

Publication

Assessment of soil erosion and deposition rates in a Moroccan agricultural field using fallout 137Cs and 210Pbex

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In Morocco land degradation - mainly caused by soil erosion - is one of the most serious agro-environmental threats encountered. However, only limited data are available on the actual magnitude of soil erosion. The study site investigated was an agricultural field located in Marchouch (6 degrees 42' W, 330 degrees 47' N) at 68 km south east from Rabat. This work demonstrates the potential of the combined use of Cs-137, Pb-210(ex) as radioisotopic soil tracers to estimate mid and long term erosion and deposition rates under Mediterranean agricultural areas. The net soil erosion rates obtained were comparable, 14.3 t ha(-1) yr(-1) and 12.1 ha(-1) yr(-1) for Cs-137 and Pb-210(ex) respectively, resulting in a similar sediment delivery ratio of about 92%. Soil redistribution patterns of the study field were established using a simple spatialisation approach. The resulting maps generated by the use of both radionuclides were similar, indicating that the soil erosion processes has not changed significantly over the last 100 years. Over the previous 10 year period, the additional results provided by the test of the prediction model RUSLE 2 provided results of the same order of magnitude.Based on the Cs-137 dataset established, the contribution of the tillage erosion impact has been evaluated with the Mass Balance Model 3 and compared to the result obtained with the Mass Balance Model 2. The findings highlighted that water erosion is the leading process in this Moroccan cultivated field, tillage erosion under the experimental condition being the main translocation process within the site without a significant and major impact on the net erosion. (C) 2012 Elsevier Ltd. All rights reserved.

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