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Shallow gas in the central part of the Korea Strait Shelf mud off SE Korea

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Shallow gas in the central part of the Korea Strait Shelf mud (KSSM) off SE Korea, revealed by Chirp and sparker profiles, is associated with acoustic blanking, acoustic turbidity, seepages, and plumes in the water column. In the Chirp profiles, the acoustic blanking is characterized by strong top reflection and complete wipeout of seismic data below. The acoustic blanking is dominant, covering about 60% of the survey area. The acoustic turbidity is characterized by very diffuse top reflection, partially masking the data below. In sparker data, the low velocity of gas-charged sediments caused velocity pulldowns below the acoustic blanking and acoustic turbidity. Assuming that the velocity of gas-charged sediments is 800 m/s, as measured in situ, the modeling of the velocity effect of gas predicts that about 60 – 70% of sediments below the acoustic blanking is gas-charged. Alternatively, assuming that the entire sedimentary column below the acoustic blanking is gas-charged, the velocity of the gas-charged sediments is about 900 – 1000 m/s.

Gas samples from the cored sediments consist almost exclusively of methane and their δ^{13}C values (–77 to –84 per mil) indicate biogenic gas. The abrupt seaward termination of the acoustic blanking at depth of about 102 m suggests that the pore water at this depth completely dissolves the methane. Assuming that the amount of methane dissolved in pore water at this depth represents the average concentration of total (dissolved and bubble-phase) methane and that porosity (78%) is constant throughout the KSSM, we estimated the total volume of methane in the study area to be 5.63×10^6 m^3 at 15 ˚C and 1 atm.