



The importance of Sediment Yield as a Desertification Indicator

Matthias Vanmaercke (1,2), Jean Poesen (1), Willem Maetens (1), Joris de Vente (3,4), and Gert Verstraeten (1)

(1) K.U.Leuven, Earth and Environmental Sciences, Heverlee, Belgium (matthias.vanmaercke@ees.kuleuven.be), (2) Fund for Scientific Research—Flanders, Belgium, (3) Estación Experimental de Zonas Áridas, EEZA-CSIC, Desertification and Geocology Department, Almeria, Spain, (4) School of Geosciences, University of Aberdeen, Aberdeen, UK

Soil erosion is often regarded as one of the main processes of desertification. This has led to the use of various desertification indicators that are related to soil erosion. Most of these indicators focus, however, on small spatial units, while little attention has been given to the mass of sediment exported at the catchment scale. Such a small spatial unit approach neglects the transfer of sediment through catchments as well as the scale-dependency of erosion processes. Furthermore, this approach does not consider important off-site impacts of soil erosion, such as sediment deposition in reservoirs, flooding and ecological impacts.

This study aims to illustrate the importance of considering catchment sediment yield (SY) in desertification assessment studies such as the EU-funded DESIRE project. Based on recently established databases of SY and plot soil loss rates in Europe and examples from previous studies, we illustrate that soil erosion rates at the plot scale are not always representative for catchment SY, as they are often several orders of magnitude smaller. Also, the erosion response of catchments to changes in land use or climate often differs strongly from responses to those changes at the plot scale. We further discuss several of the impacts of SY and their link with desertification: i.e. the sedimentation of reservoirs, problems related to flooding, catchment hydrology, export of nutrients and ecological implications.

Using earlier established criteria we evaluate the potential for using catchment SY as a desertification indicator and conclude that this could give an important added value to desertification studies. SY, used in combination with other indicators, allows the identification of other sediment sources than those considered at the plot scale and can reflect the results of desertification processes over longer time periods than periods over which assessments at the plot scale have been made. We argue therefore, that SY is a strong complementary indicator for desertification, providing valuable information on the catchment response to changes in drivers of desertification.