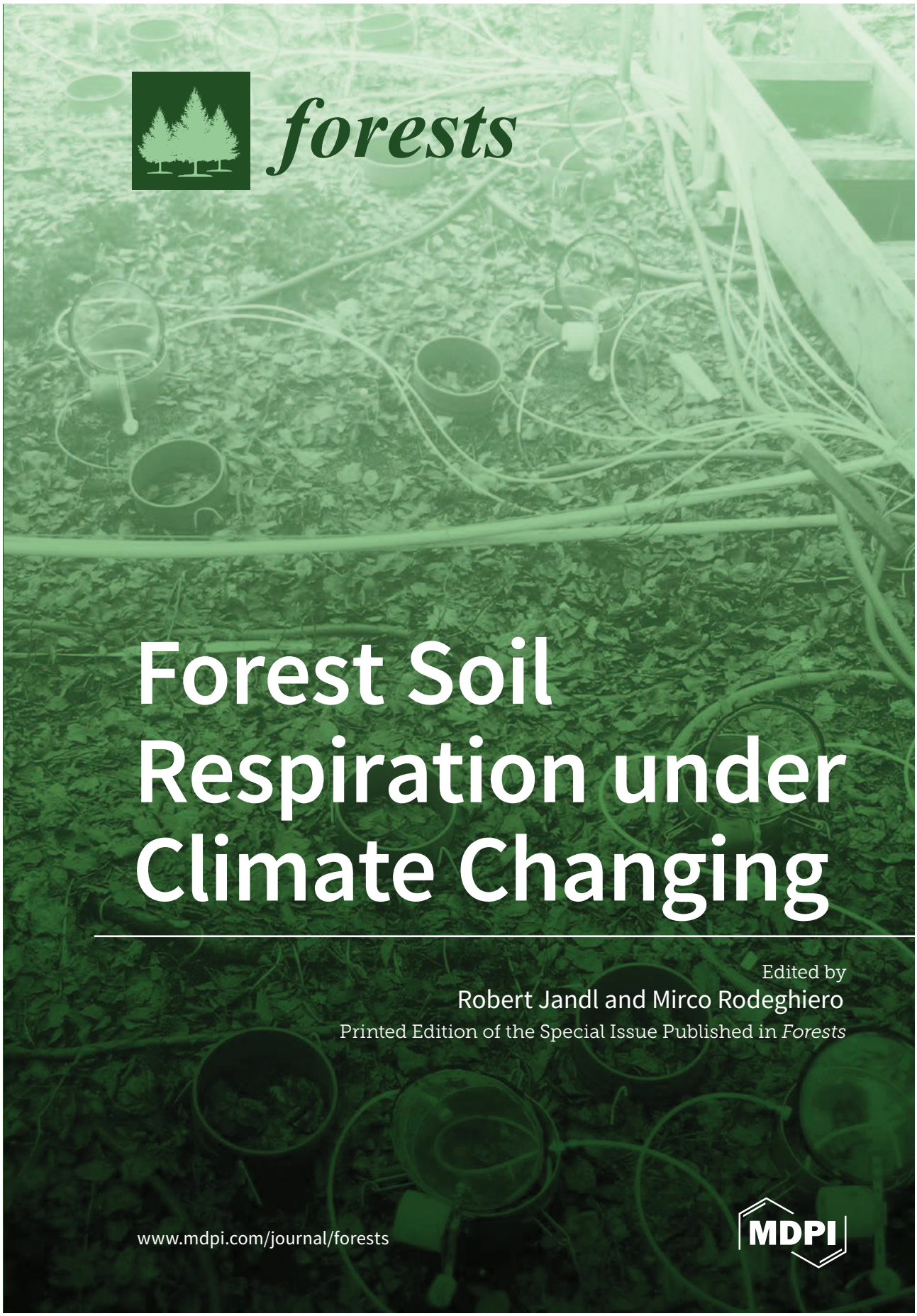

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Forest Soil Respiration under Climate Changing

Edited by
Robert Jandl and Mirco Rodeghiero

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Special Issue Editors

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About the Special Issue Editors

Robert Jandl, Univ Lecturer, Dr is a forest ecologist at the Austrian Research Center for Forests and is coordinating the research activities related to climate change. His main research interest is currently the role of forest soils in climate change mitigation and the carbon dynamics in forest ecosystems of the temperate zone. Robert Jandl is a member of the commission for Climate and Airquality of the Austrian Academy of Sciences and a Board Member of the Austrian Center for Climate Change (CCCA).

Mirco Rodeghiero, Dr, Forest Ecology PhD is a researcher at Fondazione Edmund Mach (San Michele all'Adige, Italy). His main research activity is focused on the effects of climate change on soil carbon and nitrogen dynamics by combining physiological and pedological measurements. In particular he investigated the main determinants of soil carbon dioxide efflux in forest ecosystems. He coordinated the soil sampling campaign for the Italian National Forest Inventory and was involved in the major European integrative projects for the study of soil carbon dynamics.

Preface to "Forest Soil Respiration under Climate Changing"

Soil respiration is a process of prime relevance for understanding the carbon cycle in forest ecosystems and for properly comprehending the role of forests in climate change mitigation. The process is divided into two components: (i) autotrophic soil respiration, i.e. the efflux of CO2 from the respiration of tree roots, and (ii) heterotrophic soil respiration, i.e. the efflux of CO2 due to respiration of soil microorganisms. A third component, the respiration of mycorrhizae, is still debated and it is not yet clear whether it should be accounted for in autotrophic or heterotrophic soil respiration, respectively, or whether it should be treated as a third component.

The rate of soil respiration is controlled by environmental factors. Expectedly, the strongest driver is soil temperature, followed by soil moisture. The relevance of either factor depends on site properties. Two papers are reinforcing this view. An asset of the paper compilation is the collection of case studies where other factors besides temperature and soil moisture are evidently greatly affecting the rate of soil respiration. The characteristics of the forest stand such as tree density, stand age, and tree species and additional soil properties such as aggregate stability are influencing soil respiration.

The book gives guidance on the current state of knowledge and helps identifying knowledge gaps for future research endeavours.

Robert Jandl, Mirco Rodeghiero
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