

MAP PROJECTION SELECTION FOR GLOBAL AND REGIONAL RASTER DATABASES

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As computer processing capability has increased, researchers have expanded the scope of geographic analysis and modeling to include continental and global study areas. With the increased availability of high-resolution, global-scale raster data and geographic information system (GIS) software, researchers can easily combine data from many different sources and resolutions to implement analysis and modeling. However, the accuracy of such combinations is questionable, and recently it has been demonstrated that raster databases are difficult to project accurately. In fact, even equal-area projections distort areas of raster pixels and vary with resolution and latitude. To develop a solution to this problem and to enable accurate data to be used for global and regional modeling applications, the U.S. Geological Survey (USGS) is developing a decision support system for raster database projection. The system is based on empirical work within the USGS that examined 10 equal-area projections with global data for vegetation, precipitation, temperature, elevation, land cover, and population. The databases were depicted in all 10 projections at full global extent, and also were subset by continent, with each continent projected independently. Each of the datasets was projected to varying raster resolutions to determine the effects of various pixel sizes at different latitudes. Statistical tabulations of attribute values were compared across resolutions and across projections. The results are providing the basis for constructing the decision support system.