

Impact of Hydrates on Planetary Evolution

McGEE, T. M., Center for Marine Resources and Environmental Technology, University of Mississippi, University, Mississippi, U.S.A., and LOWRIE, A., Consultant, Picayune, Mississippi, U.S.A.

There are two end-member models for the evolution of planets: cool clusters warming and hot nebulae cooling. In either case, the hydrate phase could play an important role in a planet's evolution.

If a cool cluster contains enough water and appropriate gases, hydrates could form a be part of the initial cluster consolidation. Hydrates would then act as a conservative process to retain gas molecules and would continue to exist beyond a surface that would migrate outward from the cluster center, following the appropriate thermal environment.

In the case of a hot nebula cooling, hydrates could not form until the environment cools to a temperature dictated by the ambient pressure. Some of the lighter gas molecules could "boil off" by that time, however. When hydrates did begin to form, they would form first on the cooling surface and then descend toward the center following contours of appropriate temperature, serving to conserve whatever gases remain.

A common assumption concerning the evolution of a planet is that heat is generated by gravity-driven compression.