

## **Diagenesis And Dolomite Formation In The Mallik 5L-38 Gas Hydrate Research Well, NE Mackenzie Delta, NWT**

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### **ABSTRACT**

Localized dolomite-cemented sandstones occur within poorly cemented sandy and silty packages of both the Mackenzie Bay and Kugmallit sequences in the Mallik 5L-38 Gas Hydrate research well, NE Mackenzie Delta. Previous research suggested a genetic link between gas hydrate emplacement, dolomite cementation, and pyrite formation (Jenner et al., 1999). To test this hypothesis petrographic and geochemical studies focused on constraining the origin of dolomite and authigenic pyrite cements with respect to gas hydrate emplacement.

Cement development was complex and formed during early to late diagenesis; deeper zones in the Kugmallit sequence (>1000m) are dominated by spectacularly zoned nodular dolomite cements and the upper part (<1000m) contains variable proportions of minor calcite and rhombohedral pore filling, massive oscillatory zoned, and late low luminescent dolomite cements. In some samples pyrite occurs as authigenic cements but much appears to be detrital in origin and not directly related to cementation.

This talk will constrain the diagenetic and geochemical evolution of the cements by integrating petrographic studies with major/trace element geochemistry, fluid inclusion microthermometry, and in-situ carbon, oxygen, and sulfur isotope analyses.