



Ocean Observatory Gas Hydrates Experiments on the Cascadia Margin

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Ocean Networks Canada's (ONC's) NEPTUNE observatory and the Ocean Observatories Initiative's (OOI's) Cabled Array installations enable long-term gas hydrate experiments on the Cascadia Margin offshore Vancouver Island and Washington and Oregon State. The great advantage of cabled ocean networks in providing power and high bandwidth internet access to the seafloor on a permanent basis is allowing constant monitoring and interacting with experiments hundreds of kilometres away from shore throughout the year. Many different gas hydrate related experiments are installed at three various hydrate nodes, Clayoquot Slope and Barkley Canyon offshore Vancouver Island and Southern Hydrate Ridge offshore Oregon. As an example, a seafloor crawler called Wally is operated from Bremen in Germany by Jacobs University, carrying out measurements by moving around the Barkley hydrate mounds on a daily basis, determining for instance the speed of dynamic changes of the benthic communities. In another example, several years of hourly sonar data show gas bubbles rising from the seafloor near the Bullseye Vent with varying intensities, allowing statistically sound correlations with other seafloor parameters such as ground shaking, temperature and pressure variations and currents, where tidal pressure appearing as the main driver. The Southern Hydrate Ridge is now equipped with the world's first long-term seafloor mass spectrometer, co-located with a camera and lights, hydrophone, current meters, pressure sensor, autonomous OSMO and fluid samplers, and is surrounded by a seismometer array for local seismicity. The data are freely available through open access data portals at: <http://dmas.uvic.ca/home> and <https://ooinet.oceanobservatories.org/>