spaced parallels is possible for an ellipsoidal model, it would no longer be equidistant because the distance between parallels on an ellipsoid is not constant. More complex formulae can be used to create an equidistant map whose parallels reflect the true spacing.

Reverse

$$\lambda = \frac{x}{\cos\varphi_1} + \lambda_0$$
$$\varphi = y + \varphi_1$$

See also

- List of map projections
- Cartography
- Cassini projection
- Gall–Peters projection with resolution regarding the use of rectangular world maps
- Mercator projection

References

1. *Flattening the Earth: Two Thousand Years of Map Projections*, John P. Snyder, 1993, pp. 5–8, ISBN 0-226-76747-7.

External links

- Global MODIS based satellite map (https://visibleearth.nasa.gov/view.php?id=57730) The blue marble: land surface, ocean color and sea ice.
- Table of examples and properties of all common projections (http://www.radicalcartography.net/?projectionref), from radicalcartography.net.
- Panoramic Equirectangular Projection (http://wiki.panotools.org/Equirectangular), PanoTools wiki.
- Equidistant Cylindrical (Plate Caree) in proj4 (http://proj4.org/projections/eqc.html)