



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA
DIPARTIMENTO DI
SCIENZE E TECNOLOGIE AGRO-ALIMENTARI

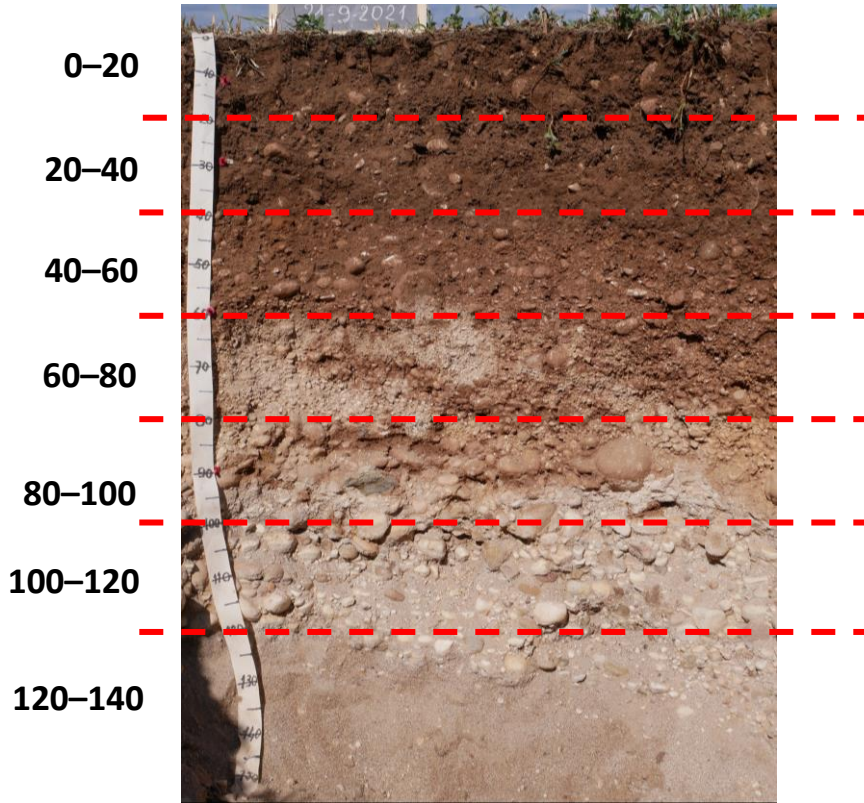
Efficacy of pedogenetic horizons sampling for site-specific assessment of soil organic matter

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Introduction

Sampling by pedogenic horizon
or fixed depth intervals?

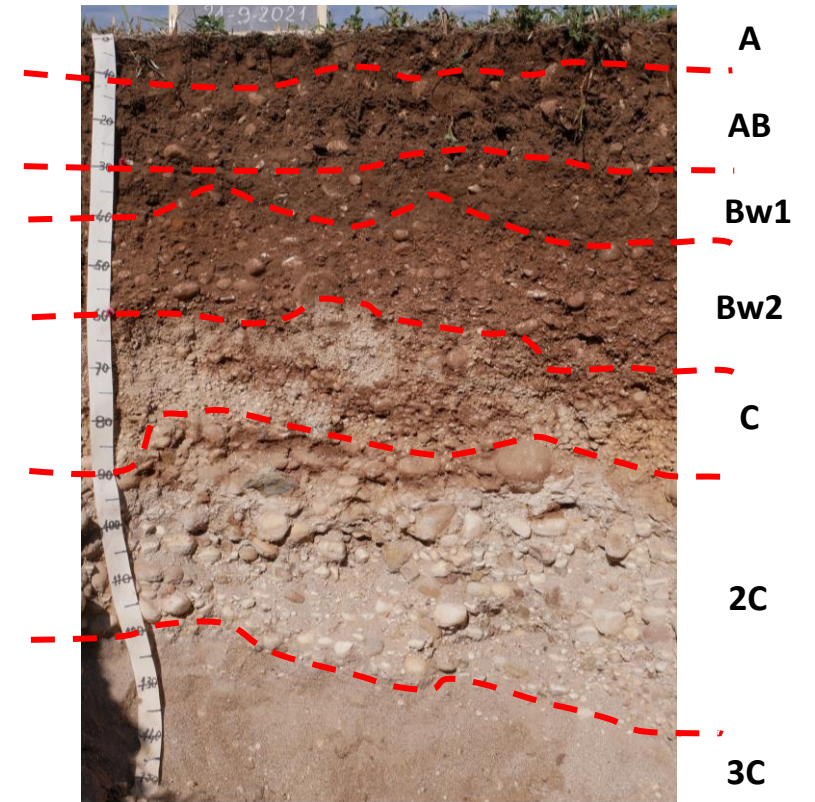


Great ease execution

Small time consuming procedure

Soil experts are not needed

Statistically efficient



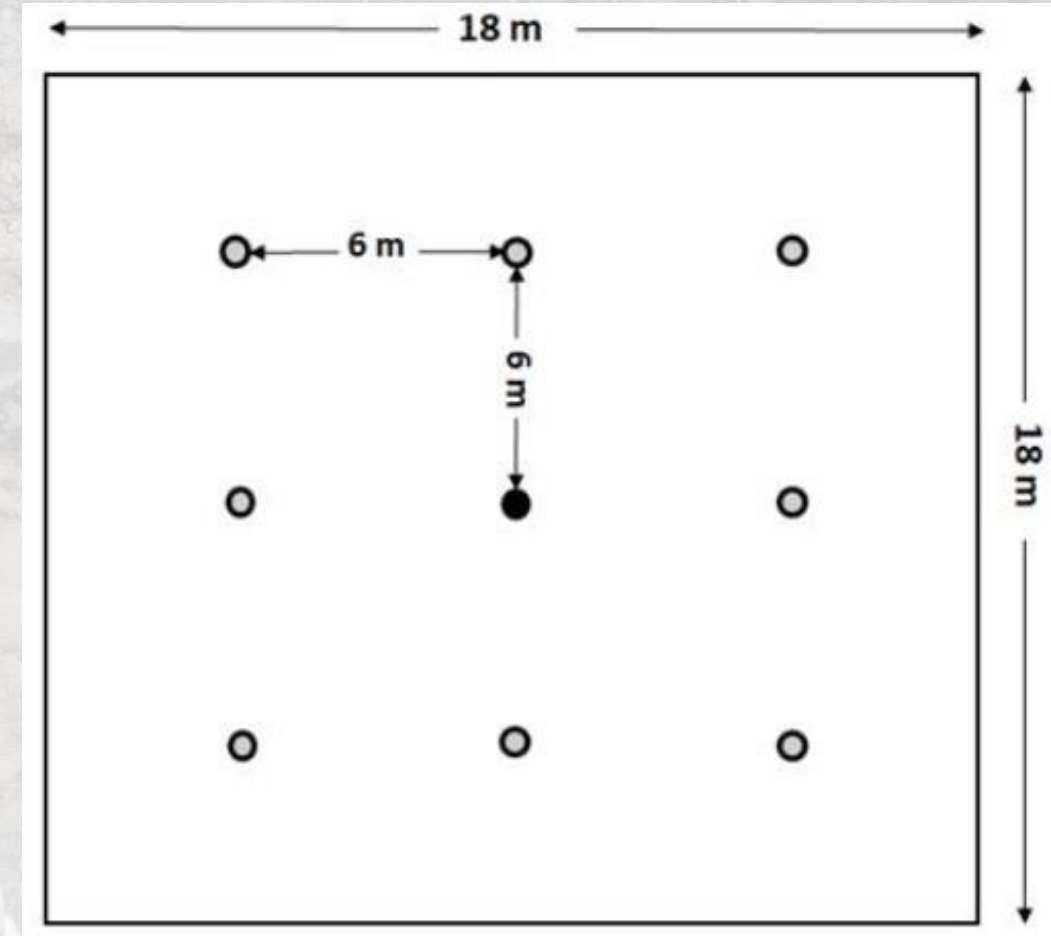
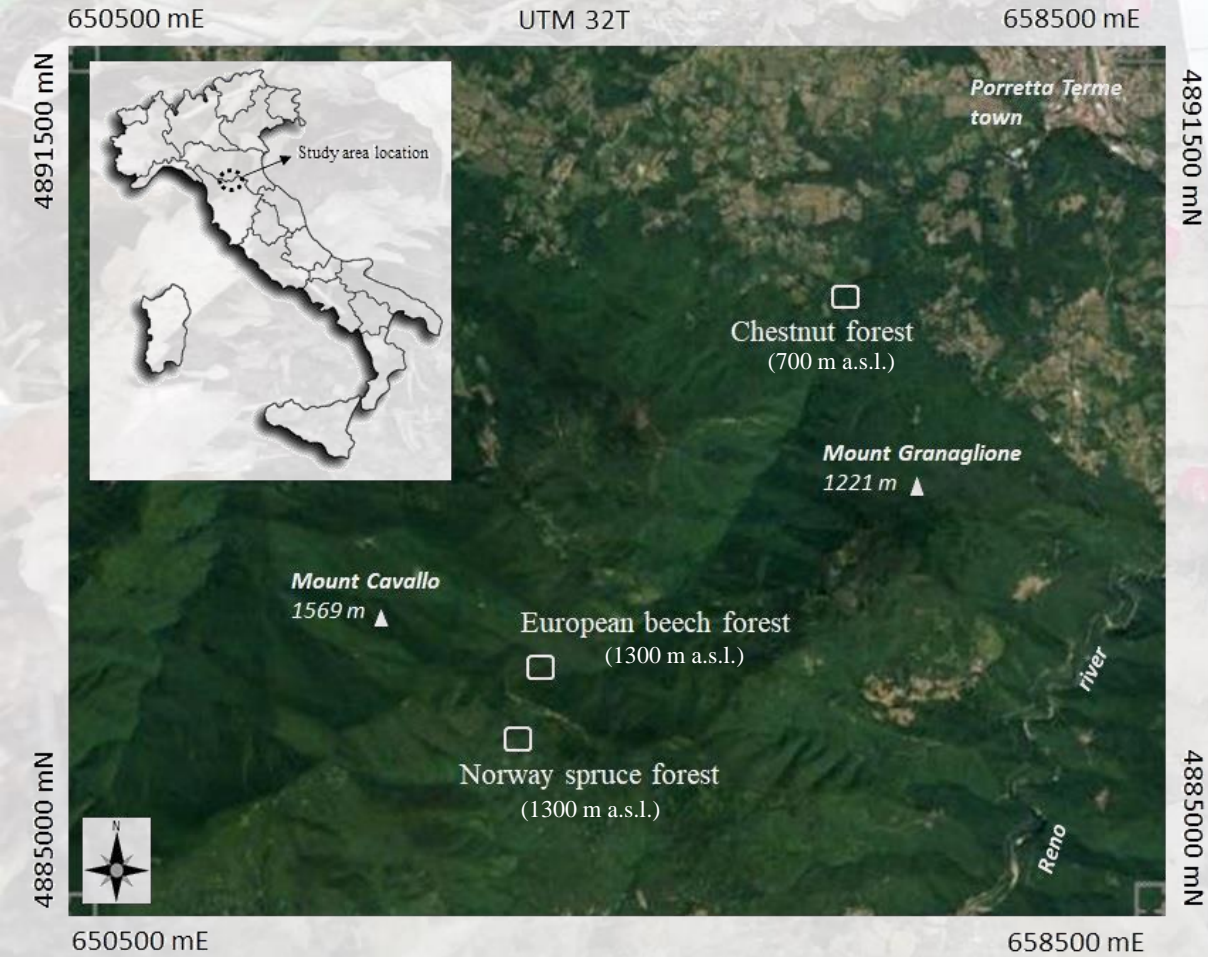
Useful when vertical and lateral
changes of soil properties are
studied

Necessary when soil processes
regulating properties and functions
are investigated

Aims of the work

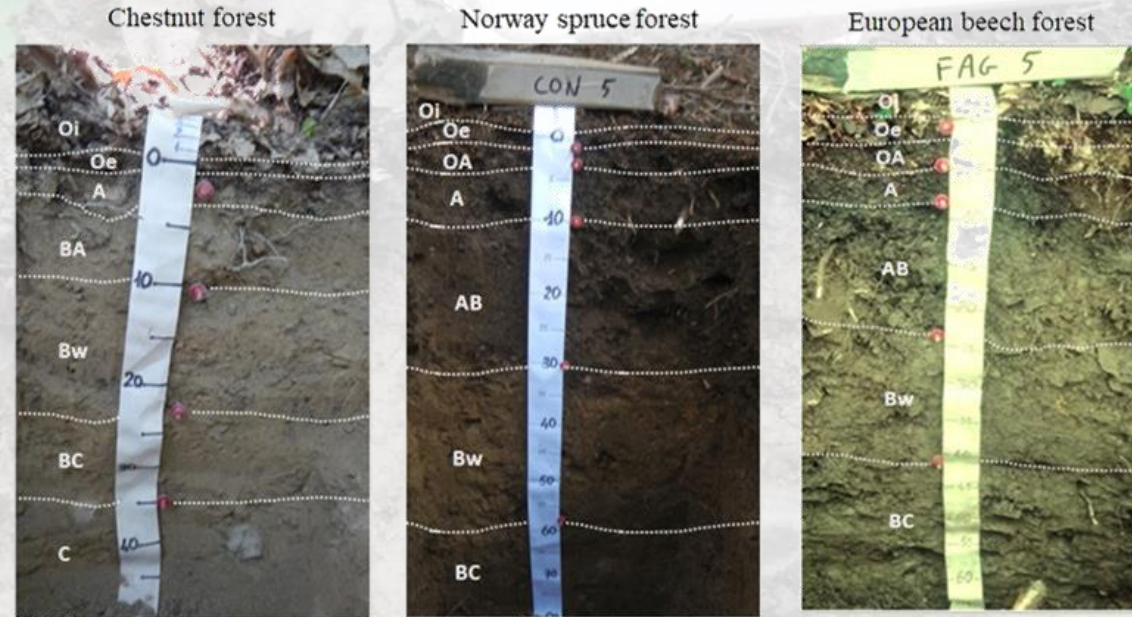
- To compare the soil organic carbon stock obtained by pedogenic horizons and fixed depth intervals in different forest ecosystems
- To discuss the differences in soil organic carbon data provided by the two soil sampling approaches, clarifying their major advantages and drawbacks

Study areas & sampling

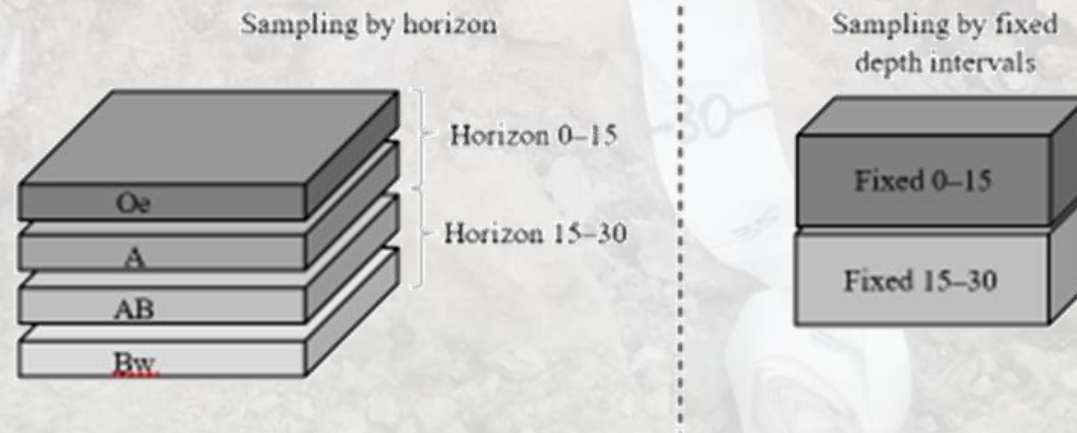


Study areas & sampling

To test the data transferability from soil horizon sampling procedure to soil fixed depth layers, the data of SOC content and stock from soil horizons were also expressed referring to soil fixed depth as weighted average based on soil horizon thickness

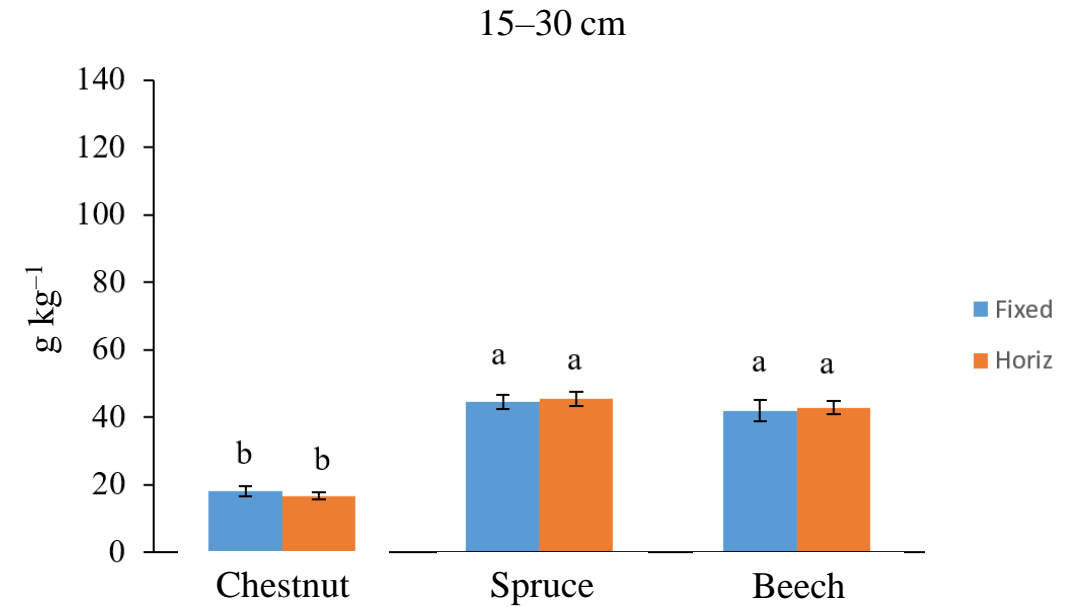
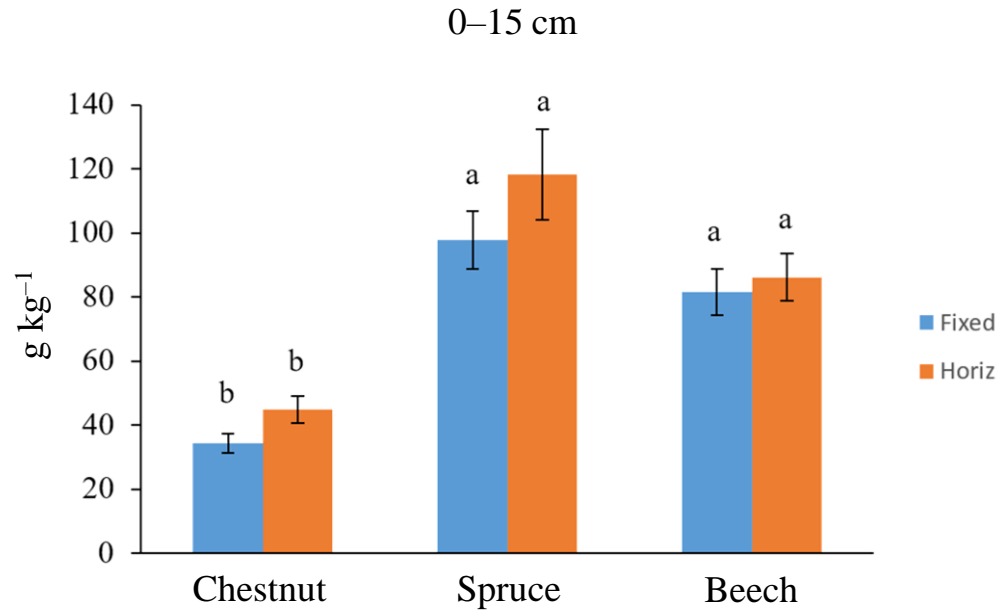


Representative soil profiles

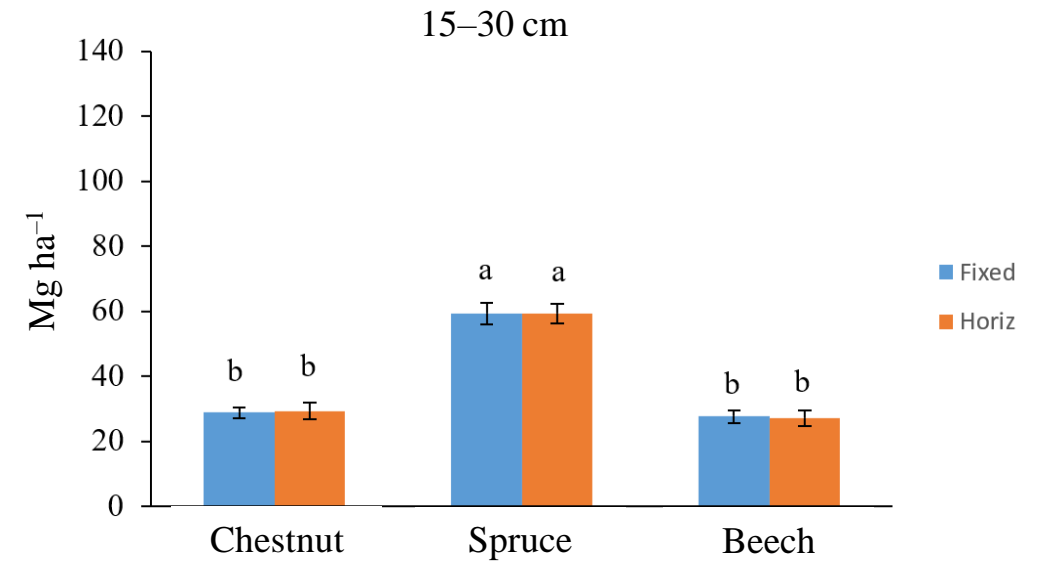
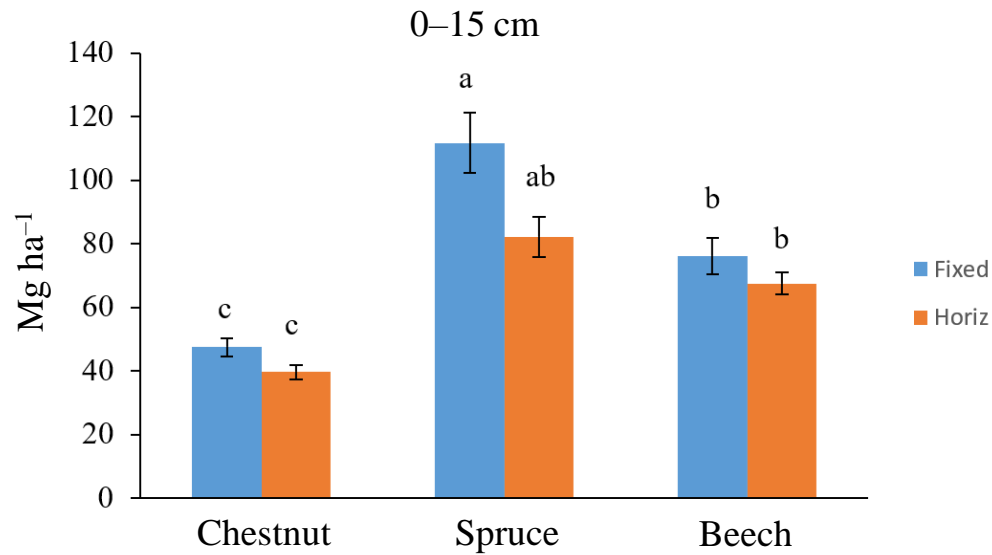


Sampling down to 30 cm depth

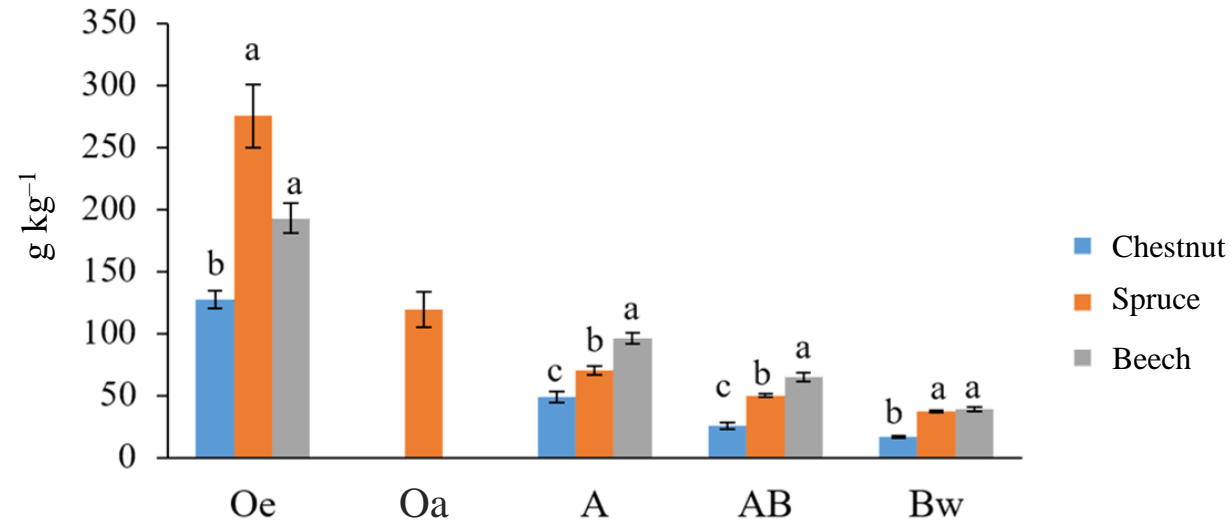
Soil organic carbon content



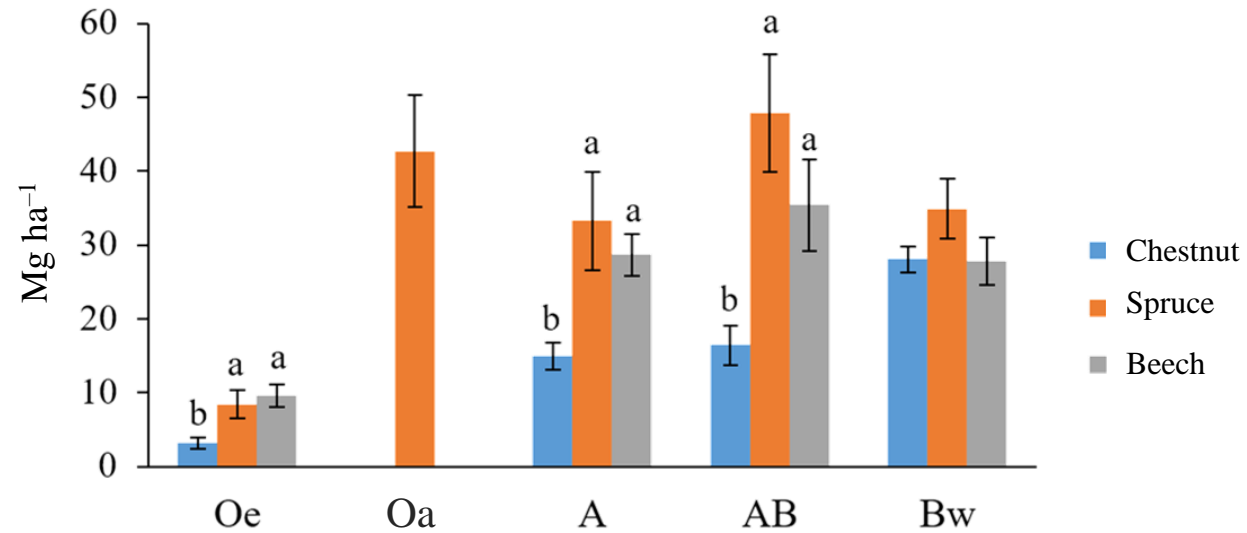
Soil organic carbon stock



Soil organic carbon content



Soil organic carbon stock



Coefficient of variation to describe the spatial variability of C stock calculated both for each identified soil horizon (Oe, Oa, A, AB and Bw) and soil depth layer (0–15 and 15–30 cm) of the plots selected inside chestnut, Norway spruce and European beech forests.

| Forest type | Oe | Oa | A | AB | Bw | 0–15 | 15–30 |
|----------------|------|------|------|------|------|------|-------|
| | % | | | | | | |
| Chestnut | 72.8 | | 36.2 | 49.2 | 19.2 | 17.7 | 16.5 |
| Norway spruce | 65.3 | 50.3 | 60.4 | 49.8 | 26.0 | 25.7 | 16.9 |
| European Beech | 35.5 | | 27.7 | 46.1 | 35.1 | 21.0 | 19.5 |

Conclusions

- In a view of soil organic carbon monitoring, the sampling by pedogenetic horizons draws a better picture of soil organic carbon distribution along depth and its potential susceptibility to external factors leading to degradation.
- The loss of information about soil organic carbon stabilization process and spatial variability would indicate the inability of fixed depth intervals sampling to support decision-making plans addressed for sustainable use of soil resource.