

Using ^{137}Cs measurements and sediment yield monitoring to document catchment-scale sediment dynamics and budgets

JEAN P. G. MINELLA¹, GUSTAVO H. MERTEN², DESMOND E. WALLING³ & MICHELE MORO²

1 Department of Soils, Federal University of Santa Maria; 97105-900, Santa Maria, Brazil
jminella@smail.ufsm.br

2 Institute of Hydraulic Research, Federal University of Rio Grande do Sul; 91501-970 Porto Alegre, Brazil

3 Department of Geography, University of Exeter; Amory Building, Rennes Drive, Exeter EX4 4RJ, UK

Abstract The rapid expansion of agriculture in Brazil has increased erosion rates and sediment yields, causing many negative environmental and economic impacts. Given the need to reduce the negative impacts, there is an important need for studies that assess the response of catchment sediment dynamics and budgets to soil and water conservation practices. ^{137}Cs measurements have been combined with measurements of sediment yield, to study the sediment dynamics and budget of a small (1.19 km²) rural catchment in southern Brazil. ^{137}Cs measurements have been used to estimate medium-term erosion and deposition rates along 17 transects in tobacco growing areas. These data have been used to estimate sediment mobilization rates from the cultivated areas subject to significant erosion. By combining the information on sediment mobilization and deposition rates provided by the ^{137}Cs measurements with available measurements of sediment yield, a sediment budget for the catchment has been established.

Key words soil erosion, sediment yield, tobacco cultivation, Brazil, catchment management, caesium-137