



Sand beaches and soil erosion in São Miguel island (Azores - Portugal)

P. Borges(1), C. Andrade(2), **J. Fontiela**(3), M. C. Freitas(2)

(1)Universidade dos Açores, Departamento de Geociências, Rua da Mãe de Deus, Apartado 1422, 9501-801 Ponta Delgada, Portugal; (Email: pb@uac.pt); (2)Universidade de Lisboa, Faculdade de Ciências, Centro de Geologia e Departamento de Geologia. Bloco C-6 3º Piso, Campo Grande, 1749-016 Lisboa, Portugal; (3)Universidade dos Açores.

An empirical method, previously tested at Ria Formosa mainland Portugal with success, was used to evaluate the relative intensity and distribution of soil erosion by water across the whole of the São Miguel island, Azores. For that purpose, a restricted number of fundamental variables of the soil erosion system were selected - surface slope, drainage density, vegetation cover and lithology - and four 1000 x 1000 m gridded thematic maps were elaborated, each one corresponding to the surface distribution of one of the variables mentioned. Each individual surface cell of the island is therefore characterized by four attributes, of both quantitative and qualitative nature, and a numerical value was assigned to each attribute, describing its relative performance in controlling the intensity of erosion. These values were rank-ordered to make sure that correspondence existed between higher rating and increasing vulnerability to erosion. Following a standardization procedure, required to remove bias resulting from different ranges between extreme values of each attribute, the variables were aggregated using an additive criterion. In this way, an index describing the potential soil erosion of São Miguel Island was obtained and the surface distribution of the index plotted in the form of a potential erosion map. This representation allowed the delimitation of the most relevant source areas of sediment to the littoral fringe that were further compared with information on the sand-producing potential of the soil and rock outcropping in each cell. Indeed, results suggest a close association between the larger concentration of sandy beaches in the coast of São Miguel and the watersheds in the central region

of island, which are characterized by maximum indexes of potential erosion.