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Kriging-based estimation of the change in soil carbon stock in the coastal Black Sea region, Turkey

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The purpose of this study is to evaluate the impact of the dominant land use pattern on soil carbon content, nitrogen content, the carbon to nitrogen ratio (C:N) from forested, deforested areas, and grasslands in the Coastal Black Sea Region of Adapazari, Turkey. For this purpose, soil samples were collected during the Spring and Fall of 2009 from a total of 45 different locations covering the entire study area (21 points within the forest areas, 24 points within defrosted areas)At each location, the undisturbed soil samples were taken from depths of 0-5, 5-20, 20-45 and 45-100 cm. C and N contents from the soil samples were analyzed in the lab by dry combustion using an automatic CHNS analyzer. An indicator kriging approach was used to estimate the spatial distribution of the carbon stock at different depths as well as the carbon stock over the entire study area. The advantage of indicator kriging is that it honors the land use pattern at each location. Statistical analyses of the results show that the nitrogen content does not exhibit any significant change with land use type or depth. The carbon content on the other hand decreases with depth for all land use types. The largest decrease is observed in the shallow soils, the 0-5 cm and 5-20 depth intervals. The carbon content was also found to be correlated with the land use type, particularly in the near surface soils where soil management practices are concentrated.