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## Comparative estimation of litter carbon inputs by two different modeling approaches in central Himalayan forests

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### ABSTRACT

The Soil Organic Carbon (SOC) status found in forest soils is the result of the balance between litter input to the soil and decomposition. Plant litter input to the soil is closely linked to net primary production (NPP). At equilibrium, the NPP is equal to the litter input to soil. In this study, plant litter input to a depth of 30 cm was estimated for ten forest sites located at different altitudes in Central Himalaya using the Rothamsted Carbon model (RothC) and was compared with estimated litter inputs from the NPP data from Moderate Resolution Imaging Spectroradiometer (MODIS). The litter carbon input calculated using RothC and that derived from MODIS NPP were positively correlated ( $r=0.62$ ), but the mean estimated litter input from RothC was 32.8% lesser than that estimated from MODIS. However, student's t-test revealed non-significant mean difference at 5% significance level between the estimates. RothC estimated litter carbon inputs were closer to MODIS NPP in case of dense and comparatively less degraded forests whereas large deviations were found in case of degraded forests. The discrepancy was probably because of the different temperature controls for the MODIS algorithm and the RothC model, and simple assumptions made in the RothC calculation. The mismatch in scale between the 1 km grid of satellite products (MODIS NPP) and the relatively small scale of ground-scale observations (SOC) might have also contributed to the disagreement observed. However, this approach merits further study to accept satellite-derived NPP data to be used as plant carbon input to soil system to drive soil models to estimate changes in forest soil carbon stocks under future climate/land management scenario.

#### Key words :

Forest soils,

MODIS NPP,

RothC,

Soil organic carbon dynamics