



The evolution of the methane hydrate system of the west Svalbard continental margin since the last glacial maximum

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The release of methane from gas hydrate at continental margins has been proposed as a positive feedback mechanism in past periods of climate warming. Improving understanding of how hydrate systems responded to warming and sea-level change since the last glacial maximum will help predictions of their behaviour in the future. An analysis of the progressive change of the hydrate stability field in the continental margin of west Svalbard since 14ka is presented, together with estimates of the consequent release of methane. The behaviour of the system has been controlled by local sea-level change, which is strongly affected by lithospheric rebound from ice loading, and by changes in the North Atlantic circulation, changing the temperature profile within the water column. The hydrate stability zone is most sensitive to changes in water depth and temperature close to the outcrop of its base at the sea bed. This is the location of significant methane release by bubble plumes emanating from the seabed, recently discovered on the Svalbard margin. The relationship between the changing hydrate stability zone and the budget of methane migrating to the seabed from depth is examined.