Estimation of Soil Organic Carbon Stock in South Korea

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Abstract

Soil represents a substantial component within the global carbon cycle and small changes in the SOC stock may result in large changes of atmospheric CO_2 particularly over tens to hundreds of years.

In this study, we aim to (i) evaluate the SOC stock in the topsoil 0 - 15 cm from soil physical and chemical characteristics and (ii) find the correlation of SOC and soil organic matter (SOM) for national-scale in South Korea.

First of all, based on the characteristics of the soil to calculate the soil hydraulic properties, SOC stock is the SOC mass per unit area for a given depth. It depends on bulk density (BD-g/cm^3), SOC content (%), the depth of topsoil (cm), and gravel content (%). Due to insufficient data on BD observation, we establish a correlation between BD and SOC content, sand content, clay content parameter. Next, we present linear and non-linear regression models of BD and the interrelationship between SOC and SOM using a linear regression model and determine the conversion factor for them, comparing with Van Bemmelen 1890's factor value for the country scale.

The results obtained, helps managers come up with suitable solutions to conserve land resources.

Keywords : SOC stock, conversion factor, regression model, South Korea

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