



Advantages of long-term multidisciplinary ocean observations for gas hydrate systems - Examples from Ocean Networks Canada

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Ocean Networks Canada (ONC) operates permanent ocean observatories around Canada, with two science nodes on gas hydrate sites on its NEPTUNE observatory off Vancouver Island. We present examples of gas hydrates related scientific discoveries that require high power and high data capacity provided by the underwater cabled network. The first example utilizes the seafloor crawler Wally that is operated by Jacobs University in Bremen. Regular live crawler missions allowed a thorough analysis of the benthic activity around the hydrate mounds, where the cabled access makes it possible to drive at a speed dependent on the seafloor turbidity to obtain clear images. Combining these visual data with a variety of co-located environmental monitoring data showed which species reacted to which parameters, for instance that sablefish appear to follow low currents, Juvenile crabs react to oxygen levels or hagfish to chlorophyll. The second example is from gas vent monitoring using a 270 kHz sonar. At least one year of constant monitoring was necessary not only to prove that seafloor gas venting is primarily controlled by the tidal pressure but also to establish months-long phases of different venting intensity. This highlights that ship-based monitoring is less adequate for quantitative analyses of methane release into the ocean, though crucial for extrapolating the observatory results. Note that all these data are freely and openly accessible to the research community through Oceans 2.0, ONC's data portal; see <http://www.oceannetworks.ca/DATA-TOOLS>.