

***Interactive comment on “Estimating the
permafrost-carbon feedback on global warming”
by T. Schneider von Deimling et al.***

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This is a very nice paper that quantifies the strength and timing of the permafrost carbon feedback. I very much like the ensemble approach to estimate uncertainty, which adds great strength to the results. I enjoyed reading it.

These estimates of carbon release from thawing permafrost are too low because the simple permafrost model did not consider talik formation. In Schaefer et al. [2011] we found that the soil column became thermodynamically unstable and thawed quite rapidly once talik thickness exceeded a critical thickness of about 0.5 m. In terms of the simple permafrost model, rapid vertical thaw would occur once the summer thaw depth exceeded the winter freeze depth by about 0.5 m. Talik formation would thaw the entire stock of frozen carbon in each latitude band at critical temperatures much lower than

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indicated by the simple permafrost model. After talik formation, the amount of thawed permafrost carbon and associated flux to the atmosphere increased by a factor of 2-3. Almost two thirds of the total 190 Gt of cumulative carbon flux in Schaefer et al. [2011] came from regions of talik formation along the southern margins of the permafrost domain. Talik formation explains why Schaefer et al. [2011] started with only 313 Gt of frozen carbon, no more than half of Schneider von Deimling et al. [2011], but estimated two or three times the flux.

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