Geophysical Research Abstracts, Vol. 8, 04854, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04854

Tabula Hungariae (1528): Errors in mapping or surface evolution rearranging the watercourses?

B. Székely, G. Molnár, G. Timár

Space Research Group, Institute of Geography and Earth Sciences, Eötvös University, Budapest, Hungary (balazs.szekely@elte.hu, H-1117 Budapest, Pázmány P. sétány 1/a, Hungary)

The last decade has witnessed the increasing importance of environmental reconstructions based on archive maps. In these type of studies there is a trade-off between the age of the map (the older the better) and severity of the cartographic problems (the older the more problematic). For the Pannonian basin, Tabula Hungariae (1528) compiled by Lazarus and published by Tanstetter in Ingolstadt (Germany) is the first presenting a whole country in continental Europe. The map was already analysed cartometrically but so far it was not georeferenced in recent coordinate systems, therefore it was not possible to use it in quantitative studies.

In our approach several hundred settlements indicated in the map have been identified by their coordinates. Based on ground control point (GCP) dataset Lazarus' map has been rectified in the Hungarian National Projection System (EOV) using TIN warping technique. This procedure has corrected the map for the majority of the projection problems, and the map became well georeferenced in regional scale. The result proved the previous assumption that the drainage is extremely well mapped in Tabula Hungariae. No wonder, since at the time of the compilation, just two years after the combat at Mohács where Turkish forces have defeated the unified Hungarian forces, the military importance of the yet uncontrolled watercourses was extremely high.

Despite this accuracy in mapping the drainage, a number of 'errors' have been identified previously. One of the most obvious 'errors' is the lack of the Danube Bend, a conspicuous horseshoe-shaped gorge north of Budapest. Instead of that, there is an island indicated, not existing today. The map of Lazarus also suggests that the southern branch could be the main one at that time. Furthermore, the mouth of the river Ipoly

(today a direct tributary of the Danube) is to river Garam (today Hron, Slovakia), an upstream tributary of Danube.

According to our new rectification it is possible that the indicated island fits to a flat, conterminous area, named Nagysziget (i.e. ‘large island’ !) in some maps and it seems possible that previously the mouth of the Ipoly was separated with longitudinal sand bars or elongated islands making the impression in drier periods that Ipoly would be really a tributary of Garam in the alluvial part of the gorge. Aerial photographs support the previous existence of a former branch of Danube in the southern part of Nagysziget. Its extent may imply that it could host the main stream of the Danube. The area is now completely filled with sediments and is not inundated anymore. The sediments filling the former channel, however, were not yet dated.

This result would imply a 1-1.5 m incision in the Danube Bend in the last ca. 500 years. The incision rate would be in the order of magnitude of 2 mm/a (with 70% error).

In the light of the new studies on river terraces, geomorphic features and denudation rate estimates based on cosmogenic nuclides this rate seems to be feasible in this region. The integration of the aforementioned data implied accelerating incision.

If we take into consideration that previously repeated levellings yielded 1.5 mm/a recent crustal uplift rate, we conclude that our results fit to the concept of the increased and accelerating incision of this section of the Danube. Of the two possible scenarios (increased differential uplift or base level drop) it is not yet possible to decide which one can be validated.

These studies were carried out in the framework of projects T47104 (contribution No. 04) of the Hungarian National Scientific Fund (OTKA) and TP-277 of the Hungarian Space Office.