We use the Michaelis-Menten equation as formalized in Kätterer et al. 2011 for roots, applying it to describe SOC and calibrating the parameters and , to describe the proportion of SOC at a certain depth (between 0 and 1):

Equation 1

We can now define the SOC of the second layer relatively to the first layer by applying Equation 1:

Equation 2

Equation 2 can be generalized to any layer:

Equation 3

Eventually we can substitute Equation 1 into Equation 3

We can now build a function to calculate the SOC at any depth that utilizes the SOC at the first layer, the bottom depths of each layer and the two parameters and :

Where is the array of the bottom depths:

We can now calibrate this model using all the profiles we have at disposal, using a two variable optimization algorithm, to find the optimal values of and . We can then analyze the residuals of this model on all the profile to see if some pattern arises (for example a pattern related to the different agroforestry managements).

The function can then be used to extend to a standard depth (we selected so far 50 cm) the profiles where there are some missing data.