Book M

Sediment Collapse Indicators in the 1970 Flathead Lake Seismic Dataset
By Robert W. Lankston and Michael H. Hofmann

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Robert W. Lankston
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The idea for this study came up during a casual conversation between Michael Hofmann and me sometime in 2014. Michael has been supportive of my development of this digital archive on the 1970 Flathead Lake seismic survey and supportive of my efforts to provide data in digital form from the original analog data and the data now available only in the images that were generated by Sidney Prahl in the 1970-71 time frame (Wold, 1982).

In 2012, I developed a largely manual process for converting the images of the seismic sections into seismic traces. With code development help from Robb Lankston, then a computer science and math major at the University of Montana, I automated the process, and in 2013, I loaded SEG-Y format files of the image to seismic traces to the collection.

A topic that had existed since the earliest days of evaluating the data and one that would come up from time to time when Hofmann and I would visit was the degree of degradation of the seismic sections by diffractions. We would also ponder the degree of degradation of the seismic sections by the bubble energy. The two ideas came together in evaluating Lines I and R, which intersect north of the mouth of Skidoo Bay.

The first draft of the article was prepared in the fall of 2015, and I presented the ideas during a lecture at the Montana Bureau of Mines and Geology (MBMG) in November of that year. Hofmann and I have worked on the text and the illustrations on and off since then hoping to have a document suitable for publication. As it stands, the article is another proof of concept regarding unrealized value that still exists in the 1970 seismic data.

The article in this book discusses evaluating a set of downwardly concave events on the Line R sections to determine that the events are not diffractions. It shows an analog to how a 1970's interpreter might have removed bubble events from a seismic section by using a modern seismic workstation. Finally, the article proposes that the arcuate reflections indicate lake sediments that collapsed into voids left after isolated blocks of glacial ice, buried deep in the valley, melted away. Fortuitously, Line I intersects Line R at the location of one of these collapse features, and a sense of the affected area can be gauged.