



3-D Surface-area computation of the state of Jammu & Kashmir using Shuttle Radar Topographic Mission (SRTM) data in Geographical Information System (GIS)

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Abstract: In hilly areas like Jammu & Kashmir State, area computations based on planimetric representation can't be taken as representative of the actual ground reality as there are bumps, hills, depressions and valleys which lead to increased surface area as compared to planimetric area. The computation of the three dimensional surface area is extremely important for the hilly areas as it shall have far reaching implications on the entire planning process. While we know this fact for thousands of years, surface area and length calculations were practically impossible to apply to paper maps. However, mathematical processing in GIS can handle the calculations and we can generate 3-dimensional surface area of the hilly terrain and subsequently compute its realistic area. But, the main problem arises because of the non-availability of contour information at the desired level for generating the slope map.

In order to overcome the difficulty in generating the slope map, Shuttle Radar Topographic Mission data with a resolution of 90 m was used in the present study to generate the slope map of the state of Jammu & Kashmir. In the present study, the slope map of the State was generated and various equations were used to generate the three dimensional surface area for the State of Jammu & Kashmir. The outcome of the study was validated over a small area around Srinagar using SOI Spot Heights, 30 m ASTER elevation data and field observations.

Keywords: Planimetric, Synthetic Radar Topographic Mission, Digital Elevation Model, realistic surface area, slope angle, surface area factor.