

Lithological controls on soil geochemistry in Lesvos island, Greece

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Soil geochemical mapping plays a crucial role in mineral exploration and environmental studies aiming to interpretation of the spatial variation of chemical elements and compounds at different sample densities and map scales depending on the objectives of the project. The composition of surface soil is the result of complex processes, with the lithological background exerting a strong influence on soil geochemical composition. Here, we present the soil geochemical characteristics in the unique island of Lesvos (NE Greece) that exhibits a complex geological structure with different kind of rocks occurring on island's surface. The geology of Lesvos comprises a schist-marble unit, a volcanosedimentary unit including metabasalts, metagabbros and schists, the ultramafic unit, whereas the largest part of the island is covered by lower to Middle Miocene volcanic rocks. Various types of mineralization have also been reported, including porphyry Cu-Mo-Re-Au, high-sulfidation Cu-Au and intermediate sulfidation Au-Ag in the northern and central part of the island. A total of 74 surface (0-20 cm depth) soil samples were collected from 66 locations on a 5 km x 5 km grid extending across the whole island. In addition, representative rock samples were also collected at 32 sampling locations adjacent to the soil samples with the aim to examine the influence of diverse lithological units and types of mineralization on soil geochemistry. The basic soil parameters pH and Total Organic Carbon were determined, along with the major and trace element composition of both rock and soil samples. Preliminary results of geochemical analyses are presented and interpretation of soil characteristics based on geology is highlighted. The ArcGIS software was used to integrate data layers including the sampling points and the respective elemental concentrations, the geological background and interpolated geochemical maps, complemented with multivariate statistical analyses with a view to define the relationship between lithology and soil geochemistry in this challenging geological terrain.

