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### **Low Temperature Fluid Inclusions in Modern and Ancient Halites**

Halite crystals preserved in an undeformed, unrecrystallized state occur in bedded evaporites as old as Late Precambrian in age. These primary crystals have numerous single-phase brine inclusions that preserve information on the temperatures and chemical compositions of the surface waters from which they formed. Single-phase fluid inclusions must be cooled in a laboratory freezer to nucleate vapor bubbles. The homogenization temperatures of these fluid inclusions represent the temperatures of the brines from which the halite crystals grew.

A large number of fluid inclusions from modern and Pleistocene halites (Death Valley, California; Salar de Atacama, Chile; Salar de Uyuni, Bolivia) homogenize between 5° and 42° C. Homogenization temperatures above 40° C are not surprising because air temperatures in modern environments, such as Death Valley, reach 45° to 55° C and because there is a close correspondence between air temperatures and shallow brine temperatures in modern arid closed basins.

Originally single-phase fluid inclusions from Permian halites (Nippewalla Group, Kansas, and Salado Formation, New Mexico) and from Silurian halite of the Salina Group, Michigan Basin (A-2 Evaporite and F Salt), homogenize between 3° and 59° C. These temperatures are within the range experienced by modern surface environments. Fluid inclusion studies allow reconstruction of ancient surface environments and also define the temperature boundary between Earth's surface and burial diagenetic environments.