Geophysical Research Abstracts
Vol. 13, EGU2011-8367, 2011
EGU General Assembly 2011

The classification of multiple window-size based sinuosity spectrum – a new evaluation method in river sinuosity calculation

Judit Petrovszki (1), Balázs Székely (1,2), and Gábor Timár (1)

(1) Eötvös Loránd University, Department of Geophysics and Space Science, Hungary, (2) Institute of Photogrammetry and Remote Sensing, Vienna University of Technology, Vienna, Austria

A new river sinuosity calculation method is introduced here for meandering rivers, by using the following data: sinuosity values were studied for major rivers in the Pannonian Basin in order to reveal neotectonic influence on their planform shape. The studied rivers were meandering before the main river regulations of the 19th century. The map sheets of the Second Military Survey of the Habsburg Empire were used to digitize the river planforms. The sinuosities of the rivers were calculated with different sample section size from 5km to 50 km. Depending on the bank-full discharge, also a 'most representative' section size is given, which can be connected to the neotectonic activity. In the Pannonian Basin 28 rivers were studied, and the connection between the fault lines of a neotectonic map and the river sinuosity was detected in 32 points, along 23 structural lines.

However, we need to know the main parameters of the rivers (e.g. the bank-full discharge) to define the 'most representative' sample section size. Using the classification, these parameters are not needed. An unsupervised ISOCLASS classification was carried out on these data, and the sinuosity values were divided into 5 classes. Because of the sinuosity calculation method, 25 kilometer-long river sections are missing at the two endpoints of the channel. So sometimes the rivers were not enough long for this method, or their displayed section did not get to the faults represented on the neotectonic map. Where the faults are crossing the rivers, the results are corresponding with the results of the sinuosity spectrum.

The results of the sinuosity calculations were scalars. It was a subjective way to divide the values into the categories (low, medium-low, medium, medium-high, and high). This new method effected whole numbers (1 to 5). These numbers were calculated from the sinuosity values, but were not equal to them. (The sinuosity values of most of the rivers were under 4, mostly between 1 and 3). In the results, the river-points on the two sides of the faults belong to different classes. Most of the points with certified neotectonic activity were along the Duna Danube), Tisza, Dráva (Drava), Száva (Sava), Garam (Hron), Maros (Mureş). Altogether 15 points were detected by using this new method.

The research is made in the frame of project OTKA-NK83400 (SourceSink Hungary). The European Union and the European Social Fund also have provided financial support to the project under the grant agreement no. TÁMOP 4.2.1./B-09/1/KMR-2010-0003.