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## DSM with covariates at different resolution for Mongolia

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Digital Soil Mapping (DSM) is an established methodology to create maps of soil properties at different resolutions and extents. It establishes a statistical relationship between the measured values at point observations and environmental covariates selected to describe the soil forming factors and to explain the spatial variability of the soil properties. These relationships are then used to map the target soil properties across the area of interest. In this example, we used 1423 measurements on soil organic carbon and pH for the 0-20 cm soil layer from a Mongolian soil survey. This survey was organised within the framework of the “National Program to Combat Desertification” to determine the primary soil quality indicators for desertification assessment in Mongolia and it was conducted based on the state network of the Meteorological and Environmental Research Agency starting in 2012. The samples are collected from 1500 monitoring points every 5 years. We used data from the monitoring round between 2012 and 2015. We used two sets of covariates for modelling predictive relationships. The first is the set used in SoilGrids at 250 m resolution with over 400 layers available of which about 180 were used for the modelling, after de-correlation. The second is a reduced set of about 40 covariates at 100 m resolution derived mainly from Sentinel (1 and 2) images, ERA5 for climate data and ALOS for morphological information. In this study we will compare the results of the two models, with both point-wise evaluation matrices and assessment of spatial patterns. In the evaluation the expertise of local partners will also be used.