



Catastrophic Seepage and Climate Change

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The emission of methane that is trapped in deep-sea methane hydrates has been postulated to explain abrupt climate change; however, dissolution to the water column presents a sever obstacle to its effect on the atmosphere. We present quantitative observations of methane emissions from a blowout from a shallow (22 m) hydrocarbon seep. Emissions were determined from atmospheric plume measurements. Observations for the blowout and for non-blowout seepage were used to validate a bubble propagation model. Simulations suggest a 1.1% gas loss to dissolution compared to ~10% loss for a typical low-flux bubble plume for this shallow blowout. Transport to the atmosphere largely was enhanced by the rapid upwelling flows induced by the massive discharge. Model simulations for deeper blowouts suggest that similar size blow-outs within the hydrate stability zone could allow a significant fraction of the emitted methane to atmospheric methane budgets.