forests

MDPI

Editorial

Forest Soil Carbon and Climate Changes

Oleg V. Menyailo

Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture, Soil and Water Management and Crop Nutrition Laboratory, 2444 Seibersdorf, Austria; menyailo@hotmail.com

Forest soil carbon is an important component of the global carbon cycle, and the changes of its accumulation and decomposition, stabilization and destabilization directly affect the atmospheric CO_2 concentration and global warming. Besides that, forest soil carbon plays a crucial role in forest ecosystems including nutrient provision, carbon sequestration, water regulation, soil structuring and biodiversity promotion. Due to the crucial importance of soil carbon storage to climate regulation and stability of forest ecosystem functions, scientists have devoted a significant amount of attention to the topic over the last decade. Central to the theme are questions concerning the temperature dependence of C mineralization and how this temperature sensitivity depends on litter quality, and how forest stand density alters temperature sensitivity and stability of soil organic matter to accelerated input of fresh organic matter (primability). Therefore, the scope of the Special Issue "Forest Soil Carbon and Climate Changes" was to summarize recent findings from different geographic locations, tackling these issues that are important to society. We invited papers dealing with temperature sensitivity of C mineralization, priming of soil organic matter, and tree species and stand density effect on soil C storage and turnover processes. In addition, N effects on C storage and fluxes were welcome. The papers could be based on original data, and reviews and meta-analysis were also considered.

The Issue includes 15 papers; based on the first author affiliation, the papers originate from Russia (7), China (3), Taiwan (2), Japan (1), South Korea (1) and Canada (1). Several papers were dealing with vegetation effects on soil organic matter [1–5]. Respiration as the second most important process of global carbon cycles was considered by researchers from several countries [5–10], including also research dealing with the temperature sensitivity of the respiration process [8,9]. Two papers concentrated on microbial metabolism in forest soils [5,11]. Climate change [12] and forest fires [13] effects on peat formation were also reported. Two papers were dealing with methodological issues of soil organic matter—excitation of soil organic carbon caused the organic acids [14] and the influence of acid rains on lignin and total soil organic matter stability [15].

Conflicts of Interest: The author declares no conflict of interest.

Citation: Menyailo, O.V. Forest Soil Carbon and Climate Changes. *Forests* **2022**, *13*, 398. https://doi.org/10.3390/f13030398

Received: 17 February 2022
Accepted: 26 February 2022
Published: 28 February 2022

References

1. Lukina, N.; Kuznetsova, A.; Tikhonova, E.; Smirnov, V.; Danilova, M.; Gornov, A.; Bakhmet, O.; Kryshen, A.; Tebenkova, D.; Shashkov, M.; et al. Linking Forest Vegetation and Soil Carbon Stock in Northwestern Russia. *Forests* **2020**, *11*, 979. [CrossRef]
2. Lin, Y.-H.; Lee, P.-C.; Menyailo, O.V.; Cheng, C.-H. Changes in Soil Organic Carbon Concentration and Stock after Forest Regeneration of Agricultural Fields in Taiwan. *Forests* **2021**, *12*, 1222. [CrossRef]
3. He, J.; Dai, Q.; Xu, F.; Peng, X.; Yan, Y. Variability in Carbon Stocks across a Chronosequence of Masson Pine Plantations and the Trade-Off between Plant and Soil Systems. *Forests* **2021**, *12*, 1342. [CrossRef]
4. Lee, S.; Lee, S.; Shin, J.; Yim, J.; Kang, J. Assessing the Carbon Storage of Soil and Litter from National Forest Inventory Data in South Korea. *Forests* **2020**, *11*, 1318. [CrossRef]
5. Menyailo, O.V.; Sobachkin, R.S.; Makarov, M.I.; Cheng, C.-H. Tree Species and Stand Density: The Effects on Soil Organic Matter Contents, Decomposability and Susceptibility to Microbial Priming. *Forests* **2022**, *13*, 284. [CrossRef]
6. Glukhova, T.V.; Ilyasov, D.V.; Vompersky, S.E.; Golovchenko, A.V.; Manucharova, N.A.; Stepanov, A.L. Soil Respiration in Alder Swamp (*Alnus glutinosa*) in Southern Taiga of European Russia Depending on Microrelief. *Forests* **2021**, *12*, 496. [CrossRef]
7. Yu, J.-C.; Chiang, P.-N.; Lai, Y.-J.; Tsai, M.-J.; Wang, Y.-N. High Rainfall Inhibited Soil Respiration in an Asian Monsoon Forest in Taiwan. *Forests* **2021**, *12*, 239. [CrossRef]
8. Makita, N.; Fujimoto, R.; Tamura, A. The Contribution of Roots, Mycorrhizal Hyphae, and Soil Free-Living Microbes to Soil Respiration and Its Temperature Sensitivity in a Larch Forest. *Forests* **2021**, *12*, 1410. [CrossRef]
9. Mukhin, V.A.; Diyarova, D.K.; Gitarskiy, M.L.; Zamolodchikov, D.G. Carbon and Oxygen Gas Exchange in Woody Debris: The Process and Climate-Related Drivers. *Forests* **2021**, *12*, 1156. [CrossRef]
10. Masyagina, O.V.; Evgrafova, S.Y.; Menyailo, O.V.; Mori, S.; Koike, T.; Prokushkin, S.G. Age-Dependent Changes in Soil Respiration and Associated Parameters in Siberian Permafrost Larch Stands Affected by Wildfire. *Forests* **2021**, *12*, 107. [CrossRef]
11. Manucharova, N.A.; Pozdnyakov, L.A.; Vlasova, A.P.; Yanovich, A.S.; Ksenofontova, N.A.; Kovalenko, M.A.; Stepanov, P.Y.; Gennadiev, A.N.; Golovchenko, A.V.; Stepanov, A.L. Metabolically Active Prokaryotic Complex in Grassland and Forests' Sod-Podzol under Polycyclic Aromatic Hydrocarbon Influence. *Forests* **2021**, *12*, 1103. [CrossRef]
12. Laamrani, A.; Valeria, O.; Chehbouni, A.; Bergeron, Y. Analysis of the Effect of Climate Warming on Paludification Processes: Will Soil Conditions Limit the Adaptation of Northern Boreal Forests to Climate Change? A Synthesis. *Forests* **2020**, *11*, 1176. [CrossRef]
13. Sirin, A.; Maslov, A.; Makarov, D.; Gulbe, Y.; Joosten, H. Assessing Wood and Soil Carbon Losses from a Forest-Peat Fire in the Boreo-Nemoral Zone. *Forests* **2021**, *12*, 880. [CrossRef]
14. Xiao, Y.; Yu, Y.; Wang, Y.; Wang, X.; Wang, Y.; Dai, W.; Luan, Y. Effect of two exogenous organic acids on the excitation effect of soil organic carbon. *Forests* **2021**, *in press*.
15. Wu, J.; Deng, Q.; Hui, D.; Xiong, X.; Zhang, H.; Zhao, M.; Wang, X.; Hu, M.; Su, Y.; Zhang, H.; et al. Reduced Lignin Decomposition and Enhanced Soil Organic Carbon Stability by Acid Rain: Evidence from ^{13}C Isotope and ^{13}C NMR Analyses. *Forests* **2020**, *11*, 1191. [CrossRef]