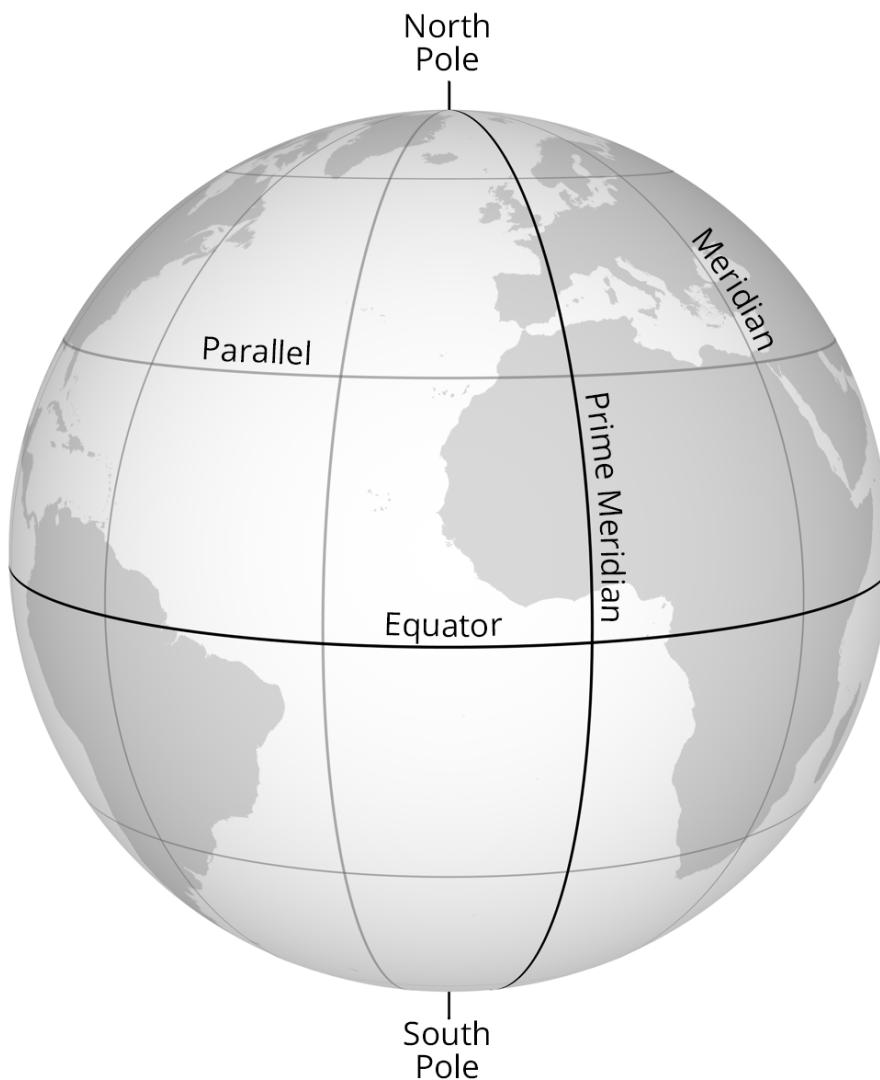


# FIT3179 Data Visualisation

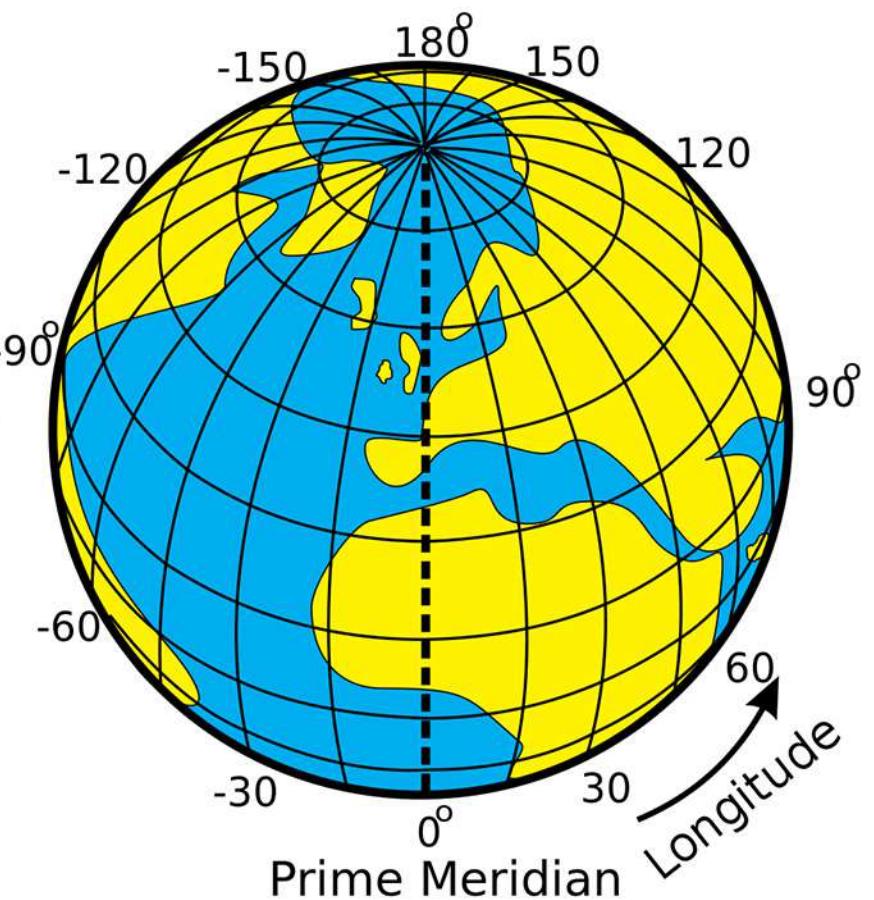
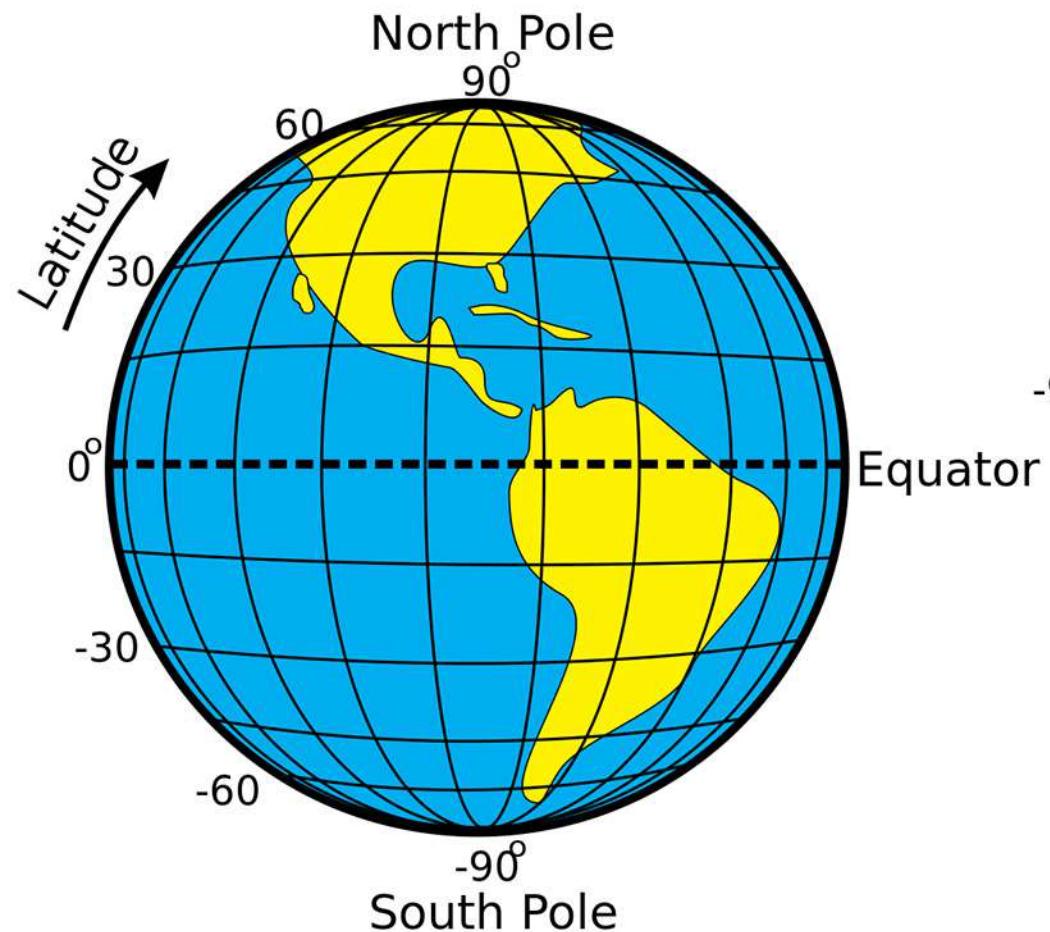
Week 07: Map Projections



# Poles, Meridians, Parallels



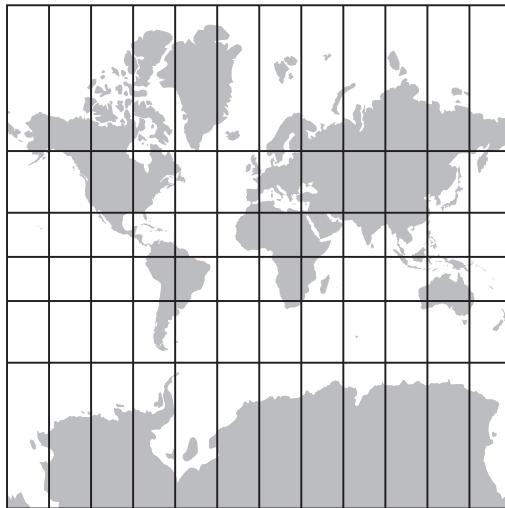
# Longitude and Latitude



- Map projection is the process of transforming spherical longitude/latitude coordinates to planar x/y coordinates.
- It is a mathematical definition:  
 $x = f_x(\text{lon}, \text{lat})$  and  $y = f_y(\text{lon}, \text{lat})$   
 $x$  and  $y$  are planar Cartesian coordinates on a flat surface,  
lon and lat are spherical coordinates.
- Not possible without distorting the spherical surface.



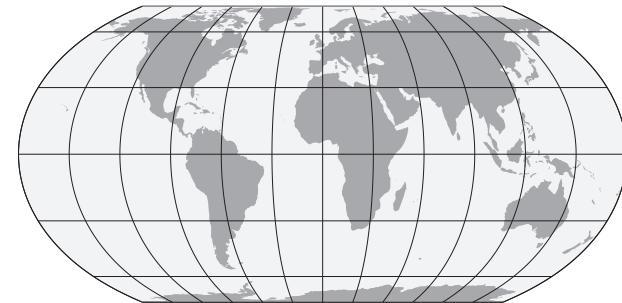
The relative **area** of objects or/and **angles** are distorted.



## Mercator projection

Example of an *angle-preserving* (or *conformal*) projection. Area is hugely inflated towards the poles. Not useful for showing the entire world.

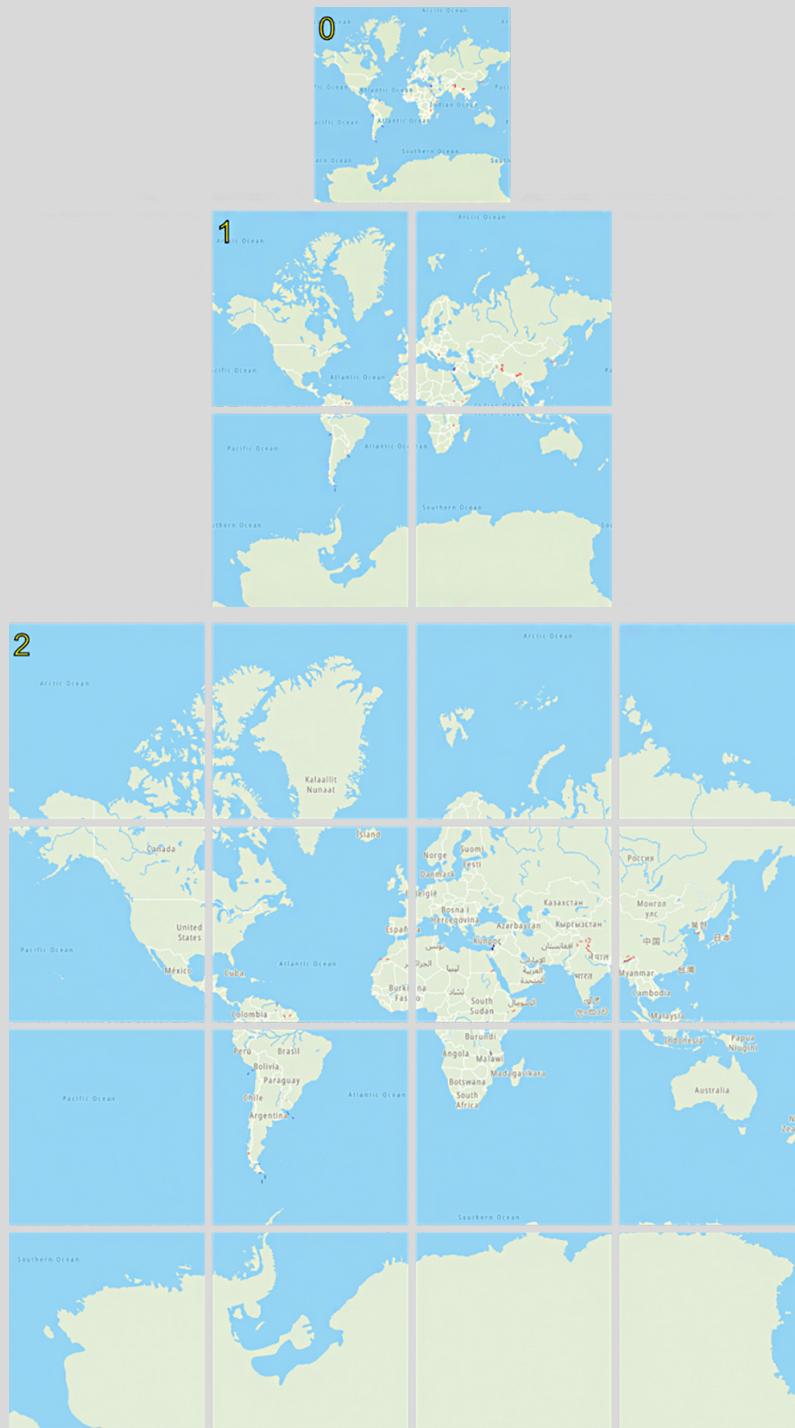
Specific to Mercator: Use for naval navigation, where bearings are measured on a *map showing a small section of the world*.

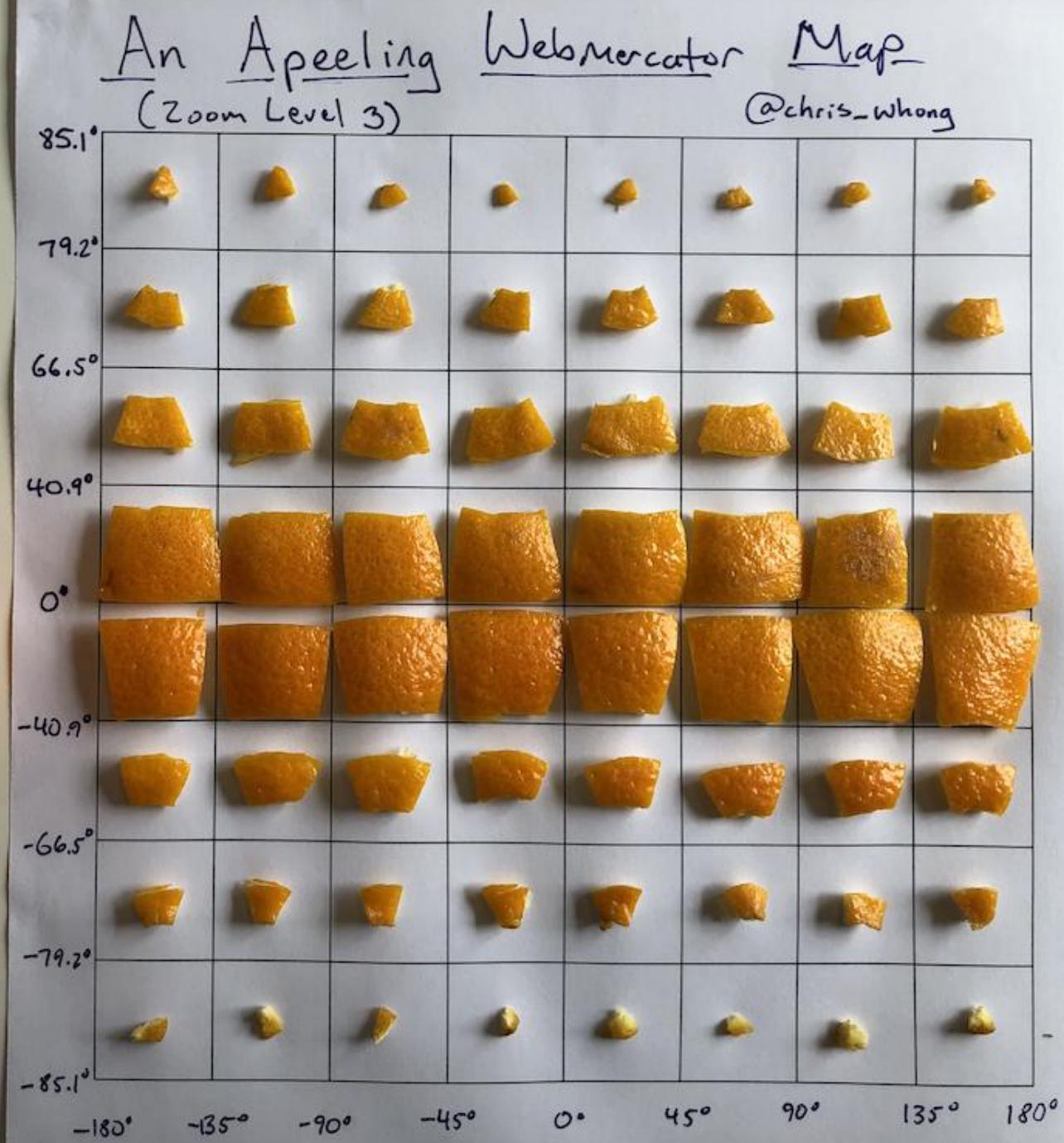


## Equal Earth projection

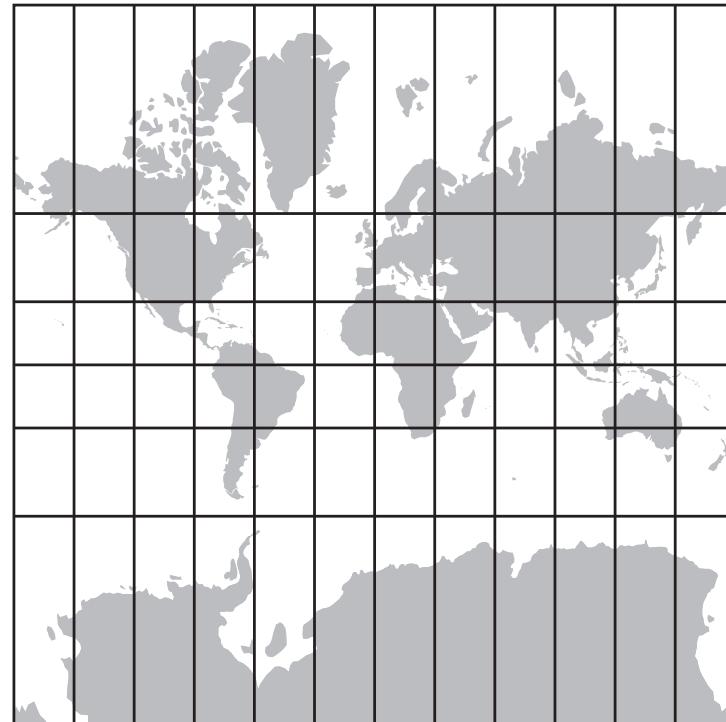
Example of an *area-preserving* (or *equal-area*) projection. Angles (and shapes) are increasingly distorted towards the border of the map. Useful when the size of areas is compared.

Specific to Equal Earth and other similar projections: Useful for showing the entire world.



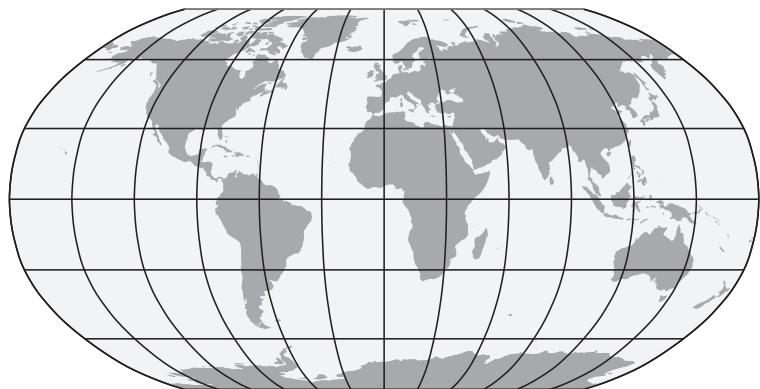


- Mercator is a poor choice for world maps.
- Tableau and Google Maps use Mercator.

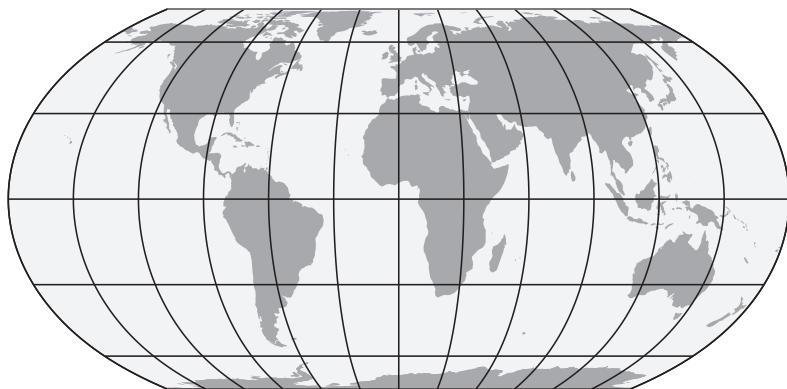


# Map Projections for World Maps

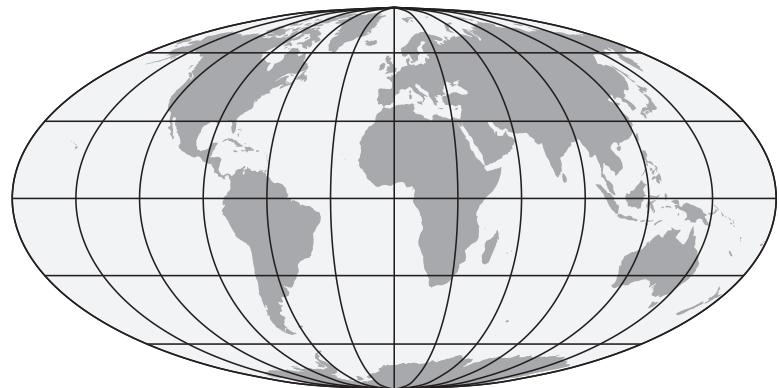
Robinson



Equal Earth



Mollweide



# Map Projections for Smaller Areas

## Developable surfaces

cylinder: cylindrical projection

cone: conic projection

plane: azimuthal projection

Developable surfaces are a conceptual model: project onto surface, then unwrap the surface.



# Map Projection Selection

- Use Projection Wizard to select a map projection
- <http://projectionwizard.org>



More information

Jenny et al. (2017). [A Guide to Selecting Map Projections for World and Hemisphere Maps](#)  
Šavrič et al (2016). [Projection Wizard – An online map projection selection tool](#)