UNIVERSITÀ DEGLI STUDI DI PALERMO

SAAF DIPARTIMENTO SCIENZE AGRARIE ALIMENTARI FORESTALI

PhD course in Mediterranean Agricultural, Food and Forest Systems (SAAFM)

Seminar March 19th 2021

EFFCTS OF ELEVATED ATMOSPHERIC CO_2 ON SOIL PROCESSES

Rising carbon dioxide (CO_2) concentration is one component of Global Change that affects various ecosystem processes and functions. The effects of elevated CO_2 (eCO_2) on belowground processes are based on complex interactions among various ecosystem fluxes and components such as net primary productivity, carbon (C) inputs to soil, and the living and dead soil C and nutrient pools. The talk will summarize the impacts of eCO_2 on 1) cycling of C and nitrogen (N), 2) microbial growth and enzyme activities, 3) turnover of soil organic matter including N mobilization/immobilization processes, and 4) associated nutrient mobilization from organic sources, 5) water budget with consequences for soil moisture, 6) formation and leaching of pedogenic carbonates, as well as 7) mobilization of nutrients through accelerated weathering. The effects in soil are mediated by plants through increased net primary production and C inputs by roots that foster intensive competition between plants and microorganisms for nutrients. Higher belowground C input from plants under eCO_2 is compensated by faster C turnover due to accelerated microbial growth, metabolism and respiration, higher enzymatic activities, and priming of soil C, N and P pools. We compare the effects of eCO_2 on pool size and associated fluxes in: soil C stocks vs. belowground C input, microbial biomass vs. CO_2 soil efux vs. various microbial activities and functions, dissolved organic matter content vs. its production, nutrient stocks vs. fluxes etc. Based on these comparisons, we generalize that eCO_2 will have little impacts on pool size but will strongly accelerate the fluxes in biologically active and stable pools and consequently will accelerates biogeochemical cycles of C, nutrients and nonessential elements.
The talk is based on the paper: https://doi.org/10.1016/j.soilbio.2018.10.005

Relatore

Yakov KUZYAKOV

Yakov Kuzyakov worked in various Soil and Environmental Science departments of universities and research institutes worldwide: Germany, USA, UK, Russia and China. His expertise covers soil ecology, biogeochemistry, rhizosphere processes, C and N cycling, soil degradation, land use and agroecology. Yakov led research projects in many countries such as Germany, China, Korea, Tanzania, Indonesia, Russia and Chile.
Yakov is an active member of several editorial boards, for top-ranked journals including Soil Biology & Biochemistry, Land Degradation & Development, Biogeosciences, Rhizosphere, Scientific Reports etc. He was awarded in 2015 the John Waid Award for Best Review Paper in Soil Biology & Biochemistry, 2016 the EGU Outstanding Editor Award etc. He has/had more than 35 Highly Cited and 9 Hot Papers.

The seminar will be held on March 19th via Microsoft Teams from 3 PM to 4 PM at the following link:
https://teams.microsoft.com/l/channel/19%3ab31825bc4b0248979e4020f955457164%40thread.tacv2/March%252019th%2520-%2520Kuzyakov?groupId=d5893b88-db47-4831-a8c2-b0a3d09ae7ac&tenantId=bf17c3fc-3ccd-4f1e-8546-88fa851bad99

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