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Fires – Climate Feedbacks – Examples from the High North

SANDER VERAVERBEKE

Vrije Universiteit Amsterdam

Presenting Author: s.s.n.veraverbeke@vu.nl

Recent extreme fire events during the summer of 2021 in western Canada and Eastern Siberia, linked to climate warming, exemplify the role of fire as a catalyst of change in arctic-boreal regions. For Eastern Siberia, the extreme fire years occur when early snowmelt and atmospheric blocking events compound each other. For northwestern America, fires are related to lightning ignitions influenced by abundance of dry fuels. A rise in overwintering 'zombie' fires in boreal forests is evident. Overwintering fires are fires that are seemingly extinguished at the end of the boreal fire season, yet smolder in organic soils throughout winter to then re-emerge as flaming forest fires the subsequent spring. There are several aspects that demonstrate a positive feedback loop between climate warming and arctic-boreal fires. The geographic coincidence of predicted increases in future lightning with climate change, lightning fires, fire-related forest losses and carbon combustion indicate the vulnerability of arctic-boreal carbon stocks to fire.

Sander is an Earth system scientist who studies the interactions between climate change, terrestrial ecosystems, and the carbon cycle. He is interested in the effects of high latitude climate change on ecosystem disturbances and carbon fluxes, and their feedbacks to climate. His research focuses on the role of ecosystem disturbance, primarily fires, on the water, carbon and energy cycles, and he therefore uses a combination of field, modeling and remote sensing methods. Sander is a science team member of NASA's Arctic-boreal Vulnerability Experiment (ABoVE) and his current research is supported by the Dutch and European Research Councils.