Geophysical Research Abstracts, Vol. 7, 00580, 2005
SRef-ID: 1607-7962/gra/EGU05-A-00580

Historical land use changes and their impact on sediment fluxes in the Balaton Lake, Hungary

W. Van Dessel (1), A. Van Rompaey(1), G. Jordan (2), P. Szilassi (3), G. Csillag (2), U. Fügedi (2)

1. University of Leuven, Department of Geography, Leuven, Belgium
2. Geological Institute of Hungary, Hungarian Geological Survey, Budapest, Hungary
3. Szeged University, Department of Geography,, Szeged, Hungary

wim.vandessel@geo.kuleuven.ac.be

The objective of this study was to investigate the link between historical land use changes in the catchment of the Balaton Lake, Hungary on the one hand and soil erosion and sediment export processes on the other. The shallow lake ecosystem, with its low chemical and biological buffer capacity is very sensitive to erosion and pollution effects coming from livestock-breeding farms, high rate of mineral fertilizers from arable land and the expanding towns on the shores of the lake. A sound understanding of relation between land use patterns and sediment fluxes is of dual importance. Firstly, it is important to know how a catchment will react on possible future landscape changes. Secondly, recorded erosion and sedimentation patterns may provide useful proxy data in case direct data on land use are not available. The Pécsely Basin, situated at the northern shore of Lake Balaton, was taken as an example application. The catchment has seen significant land use changes over the last 50 years as a consequence of changes to centrally directed economy after WWII, transition to market economy at the end of the eighties and becoming a member of the European Union in 2004. Land use changes were recorded on aerial photographs from 1958, 1978 and 2002 and satellite images of the last 15 years. This information was used as an input for WaTEM/SEDEM, a spatially distributed soil erosion model. The results were calibrated using measured suspension load data in rivers. Next, a transition probability model was used to generate future land use scenario's, which allowed the prediction of possible future sediment fluxes. The results show that the geomorphic response to

land use changes is non-linear and that a prediction of the exact location of land cover type is equally important as the prediction of the total volume of a given land cover type. This last finding stresses the need for a further development and validation of spatially explicit land use change models.