

Adventures in Mesozoic-Cenozoic event stratigraphy, northern and offshore eastern Canada

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In a series of projects and with various collaborators over the past two decades, we have been using event stratigraphy to more rigorously determine the temporal framework of Mesozoic and Cenozoic strata in northern and offshore eastern Canada. Events may be any one-time contemporaneous regional to global marker, for example a distinctive regional stratum, seismic marker or log pick, or a global geochemical signal. However, we use mainly events related to ranges of fossil species, such as extinctions, primarily of dinoflagellate cysts (dinocysts). Several of our collaborative studies also incorporate data from microfossil groups such as nannofossils and foraminifera: the more disciplines involved, usually the more refined will be the stratigraphic framework developed. The first study of the series involved Late Cretaceous–Cenozoic strata of the Scotian Margin and incorporated events based primarily on dinocysts and nannofossils, but also on spores and pollen (miospores) and foraminifera. This study was a key element of a much larger project on the Scotian Basin — the biostratigraphy component of the OETRA Play Fairway Analysis study funded by the Nova Scotia Government. This study involved new commercial analyses, as well as historical data from GSC Atlantic and incorporated data from several groups of microfossils. Throughout the progress of these studies, we were also pursuing a collaboration with the Denmark and Greenland Survey (GEUS) in developing an event stratigraphy for the Labrador Sea-Davis Strait-Baffin Bay region (the LabradorBaffin Seaway). This study has involved the palynological analyses of 17 wells on the Canadian and Greenland margins, although using only palynological data. A gap in data caused by the lack of industry wells on the Canadian margin of Baffin Bay is being filled by ongoing studies of the palynological assemblages of shallow core holes on the Baffin Shelf and of onshore sections on Bylot Island. We are now in the initial stages of applying this approach to Mesozoic-Cenozoic strata in the Sverdrup Basin. There exist many biostratigraphic studies of these strata, but they tend to be piecemeal and zonation based. Bringing all the data together, plus the generation of new data for this purpose, will provide a significant advance in the understanding of the geological history of the Canadian Arctic, and will involve events based on multiple fossil groups, as well as on geochronology and geochemistry.