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Continuous pCO_2 Time Series from Ocean Networks Canada cabled observatories on the northeast Pacific shelf-edge/upper slope and in the sub-tidal Arctic

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Continuous monitoring platforms contribute to our understanding of ocean change by resolving variability that can be a defining component of long-term change and a confounding factor in its detection by occasional measurements. The reliability of pCO_2 sensors technologies has progressed to the point where months-long field recordings from autonomous and cabled sensor platforms can be used to document seasonal and higher frequency variability in pCO_2 and its relationship to oceanographic processes. We will present pCO_2 time-series data from deployments on two Ocean Networks Canada cabled platforms: a bottom-moored, vertical profiler at the edge of the continental shelf off Vancouver Island, Canada, and a seafloor platform at subtidal depth in the Canadian Arctic at Cambridge Bay, Nunavut. Both platforms support Pro-Oceanus pCO_2 sensors together with other oceanographic instruments, and streamed continuous data to a shore-based archive. The vertical profiler deployment yielded a 7-month time series of pCO_2 and corresponding oceanographic sensor data from 5 vertical profiles per data, from 400m depth to surface waters, centered around local noon. Step-wise profiles during the downcast provided the most reliable pCO_2 data, permitting the sensor to equilibrate to the broad range of pCO_2 concentrations encountered over this depth interval. The Arctic sensor platform was deployed in August 2015 and has been recording increasing pCO_2 concentrations since the formation of sea ice. We will review the major characteristics of these two time series and the performance of the sensors in relation to the operational conditions encountered in vertical profiling and continuous operation in subzero seawater. We will also review the under-ice performance of a pH sensor and a prototype optical CO_2 sensor that are deployed on the same Arctic platform.