

Evaluation of two sediment tracers under simulated rainfall

PETER STRAUSS¹, GEMA GUZMAN², AXEL MENTLER³, ROSEMARIE HÖSL¹, SHENGPING WANG⁴, JOSE ALFONSO GOMEZ² & ZHIQIANG ZHANG⁵

1 Federal Agency for Water Management, A-3252 Petzenkirchen, Austria

peter.strauss@baw.at

2 Institute for Sustainable Agriculture-CSIC, 14080 Cordoba, Spain

3 University for Natural Resources and Life Sciences, 1190 Vienna, Austria

4 North China Electricity Power University, Beijing 102206, P. R. China

5 Beijing Forestry University, Beijing 100083, P. R. China

Abstract A number of different tracing approaches have already been established, including the use of rare earth oxides or environmental radionuclides. However, since existing techniques face various limitations, the search for alternative procedures continues. Two alternative tracing approaches involve the use of organophilic clays and magnetic iron oxides. This study performed a combined test of these tracers to assess potential contrasts in their behaviour under a controlled rainfall simulation experiment. The experiment consisted of a simulated rainfall event of 55 mm·h⁻¹ applied to a bed–shoulder system (2 × 1.14 m). The results highlighted differences between the tracers in terms of their enrichment in sediment and different soil aggregate classes. Comparison of the contribution of the different plot sections to the total sediment export using both tracers suggested that most of the sediment originated from the shoulders.

Key words erosion; tracer; magnetic iron oxide; rainfall simulation; organophilic clays