A simplified gis-based model for large wood recruitment and connectivity in mountain basins

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During the last 50 years in the Alps the decline of the rural and forest economy and at the depopulation of the mountain areas caused the progressive abandon of the land in general and in particular of the riparian zones and the consequent increment of the vegetation extension.

On one hand the wood increases the availability of organic matter and has positive effects on mountain river systems. However, during flooding events large woods that reach the stream cause the clogging of bridges with an increase of flood hazard.

The approach to the evaluation of the availability of large wood during flooding events is still a challenge. There are models that simulate the propagation of the logs downstream, but the evaluation of the trees that can reach the stream is still done using simplified GIS procedures. These procedures are the base for our research which will include LiDAR derived information on vegetation to evaluate large wood recruitment extreme events.

Within the last Google Summer of Code (2014) we developed a set of tools to evaluate large wood recruitment and propagation along the channel network based on a simplified methodology for monitoring and modeling large wood recruitment and transport in mountain basins implemented by Lucía et 2014. These tools are integrated in the JGrassTools project as a dedicated section in the Hydro-Geomorphology library. The section LWRecruitment contains 10 simple modules that allow the user to start from very simple information related to geomorphology, flooding areas and vegetation cover and obtain a map of the most probable critical sections on the streams.

The tools cover the two main aspects related to the iteration of large wood with the rivers: the recruitment mechanisms and the propagation downstream. While the propagation tool is very simple and does not consider the hydrodynamic of the problem, the recruitment algorithms are more specific and consider the influence of hillslopes stability and the flooding extension.

The modules are available for download at www.jgrasstools.org. A simple and easy to use graphical interface to run the models is available at https://github.com/moovida/STAGE/releases.