



Forest cover changes on the catchment of the Békény Creek (Gyergyó/Gheorgheni Basin, Eastern Carpathians) from the 18th century to nowadays

G. Timár (1), Cs. Galambos (2), G. Molnár (1) and Z. Czibalmás-Szabó (3)

(1) Space Research Group, Dept. of Geophysics, Eötvös University of Budapest, Hungary (spacerg@sas.elte.hu / Fax: +36 1 3722927 / Phone: +36 1 2090555 6651), (2) Hungarian Geological Institute, Dept. of Informatics, Budapest, Hungary (galambos@mafi.hu / Fax: +36 1 2510703 / Phone: +36 1 2206194), (3) School Center of Machinery Industry, Gyergyószentmiklós/Gheorgheni, Romania (ctivadar@kabelkon.ro; no other availability)

The Békény Creek, the trunk stream of the eastern part of the Gyergyó/Georgheni Basin, drains 120 sq kms in the Eastern Carpathians and the basin itself. It belongs to the Tisza water system at the Eastern part of the Pannonian Basin. Three quarters of the catchment area is in the high mountains. To west, the watershed is a thin stripe on the flatlands along the Maros River. In the satellite images, the alluvial fan of the Békény and the neighbouring creeks is clearly recognizable.

According to the local observations, the variance of the water level of the Békény Creek has been changed in the last decade: the high-water events became more frequent while the high water mark has risen. It is aimed to decide, whether this alteration is a consequence of the forest cover change on the catchment area.

Historical maps, the sheets of the first military survey of the Habsburg Empire (made in the decade of 1780s) were used together with modern satellite images, LANDSAT TM and ETM mosaic composites, taken around 1990 and 2000. In the first step, these geoinformatic databases have been reprojected to a unified map coordinate system. As the satellite mosaic was originally in UTM35/WGS84 system, it was an obvious selection that the historical maps should be converted also to this projection. The first survey had no standard geodetic base so this transformation has been made using ground control points. The average error of this conversion was about 120 meters, which is equal to eight pixels on the LANDSAT ETM coverage.

The result is that at the end on the 18th century, almost the half (precisely 49%) of the Békény catchment was covered by forests. This ratio has fallen to 45% at 1990. After the political changes in the early 1990s, the decrease quickened and the forest cover has fallen to cca. 37% in 2000. The slow change to 1990 can be considered a significant, although long-term effect. The quick deforestation in the last fifteen years is a striking environmental change and can be a primary cause of the recent floods. It should be noted that the Békény watershed is relatively small; according to our past analyses, larger parts of the Tisza water system cannot be effected so much by the deforestation.

The reseach was taken in the framework of the project TP198, supported by the Ministry of Informatics and Communication and the Hungarian Space Office.