Assessing the positional accuracy of spatial data in GIS environment.

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Abstract

Objects described in analog maps are considered all of similar quality, while spatial data of different origin and accuracy are usually integrated in GIS environment. The prevailing opinion expects digital data to be of higher quality than conventional map data, since they have a far broader range of applications and their technological advances enhance the quality of data. In addition, actual digital systems are capable of processing data more precisely than analog systems, but their comprehensive accuracy still depends on the accuracy of their source data, which in most cases remain analog. Finally, the introduction of GIS into mapping has produced a completely new user compared with traditional map user. This situation asks for identifying shared requirements for a coherent and accurate implementation of such systems, since determining the accuracy of digital data is difficult if using existing standards.

Seven components of spatial data quality were defined by the ICA Commission of Spatial Data Quality: positional accuracy, attribute accuracy, lineage, completeness, logical consistency, semantic accuracy and temporal information. In this paper we analyse such components,   with particular emphasis to the positional accuracy and the effects that errors of heterogeneous spatial data sources produce on the overall quality of a geographic database. The recent NSSDA (National Standard for Spatial Data Accuracy), issued by Federal Geographic Data Committee, allows to overcome this problem by providing a method for estimating positional accuracy of geographic data.

Then, we carry out a comparative analysis of the current approaches developed in this field and, finally, we perform a test of NSSDA procedure with the aim to measure and report the positional accuracy for a GIS that contains linear geographic features like roads and land cover boundaries.