Geophysical Research Abstracts,
Vol. 10, EGU2008-A-12236, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-12236
EGU General Assembly 2008

Evaluating the role of buffer strips in arable catchments using fallout radionuclide tracers

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The on and off-site effects of soil erosion and consequent economic costs are well documented. Sustainable soil management has received increased attention in light of the European 2003 Common Agricultural Policy reform and Water Framework Directive. In the UK, the Environmental Stewardship and Catchment Sensitive Farming schemes encourage implementation of soil conservation and sediment retention practice, e.g. buffer strips, which can be demanding on the knowledge and skills of farmers and farming advisors. This has highlighted a national dearth of comparative information on sediment yields from land employing buffer strips and there is little hydrological data, in the UK context, to evaluate the benefits or to demonstrate the optimum size of buffers for specific slope conditions. The present study has adopted a combined tracing and modelling approach to fill this gap. Here, preliminary hillslope-scale sediment budgets for a steep market vegetable field, susceptible to surface soil erosion, are presented. Historically, the field has been unbuffered with high slope-channel connectivity. More recently, a 6 m grass buffer strip was installed to reduce slope-channel connectivity. Consequently, hillslope sediment budgets have been developed for the medium-term (40 years) using the ^{137}Cs budgeting technique and short-term (event) using the ^{7}Be technique, with focus on sediment retention within the buffer feature. Short term sediment yields for the buffered landscape are interpreted in the context of medium-term average annual data, which reflect the unbuffered landscape. Data will further be used to test existing sediment yield models which can be used to predict the benefit of more widespread buffering within the subcatchment. Quantitative evaluation of conservation measures is essential for informed catchment management

and the protection of downstream ecosystems and water resources in agricultural river basins.