

Interactive comment on “A model of the methane cycle, permafrost, and hydrology of the Siberian continental margin” by D. Archer

Anonymous Referee #2

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Reading the long comment from N. Shakhova, half of it being a description/defense of her own researches, it seems to me that she (and her group) felt attacked by the paper proposed by D. Archer. Indeed, D. Archer often refers and quotes N. Shakhova's group important experimental work all along the paper (more than 15 times) and therefore, to me, acknowledges their major contribution to the understanding of processes producing/emitting methane in this key climate region. In one reference (page7878, lines12-25), D. Archer questions one hypothesis from N. Shakhova and develops a little discussion about the possibility of a 50Gt release of methane within a few years. As a reviewer, I encourage D. Archer to review this small discussion according to the scientific elements made about this in N. Shakhova's comment.

I will not discuss long the style of N. Shakhova's comment, but I find it several times

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inappropriate in a scientific exchange. One should be careful to stay on a scientific “terrain” and not derive elsewhere. If one does not take this style into account, a few scientific questions remain in N. Shakhova's and V. Tumskey's comments which (as a reviewer), I encourage D. Archer to answer. These issues mostly question a too simplistic approach in the proposed model (assumptions, formulations, process representation). This is a classical issue between experimentalists spending a lot of energy, time and money to document, explain and model specific processes in detail, and larger-scale (time and space) modellers who aim at giving regional to global answers over time. The former are shocked with over-simplifications, which the scales addressed by the latter make mandatory. As stated in my review, as long as assumptions and limitations are clearly given (and I think they are in D. Archer's paper), I find useful to have integrated models on the top of local process-oriented measurements. If properly calibrated/evaluated, such models provide a scientific approach that seems more valid to me than simple extrapolations methods sometimes applied by experimental groups. In my opinion, integrated models and observations should complement each other and not be opposed in endless debates.

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