

Seafloor Reflectivity: An Important Seismic Property for Interpreting Fluid/Gas Expulsion Geology and the Presence of Shallow Gas Hydrate

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ABSTRACT

A bottom-simulating reflector (BSR) is a seismic reflectivity phenomenon that is widely accepted as indicating the base of the gas hydrate stability zone. The acoustic impedance difference between sediments invaded with gas hydrate above the BSR and sediments without gas hydrate, but commonly with free gas below, are accepted as the conditions that create this reflector. The relationship between BSRs and marine gas hydrate has become so well known since the 1970s that investigators, when asked to define the most important seismic attribute of marine gas hydrate systems, usually reply, "a BSR event." Research conducted over the last decade has focused on calibrating seafloor seismic reflectivity across the northern Gulf of Mexico continental slope surface to seafloor geology and indicates that the presence and character of seafloor bright spots (SBS) can be indicators of gas hydrates in surface and near-surface sediments. It has become apparent that SBSs on the continental slope generally are responses to fluid and gas expulsion processes. Gas hydrate formation is, in turn, related to these processes. As gas hydrate research expands around the world, it will be interesting to find if SBS behavior in other deep-water settings is as useful for identifying gas hydrate sites as in the Gulf of Mexico.