Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03009, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03009
EGU General Assembly 2008

Quantitative applications of regional scale LIDAR imagery in fluvial geomorphology

B. Notebaert, G. Verstraeten, J. Poesen, G. Govers

Physical and Regional Geography Research Group, K.U. Leuven, Belgium
(Bastiaan.notebaert@geo.kuleuven.be / Phone: +32 16 326420)

Recently, LIDAR imagery has become a very attractive tool to provide detailed information on fluvial morphology. This is especially the case were high-resolution imagery is recorded during local case studies. However, for several regions, LIDAR imagery with less-optimal conditions is now available. Here we tested the possibility to extract quantitative information on fluvial morphology and fluvial dynamics from regionally available LIDAR images for the River Dijle (Belgium). Two regional LIDAR datasets with different quality were available for parts of the floodplain, with a small overlapping area.

Accurate RTK-GPS data were used as ground truth data for assessing the respective errors on both images. Error calculations included the assessment of the systematic and random error of both images. The more detailed LIDAR image appear to have a larger systematic error while the random error is comparable for both datasets. Changes in channel morphology were assessed from the LIDAR images (2003) and from topographical data obtained by level instruments in 1969. The results show an average increase of channel width with 3 meter between 1969 and 2003. A sediment budget of channel processes of a 1 km long river reach for the same period resulted in a total amount of river bank erosion of 16.1 10^3 m^3 and a total amount of within channel sediment deposition of 7.1 10^3 m^3, resulting in a net river erosion volume of 9.0 10^3 m^3. This corresponds with a net erosion rate of 0.4 Mg a^{-1} per meter river length. Sequential LIDAR images can in theory be used to calculate vertical sedimentation rates. However, incorporating the long term average floodplain sediment rates for the Dijle, a period of at least 20 year is necessary before height differences can be detected

on regionally available LIDAR images.