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USING A.R.P. PROXIMAL SURVEY TO MAP CALCIC HORIZON DEPTH IN VINEYARDS

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The investigation of spatial variability of soil water retention capacity and depth is essential for a correct and economical planning of water supply of a vineyard. The advantage of measuring soil electrical properties by proximal sensors is the ability to operate with mobile and non-destructive tools, quicker than the traditional soil survey. A.R.P. (Automatic Resistivity Profiling) is a mobile soil electrical resistivity (ER) mapping system conceived by Geocarta (Paris, France), and it is comprised by a couple of transmitter sprocket-wheels, which inject current within the soil, and three couples of receiver sprocket-wheels, which measure the voltage-drop at three different depths, about 0-50, 0-100 and 0-170 cm. Ten vineyards of "Villa Albius" farm in Sicily region (southern Italy) were chosen to carry out the A.R.P. survey, for a overall surface of 45 hectares. The vineyards were located in a wide Plio-Pleistocene marine terrace, characterized by a few meters level of calcarenite, overlying partially cemented by calcium carbonate yellow sands. During the A.R.P. survey, 12 boreholes were described and sampled for the laboratory analysis and other 6 boreholes were carried out to validate the map. All soils showed a calcic horizon (Bk, BCK or Ck) with the upper limit at variable depths. The depth of calcic horizon (Dk) of each boreholes resulted significantly correlated to ER, especially with the ER0-100 ($R^2 = 0.83$). Dk map was interpolated using the regression kriging and validated by the boreholes ($R^2 = 0.71$) and with a NDVI map of the same vintage ($R^2 = 0.95$).