Lacustrine halite deposits have long been utilized for interrogating past climate conditions. In particular, microthermometry performed on fluid inclusions in halite crystals has been used to interpret lake water temperatures from ancient deposits. One notable obstacle in performing microthermometry in halite fluid inclusions is the lack of a vapour bubble in the single-phase liquid brine. Isochoric cooling of the inclusions to high negative pressures far below the homogenization temperature has commonly been used to provoke spontaneous vapor bubble nucleation in the metastable liquid. In a host minerals like halite, however, internal tensile stress may result in plastic deformation of the inclusion walls and typically a wide scatter of measured homogenization temperatures. Nucleation-assisted microthermometry, in contrast, employs single ultra-short laser pulses provided by a femtosecond laser to stimulate vapour bubble nucleation in metastable single-phase liquid inclusions slightly below the expected homogenization temperature. This technique allows for repeated vapour bubble nucleation in fluid inclusions without damaging the inclusion walls, yielding highly precise and accurate paleotemperatures from halite fluid inclusions. Moreover, the highly selective nature of nucleation-assisted microthermometry allows for a higher degree of quality control compared to the previous standard method. In this study, we tested the precision and accuracy of nucleation-assisted microthermometry for use in paleoclimate reconstruction utilizing modern halites precipitated in the laboratory under controlled and monitored conditions, Pleistocene halite samples from Death Valley, and varved halites precipitated in the 1980s in the Dead Sea.