MAP PROJECTION UG HONS. 2ND YEAR

Dr. Chandan Surabhi Ca Asst. Prof. in Geography Barasat Govt. College

Map projection

- IT is "the process of systematically transforming positions on the Earth's spherical surface to a flat map while maintaining spatial relationships.
- This process is accomplished by the use of geometry or, more commonly, by mathematical formulas.

MAPS Maps are a visual representation of the Earth's surface, drawn to scale and made for a specific purpose.



Each unique map projection serves a particular purpose.





Maps have four properties. When you take a round globe and "flatten" it, one or more of these properties will be "distorted."



Notice the size of Greenland compared to South America or Africa. In reality, it is about the size of Argentina.



Shapes are correct but sizes are distorted.



While it "looks" larger at the top, note how the distance between latitude lines increases

Projection	What is distorted	Disadvantages	Advantages (what is it used for)
Robinson	Compromises Polar Areas	Hard to see the poles	Shows minimal distortion. Used by schools
Mercator	Areas larger near the poles.	Greenland looks as large as South America	Shows true direction. Used by ships navigators.
Azimuthal	Latitude lines	Can't see the entire world on one map.	Used by airline pilots to plot the best route around the globe. 7



Mercator Projection



Gall-Peters Projection



Miller Cylindrical Projection



Mollweide Projection



Goode's Homolosine Equal-area Projection



Sinusoidal Equal-Area Projection

Robinson Projection

REMEMBER, THERE ARE HUNDREDS OF MAP PROJECTIONS, EACH USED FOR A SPECIFIC PURPOSE.















Transforming something spherical into something flat means that the 2-D image will never exactly represent what is visible in three-dimensions.

 Geographers use numerous mathematical equations to produce
Smap projections.

- Equal-area (or equivalent) projections: maps that maintain area but distort other properties.
- Conformal (or orthomorphic) projections: maps that maintain shape but distort other properties (it is impossible to have a projection that is both conformal and equal area).
- Azimuthal projections: maps that maintain direction but distort other properties.
- Equidistant projections: maps that maintain distance but distort
- other properties.

TYPES OF PROJECTIONS

Cylindrical map projection

- Useful for navigation because it maintains accurate direction
- Famous for their distortion in area that makes landmasses at the poles appear oversized

MERCATOR PROJECTION



Planar

Formed when a flat piece of paper is placed on top of the globe and, as described earlier, a light source projects the surrounding areas onto the map.

Either the North Pole or South Pole is oriented at the center of the map which gives the viewer the impression of looking up or down at the earth.

AZIMUTHAL PROJECTION

- The most simple conic projection is tangent to the globe along a line of latitude
- This is called a standard parallel for a projection
- The meridians are projected onto the conical surface, meeting at the apex
- Intitudes are projected as rings onto the conical surface

CONIC PROJECTION



Conical Projection Surface



CYLINDRICAL PROJECTIONS

- Cylindrical projections may also have one line of tangency o two lines of secancy around the globe.
- Mercator projection is one of the most common cylindrica projections, and the Equator is usually its line of tangency.
- Meridians are Geometrically projected onto the cylindrical surface, and latitude parallels are mathematically projected producing graticular angles of 90 degrees.
- For more complex cylindrical projections the cylinder is rotated thus changing the lines used for tangency Or secancy.

- The cylinder can be 'cut' along, any meridian to produce the final cylindrical projection.
- The meridians are equally spaced, while the spacing between parallel lines of latitudes increases toward the poles.

This projection is conformal and display true direction along straight lines.

Transverse Mercator uses meridians as their tangential contact line.

Oblique Cylinders are rotated around a great circle line located anywhere between the Equator and the meridians. In these complex projections most meridians and the lines of latitudes are not straight.

In all cylindrical projections, the line of tangency or lines of secancy have no distortion and thus are lines of equidistance. Other geographical properties vary depending on the specific projection

PROJECTION SURFACE



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- Conic (Albers Equal Area, Lambert Conformal Conic) - good for East-West land areas
- Cylindrical (Transverse Mercator) good for North-South land areas
- Azimuthal (Lambert Azimuthal Equal Area) good for global views

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TYPES OF PROJECTIONS

- Standard parallels and meridians the place where the projected surface intersects the earth – there is no scale distortion
- Central meridian on conic projects, the center of the map (balances the projection, visually)

SOME PROJECTION PARAMETERS



CYLINDRICAL PROJECTIONS (MERCATOR)







Oblique









<u>REFERENCES</u>

 MAP PROJECTION BY P. ROY
CARTOGRAPHY BY ROBINSON
MAP PROJECTIONS: A REFERENCE MANUAL BY L M BUGAYEVSKIY, JOHN SNYDER

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