

## **Abstract**

Watersheds as a complex set require to survey and analysis. Recognizing this object is an important principle in integrated management and created sustainable development. In order to real survey watersheds attribute is an inevitable to use digital elevation model (DEM) provided by suitable method with less error. This issue helps to know better in hydrologic and physiographic attribute of watersheds. The most important question is to change in DEM resolution, how to change values of this attribute. This research also studies the amount of effect of DEM resolution changes on hydrologic and physiographic attribute in Mazandaran western watersheds. The software applied in this investigation is as related assemblages which used output values of each other's until to get favorable results finally. First DEMs with 10m resolution was resampled using a nearest-neighbor algorithm to achieve models with resolution of (20, 30, 40, 50, 80 and 100) meter in PCI Geomatica. After digitizing, models imported to Surfer software and turned in to an X, Y, and Z ASCII type with CSV format. Then imported to Arc GIS software. Finally with changing models format to ASCII, imported to TAS software. The physiographic and hydrologic attribute derived from them. The effect of DEM resolution examined on the physiographic attribute including elevation, slope, profile curvature, plan curvature, wetness index and hydrologic attribute such as stream network and stream order, Bifurcation Ratio, drainage density, average of stream length and etc. The results analyzed by using t-test in 95% significant level. The maximum values of elevation and slope are found to decrease as DEM cell size increases and minimum values of them increased. The rate of Surface curvature, profile curvature and plan curvature diminished as DEM cell size increases. In spite of this parameters of wetness index increased with DEM cell size become coarse. The average of Sediment Capacity Index decreased with increasing in DEM cell size. In hydrologic attribute, with increase while DEM cell size, stream number in different orders, the stream order and drainage density reduced as well. Bifurcation ratios, average of stream length and stream slope have conflicted. . Plan curvature trends indicated that a 40 m DEM, as an optimum model for watershed selected that capable illustrates suitable results with minimum resolution. This research contributed useful results a bout quantifying effects of DEM resolution in physiographic and hydrologic attribute of watersheds.

**Keyword:** DEM, Resolution, Slope Gradient, Plan Curvature, western Mazandaran watersheds.



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