



Evaluation of Map Projection Systems for Iran

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Defining the best and most convenient map projection for each country is one of the most important tasks of mapping organizations. This paper aims to evaluate different equal-area and equal-distance map projections for the country of Iran in order to introduce the best projection and its parameters. Since Lambert Conformal Conic (LCC) map projection is usually used for mapping the entire country, the best parameters of LCC map projection are also derived. For comparing the equal area map projections, three equal-area systems (Albers equal area conic, Lambert azimuthal equal area and Cylindrical equal area) are chosen. Then, the area of all 7.5' by 7.5' tesseral cells (10404 cells covering the whole country) in each projection are compared with the exact area of the cells on the surface of the reference ellipsoid (WGS84). Statistical analysis of this comparison indicates the Cylindrical Equal Area as the best equal-area projection for Iran. The same analysis and comparison is accomplished to find the best circumference-preserving projection using the circumference of the cells instead of the area. Comparison is fulfilled implementing selected equal-distance projections (Equidistant Azimuthal, Equidistant Cylindrical and Equidistance Conic). The best equal area projection (Albers Equal Area Conic) is also added to the comparison. Results from analysis surprisingly show that Albers Equal Area Conic is the best in preserving the circumferences. Finally, the best parameters of LCC map projection for Iran are found based on statistical analysis on scale factor and meridian convergence computed for central points of the abovementioned cells selecting different standard parallels from 26N to 39N ($\phi_1=26:32.5$; $\phi_2=33:39$; step 0.5). Results indicated the 29N and 36N as the best standard parallels and 54.5E as the best central meridian for mapping the entire country by LCC.