

Dating of pore water from the gas hydrate occurrence off Shimokita Peninsula, Japan: 129I results from D/V Chikyu shakedown cruise

Hitoshi Tomaru[1]; Rika Takeuchi[2]; Fumio Inagaki[3]; Hiroyuki Imachi[4]; Ryosuke Kotani[5]; Udo Fehn[6]; Zunli Lu[6]; Ryo Matsumoto[7]; Kan Aoike[8]

[1] New Energy Resources Research Center, Kitami Institute of Technology; [2] Earth and Planetary Sci., Tokyo Univ; [3] JAMSTEC; [4] XBR, JAMSTEC; [5] Earth and Planetary Sci., Univ of Tokyo; [6] EES, Univ. Rochester; [7] Earth and Planetary Sci., Univ. of Tokyo; [8] CDEX / JAMSTEC

Iodine concentration and radioisotopic composition ($^{129}\text{I}/\text{I}$) were measured for the pore waters from the gas hydrate occurrence in the forearc basin offshore Shimokita Peninsula, northeastern Japan, to determine the source formation of I and by association of accompanying hydrocarbons. Iodine concentration correlates well with the alkalinity and sulfate patterns, reflecting degradation stages of I-rich buried organic matter; rapidly increase in the sulfate reduction interval, and reach steady state with the upwelling flux at a rate of $2.9 \times 10^{-8} \text{ } \mu\text{mol}/\text{cm}^2/\text{yr}$ below 250 mbsf. The $^{129}\text{I}/\text{I}$ ratios of deep pore waters of 300×10^{-15} to 400×10^{-15} suggest potential ages for the I and hydrocarbon sources as old as 30 to 40 Ma, correlative well with the Eocene coaly source formations responsible also for the natural gas deposits underlying gas hydrate stability, indicating a close relation of their sources between recently exploited gas hydrate and conventional gas deposits in the same region.

Similar profiles are observed in I concentrations and $^{129}\text{I}/\text{I}$ ratios of the pore waters from the forearc basin in the eastern Nankai Trough, offshore central Japan; pore waters receive diffusive old I from deep sections at the forearc site, while those on the outer ridge contain younger I delivered through active faults induced by subduction. Source and accumulation of gas hydrate deposits are constrained well by the geological setting along the Japanese Island Arc.