

### Seafloor pockmarks in Passamaquoddy Bay: evidence for a biogenic methane origin

Bill Gray

*Ocean Mapping Group, Department of Geology, University of New Brunswick,  
P.O. Box 4400, Fredericton, New Brunswick E3B 5A3, Canada*

Pockmarks are now well-known morphological features of the sea-floor, having been identified in marine and lacustrine environments throughout the world. This phenomenon was first discovered in the Maritimes by King and MacLean in 1970, therefore, it is appropriate that one of the most extensively mapped pockmark fields in the world is also local, that of Passamaquoddy Bay, New Brunswick.

Most studies suggest methane gas as the venting fluid (gas or liquid) that current theories of pockmark formation require to initiate failure of sea-floor sediment. The origin of this methane is debated—indeed there are convincing examples of both thermogenic- and biogenic-gas generated pockmarks in the literature. A case is made here that the Passamaquoddy Bay pockmarks are produced by the escape of biogenic methane gas, generated within rapidly-depos-

ited Holocene silts and clays. Support for this conclusion is derived from GIS modeling of sediment, bedrock, and pockmark distributions within the bay.

Additional support for this conclusion is provided by anecdotal evidence, of the sort reported in journals such as *Science and Nature*, near the dawn of the twentieth century. Many seemingly unrelated phenomena, reported from lakes and coastal areas throughout the world, begin to assemble into a coherent, plausible hypothesis. These phenomena, such as “Barisal” or “lake guns”, “mistpuffers”, and even reports of beach sands catching fire, can all be explained by the venting of methane gas from the sea-floor. This contribution presents images of the Passamaquoddy Bay pockmark field, as well as anecdotal descriptions of the aforementioned phenomena, demonstrating their possible relationships.