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Digital mapping of topsoil texture in the southern Argentine Pampas

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Climate, hydrological, and ecological models requires accurate information about the spatial distribution of soil texture at regional scales. We produced a spatial dataset of topsoil texture in digital format for the southern Argentine Pampas based on the 1:50,000 scale soil map and 813 soil profiles. This dataset includes (i) a digital map of particle-size fractions at 1-km spatial resolution predicted from Cubist model; (ii) a digital map of the soil texture based on the USDA classification at 0–20 cm and 20–40 cm depths; and (iii) a spatial relationship among textural classes for each District studied. A total of thirty-seven predictors related to topography, climate and spectral indices were used and their importance of prediction was also calculated. The results suggest that Cubist predictions were slightly better for 0–20 cm than for 20–40 cm for all particle-size fractions. Predictors related to climate were the most important to predict particle-size fractions. The uncertainties quantified from a bootstrapping approach were acceptably higher (PICP between 78-85%) to particle-size fractions at both soil depths. In general, the spatial distribution of the particle-size fractions was similar at both depths, supporting the vertical homogeneity of the profiles in the whole study area at a depth lower than 40 cm. Variations in sand, in detriment of clay and silt, from the east to west of the study area, caused an increase in the sand content further west. Based on USDA texture classification, the soils of the study area at 0–20 cm depth are Sandy loam, Loam, and Sandy clay loam, while those at 20–40 cm are Sandy clay loam, Loam, Clay loam and Sandy loam. We demonstrated that the use of DSM techniques can be relevant to optimize the predictions of soil properties in the Argentine Pampas.