From Spot Heights to Cell Heights: the Data Structure and the Dynamics of the Digital Elevation Model

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SUMMARY

This paper notes the increasing growth of the use of the Digital Elevation Model (DEM) in Digital Terrain Analysis (DTA) and terrain characterizing and phenomenon modelling. It explores ongoing researches in the data structures and applications of the Digital Elevation Model. The different data structures of the Triangulated Irregular Network (TIN) and the grid Digital Elevation Model are presented. Sources of DEM data and their possible sources of errors and their accuracies are discussed.

One notable area where the DEM has been very successful in Digital Terrain Analysis (DTA) is in the area of delineating drainage routes and marking out sub-catchments. The scheme of this analysis is discussed. Processing the DEM produces the Flow Direction Grid, this is processed to determine the number of cells that their runoff will flow into a given cell, producing the Flow Accumulation Grid, and then the stream link grid is produced.

The paper points out that obviously the topographic content represented by the DEM is the most important factor in the terrain characterization and terrain phenomenon modelling such as stream and drainage route and ridge delineation, erosion modelling, flood risk potential simulation, etc. It is the DEM that is used in various Digital Terrain Analysis (DTA) of all branches of the geosciences. The paper then calls for the training of surveyors with the skills for developing the Digital Elevation Models and to apply the same.