CLATHRATE SMOKING GUN HYPOTHESIS: OCEAN GAS HYDRATE MELTING CAUSES CRACKING OF UPPER CONTINENTAL MARGIN SLOPES CREATING MAJOR GAS RELEASE PATHWAYS

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Despite the potential for large releases of methane from the upper continental margin by hydrate dissociation, geophysical investigations have not included the critical part of the hydrate stability zone (HSZ) outcrop. If these HSZ outcrop areas at the shelf edge and upper continental slope are exposing dynamic "hydrate reservoirs", then it potential to affect the Earth’s climate by releasing methane to the ocean and atmosphere has to be considered. Our investigations on the high latitude Norwegian Margin show the instability of methane hydrates driven mainly by ocean warming and not of sea level change. Widespread cracks and faults at the outcrop zone of the HSZ point towards a relation to dissociating hydrates causing cracking of outer shelf and upper continental slope sediments in the shallow geosphere. Such recognition of cracks on the outer shelf will become important in the evaluation of methane releases as a powerful contributer to the Greenhouse Warming associated with millenia-scale climate change. Our geophysical observations will be discussed in context with ocean warming and hydrate melting scenarios during the Holocene.