

## Glacial-marine Sediments Record Ice-shelf Retreat During the Late Holocene in Beascochea Bay on the Western Margin of the Antarctic Peninsula

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Beascochea Bay has an overall rapid rate of sedimentation due to retreating, fast-flowing ice, and thus contains high-resolution records of Antarctica's glacial and climate history. Beascochea Bay is 16 km long by 8 km wide, located on the western margin of the Antarctica Peninsula, centered between Anvers Island and Renaud Island but open to the Bellingshausen Sea. Currently, three tidewater glaciers draining the Bruce Plateau of Graham Land enter into the fjords of Beascochea Bay, releasing terrigenous sediments which have left a record of the fluctuations of the Antarctic Peninsula Ice Cap since the grounded ice decoupled from the seafloor after the last glacial maximum. These three glaciers have played a significant role in providing sediment to the main basin, allowing a detailed sediment facies analysis to be conducted from eight sediment cores which were collected during the austral summer of 2007. Pebbly silty clay sediment cores, along with 3.5-kHz seismic data and multibeam swath bathymetry data, are integrated to reconstruct a glacial retreat timeline for the middle to late Holocene which can be compared to the recent retreat rates over the last century. Paleoenvironment of deposition is determined by mapping lateral facies changes from the side fjords (proximal) to the outer basin (distal), as each region records the transition from glacial-marine sediments to

open-marine sediments. As the ice retreated from the outer basin to the inner basin, most recently leaving the side fjords, each facies deposited can be age-constrained by radiocarbon,  $^{210}\text{Pb}$ , and  $^{137}\text{Cs}$  dating methods. A distinct  $^{137}\text{Cs}$  signal is readily seen in two kasten cores from the side fjord and inner basin of Beascochea Bay. This dating method revealed an average sedimentation rate of 2.7 mm per year for approximately the last century, which is comparable to  $^{210}\text{Pb}$  rates obtained in other studies. Lithology variations in each sediment core record indications of ice-shelf influence in Beascochea Bay throughout the Holocene deglaciation. The distinctively laminated sub-ice shelf facies can be clearly seen in the x-rays of these cores, and can be easily distinguished from the poorly sorted glacial-marine facies and the greenish finer-grained facies deposited in open-marine conditions. A 14 m-long sediment core taken from the outer basin of Beascochea Bay recovered the greatest length of sediment and it dates back to the middle Holocene. X-rays of this core show a possible mid-Holocene retreat of the ice shelf followed by intermittent advance and retreat that precedes the most recent retreat. The inner basin of Beascochea Bay has been without an ice shelf for the last 200 years, based on the sedimentation rates of the last century projected downcore. ■