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Validation at regional scale of soil property maps derived from spatial disaggregation of large scale legacy soil maps

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Spatial disaggregation of soil map units involves the downscaling of information to produce new information at a finer scale than the original source. Currently, it is becoming a powerful tool to address the spatial distribution of soil information over large areas, where legacy soil polygon maps are the only source of soil information. Because of the high expense of additional resampling, only few studies have sought to validate disaggregated soil maps using independent sampling. This study aims to measure the quality of novel soil properties predictions derived from disaggregated soil maps, using a stratified simple random sampling approach at regional scale. The existing legacy soil polygon map at 1:250,000 scale of Brittany (France) was spatially disaggregated at 50m resolution using DSMART algorithm and soil-landscape expert rules for soil distribution (Vincent et al., 2016). Soil properties were then estimated at six depth intervals according to GlobalSoilMap.net specifications. Over a study area of 6,775 km^2, we test the accuracy of novel soil properties maps using an independent validation dataset. The validation strategy was based on a stratified random sampling procedure using stratification by k-means clustering of dominant soil parent materiel. Eleven strata were identified, and sample size was proportional to the surface area of each strata. Points were selected at random within each strata and transect sampling along hillslope was applied starting from each point. Overall, 405 independent soil profiles were described up to 2 m and sampled by depth interval for laboratory analysis in order to assess the quality of soil property maps. Field validation gave good results that varied with strata and soil properties. The strict purity ranged from 17% for gritty schist strata to 83% for marsh strata while the average purity ranged from 58 % for hard schist strata to 96 % for marsh strata. The partial purity of parent material varied from 72 % for granite and gneiss strata to 100% for medium schist strata, alluvial terrace strata and march strata. Similarly, the partial purity of soil depth ranged from 50% for hard schist strata to 100 % for march strata. Differences of prediction accuracies between strata denote areas where more soil data or better soil prediction models are needed to improve the disaggregation processes.