Changes in topography of Cracow centre during the last millennium, Poland

Adam Lajczak and Roksana Zarychta
Department of Geoinformation and Environmental Research, Pedagogical University of Krakow, Cracow, Poland

In the investigations on changes of topography of historical town centres the attention is focused on estimation of the thickness of cultural layers and on determination of changes of land topography in selected small areas or along profiles. Less often the attention is focused on determination of spatial differentiation of these changes within larger parts of centres of historical towns. The aim of presentation is to reconstruct differences between paleotopography and modern topography of historical centre of Cracow, Poland, during the last millennium. The paleotopography studied represents situation before the 10th century without any significant human impact. The paleotopography was reconstructed using the published contour-line maps basing on archeological and geoengineering investigations and showing the roof of in situ fossil soil. The preliminary contour-line map represented a Digital Elevation Model (DEM) base map. DEM from aerial laser scanning (ALS DEM) shows the contemporary topography of Cracow centre. The application of selected morphometric indices makes it possible to describe quantitatively changes in spatial aspect in altitude, local relative height, slope, and aspect classes. The analysis of changes of values of the studied elements of topography shows that in the scale of the whole study area, the changes are directed towards the flattening of the area. In more local scale, the areas of flattening trends are adjacent to the areas of undulating trends.

Only few papers discuss the changes in town topography as the consequence of long lasting increase of anthropogenic deposits resulting in land flattening or undulation increase. These papers, however, do not consider the quantitative evaluation of many-sided character of this process. Similar remarks concern the papers on modern development of towns. Revealed in the newest literature positive vertical changes in the topography of Cracow centre which occurred during the last millennium show large spatial differentiation and range to over 10 m. In the older literature the value 5 m was so far suggested in the area of Old Town in Cracow. Other parameters of changes in Cracow topography studied by the Authors have never been considered in literature.