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Erosion and non-point-source pollutants simulation in catchments of the largest natural lagoons of Pico island, Azores

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The objective of this study is to assess the erosion and non-point-source pollution in the catchments of the five major natural lagoons in the Island of Pico, Açores. The water erosion and non-point-source pollutants are influenced by the rate of precipitation, type of soil, slope and length of the hillsides, as well as by the vegetation cover and land management. The catchments under study are located at an altitude ranging from 780 and 1010 m, the respective surface areas range between 13,3 and 183 ha, and slopes are steep. The soils are andosols of recent volcanic origin and have chemical and physical properties different from those of common soils due to the presence of allophane and to the respective processes of soil formation. The vegetation cover is dominantly permanent pasture but also occur bushes and trees such as *Erica azorica*, *Rubia agostinhoi*, *Juniperus brevifolia*, and *Cryptomeria japonica*. The rainfall regime is influenced by the oceanic conditions prevailing at medium latitudes, the altitude and the exposition to wet fronts. The 3 years averaged annual precipitation relative to the period 2003/04 - 2005/06 ranges between 3650 and 5355 mm, with a daily maxima of 250 mm/day.

To assess the erosion and non-point-source pollution in the catchments the OPUS

model was used. It was formerly calibrated and parameterized for various andosols of Azores and for different vegetation cover conditions. The model OPUS uses the curve number (CN) method for the quantification of the daily runoff and the MUSLE approach for simulation of erosion and transport of sediments. The nutrient simulation in Opus is done with the “Century” organic-matter model. Former calibration for N mineralization and nitrates simulation as well as for phosphates have been also performed.

Results obtained show that the hydrologic and erosion regimes of the catchments highly depend upon land use and management. When bushes and trees are predominant and where vegetation is not under animal grazing, surface runoff is small, with insignificant erosion and nutrients transport. In basins with permanent grazed pasture, some erosion is observed due to the animal disturbance of surface aggregates; where the use of fertilizers is heavy, nutrient transport to the lagoons is detected. Results allow building-up related best management practices aimed at conservation of ecological conditions in the lagoons.