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HOW CAN WE CONSIDER PERMAFROST CARBON IN ESMs

One major challenge for society in the next three decades is to keep global warming below 1.5 °C above pre-industrial levels (Paris / Glasgow Agreement). A crucial contribution to societal discussions and political decisions from science is the estimation of the potential anthropogenic greenhouse gas (GHG) emission budget to ensure the implementation of such agreements. Importantly, dynamics of Arctic permafrost-affected soils have not yet been considered in models used to estimate these potential GHG emission budgets, despite of their global relevance. Also, the lack of representing potential permafrost organic matter decomposition in global models prevents us from studying permafrost carbon-climate feedbacks. In this seminar, we will present the current state-of-the-art of representations of permafrost carbon in global models. Then, we aim to discuss some important methodological issues that we face at the moment and possible future directions to overcome these methodological limitations, in particular:

- Initial condition of permafrost organic matter
- Spatial heterogeneity and aggregation error
- Importance of ground ice content and hydrology for future dynamics of soil carbon dynamics
- Carbon stabilization processes
- Non-CO₂ greenhouse gases
- Plant-soil interactions