

SOIL CHARACTERISTICS AND PERMAFROST DISTRIBUTION IN THE SOUTH SHETLAND ISLANDS

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Soils developed under wet environmental conditions in ice-free areas of the South Shetland Islands (maritime Antarctic) are characterized in this study. Representative soils corresponding to different lithological and altitudinal contexts have been sampled. The following main soil properties were analysed: pH, electrical conductivity, carbonate content, bulk density, granulometric fractions and soil texture, soil fertility indicators and elemental composition. The geochemical and mineralogical compositions indicate a close relation with the parent materials in the study area. Main soil processes are related to freezing-thaw cycles taking place within the soil active layer. The results differ among the soils in the different morphoedafic environments indicating the influence of the physiographic conditions and lithological composition.

The occurrence of permafrost and its geographical distribution is also described. At depths between 25 and 75 cm direct observations of permafrost have been made at several sites and its presence has been deduced in others by considering the distribution of associated landforms. Continuous permafrost occurs above 30 m a.s.l., being discontinuous below the mentioned altitude and existing only in special circumstances close to the sea level, pointing out the importance of altitude and topography in its distribution. It has been stated that permafrost in combination with freezing-thaw cycles and active layer and wetting-drying processes also play an important role in weathering mechanisms. Soils are a record of past and present conditions being a source of information about environmental changes and can provide useful data for evaluating climate change effects.