Permanent Access to the Seafloor Through Ocean Networks Canada - Key Discoveries From Nine Years of Data

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Ocean Networks Canada operates ocean observatories and hosts data from the Canadian Pacific, Arctic and recently the Atlantic Ocean. The two prominent observatories are VENUS (Victoria Experimental Network Under the Sea), online since 2006, inshore from Vancouver Island in the Salish Sea, and NEPTUNE (North East Pacific Time-series Underwater Networked Experiments), offshore at the northern Cascadia margin across the Juan de Fuca Plate, online since 2009. Over 250 Terabytes of data have been collected and are openly and freely accessible. Geoscientific research has made use of these high-resolution permanent time series and started to quantify ocean and seafloor dynamics. For example, upward-looking echo-sounders quantify vertical migration of euphausiids (e.g. krill) in the water column, showing additional environment- and growth-related influence to the expected light intensity-related diel migration pattern; or camera observations quantify in-situ the speed of bacterial mat withering, clam movements and local anoxic region distribution changes; or rotating sonars show unprecedented long-term stability observations of a hydrothermal vent system and the sudden changes after a local earthquake, or at a gas hydrate field sonar data detect gas venting that has an amazingly specific tidal pressure correlation which hints at internal sediment processes in relation to gas hydrate dissociation; or a regional array of bottom pressure recorders has detected five major tsunami events which help fine-tune tsunami models for better hazard preparedness.