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Applying the Fuzzy ARTMAP neural network for mapping erosive status in the Ria Formosa catchment (Portugal)

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The study of the soil erosion risk is the starting point for development and sustainable land management. The intensity of soil erosion risk is conditioned by soil erodibility, slope, land use and vegetation cover.
The objective of this work is mapping the erosive status of the Ria Formosa catchment using "Fuzzy ARTMAP" neural network.
The study area is the catchment of Ria Formosa, which includes a shallow coastal lagoon with an area of about 16000 ha located in Algarve (southern Portugal). It is protected by EU and national laws, and is classified as a wetland of international importance under the RAMSAR convention.
Previously to the construction of the artificial neuronal network model, it was necessary to establish the training areas (< 1% of total study area) in order to get information about lithofacies, land use, slope and the percentage of vegetation cover. These variables were assessed by supervised classification.
Five classes of erosive status were obtained by the artificial neuronal network. These classes were compared with the map of erosive status elaborated with the methodology proposed by the Priority Action Plan/Regional Activity Centre (PAP/RAC, 1997). The differences between both methods were about 1% of the total area. Both maps were validated with field observations and analysis of aerial photographs.