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Permafrost and Carbon Dioxide Emission

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Message from the Guest Editor

Dear Colleagues,

There is a clear sign of the extreme and accelerating effects of climate change in northern regions. Warming and thawing of permafrost promotes decomposition of this once frozen organic matter, threatening to turn the Arctic carbon sink into a net source of greenhouse gases to the atmosphere. Rising global temperatures in Arctic are causing permafrost to thaw and release CO_2 that has been stored within it for thousands of years. Abrupt thaw and thermokarst could emit a substantial amount of carbon to the atmosphere rapidly, mobilizing the deep legacy carbon sequestered in icy and enriched by organic material permafrost. The amount of carbon stored in permafrost is estimated to be approximately a few times greater than the combined amount of CO_2 emitted by modern humans. An estimate is needed to calculate carbon dioxide output to the atmosphere. Carbon emissions from thawing permafrost and intensifying wildfire regimes present a major challenge to meet the aspirational goal of limiting the temperature increase to 1.5 °C.

The research topics of this Special Issue include permafrost, carbon dioxide emission, emission, thermokarst, ice and etc.

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Special Issue