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# Geophysical Characterization of Late Pleistocene Coquina and Eolianite on Western Black Sea Coast of Turkey By Using Electrical Resistivity Tomography Survey

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Electrical resistivity tomography (ERT) survey was carried out in order to investigate the nature and subsurface geometry of cemented coquina and eolianite on western Black Sea coast of NW Turkey. The study area is located about 13 km west of the Şile district of Istanbul in the Marmara Region. The coquinite beds lie ahead of a 150-m-long and 10-30 m-wide sandy beach and are backed by a coastal dune field that rests on carbonate cemented eolianite. Three coastline-parallel ERT transects were measured for imaging the subsurface structure of the studied coastal area. The first tomogram was taken along the wave swash zone where coquina beds are widely exposed. The second tomogram was obtained from the transition zone between the sandy beach and incipient foredunes in order to monitor the landward extension of coquina beds under the beach sands. Space limitation due to the width of the beach (maximum 15 m) did not allow the measuring of transects perpendicular to the coastline. Therefore, and because the beach is backed by Late Pleistocene eolianites encased in foredune sands, we obtained a third transect from the foredune area at the back to identify the resistivity difference between the eolianites and coquinite. First tomogram showed a large resistivity range varying between 1-900 ohm-m. Relatively high resistivity values observed at the beginning and end of the transect indicated that the exposed blocks are protrusions of a body of coquinite buried under the beach sands. On the other hand, lower values (<5 ohm-m) well defined saturation of the beach material by sea-water input. The thickness of the beach material appears to be about 9-10 m and it covers resistive (>500 ohm-m) rugged bedrock at the bottom. Second tomogram, obtained 13 m back from the first one, showed very similar subsurface patterns and revealed a landward extension of the coquinite beds under the beach sands. The thicknesses of the coquinite beds here are not more than 5 m, based on tomographic images. The last transect helped ensure the existence of coquinite beds under the beach sands. Unlike to the coquinite, the 3-8 m thick eolianite body showed very high resistivity values of between 400-900 ohm-m. The overlying coastal dune characterized by moderate resistivity values have a maximum thickness of 3 m and sand and clay levels were displayed in the lowermost part of the resistivity tomogram.

Keywords: Coquina, Eolianite, Electrical Resistivity Tomography, Black Sea