## Prediction of Gas-hydrate Concentrations from the AVO Characteristics of the BSR in the Ulleung Basin, East Sea (Japan Sea)

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Amplitude-variation-with-offset (AVO) analysis of the gas-hydrate bottomsimulating reflectors (BSRs) in the Ulleung Basin, East Sea, reveals that the BSRs with different reflection strengths in different sediment types exhibit different AVO characteristics, suggesting different gas-hydrate and gas concentrations. The BSRs in turbidite/hemipelagic sediments are characterized by a positive AVO gradient, indicating decreased Poisson's ratio in the gas-hydrate stability zone (GHSZ) probably due to the presence of gas hydrate. The BSRs in debris-flow deposits are characterized by a negative AVO gradient, indicating a decrease in Poisson's ratio below the GHSZ likely due to the presence of gas. The AVO gradient-intercept crossplots exhibit the same trends as those of rock physics models, helping predict gas-hydrate and gas concentrations across the GHSZ. The moderate- and highamplitude BSRs with relatively strong zero-offset amplitude in turbidite/hemipelagic sediments suggest high gas-hydrate concentrations. The high-amplitude BSRs in debris-flow deposits suggest a few percent or greater gas saturations and very small or little gas hydrate accumulation. The BSRs with a nearly flat AVO is probably due to low gas-hydrate concentrations and/or low gas saturations. The apparent high gashydrate concentrations in turbidite/hemipelagic sediments indicate that lithology is an important controlling factor for the distribution of gas hydrate in the area.

Keywords: gas hydrate; BSR; AVO; Ulleung Basin; East Sea