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Scientist at Work

Notes From the Field

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Deep Sea Methane Vents at Hydrate Ridge

By [JEFFREY MARLOW](#)

Jeffrey Marlow A view from the Astoria Column.

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The 125-foot-tall column overlooking Astoria, Ore., is covered with scenes of the region's exploration-rich history: Capt. Robert Gray claims the region for America in 1792, Lewis and Clark reach the Pacific in 1805, and explorers with the Pacific Fur Company arrive in 1811. Despite these textbook-worthy highlights, Astoria is perhaps best known for its starring role in the Oscar-snubbed cult classic film "The Goonies" (apparently we missed the 25-year "Goonies" reunion by a couple of weeks). Nonetheless, it's a fitting place to set off on our own journey of discovery.

Over the next 12 days, our contingent of 24 scientists and 30 crew members will be mounting a [scientific assault on Hydrate Ridge](#), a fascinating site 90 kilometers off the Oregon coast where methane gas flows out of the earth's crust and into the deep ocean. Methane has a P.R. problem: In the atmosphere, the gas is a troublemaker, contributing to climate change with 25 times the heat-trapping power of carbon dioxide. But on the seafloor, it's a lifeline, as innovative micro-organisms are able to eke out a living converting methane to carbon dioxide and using the resulting energy to grow. Where one type of organism leads, others will follow, and entire ecosystems have grown up around these methane vents: microbes, clams, stringy tube worms and a range of other exotic species.

The methane vents at Hydrate Ridge are known as cold seeps, because the temperature hovers around 4 degrees Celsius — typical of the deep ocean. These conditions are in marked contrast to the flashier hydrothermal vents, where superheated water can exceed 100 degrees Celsius and plumes of "black smoke" (which is really composed of metallic minerals) billow out of the rock chimneys.

But from a biological point of view, both types of deep sea

National Energy Technology Laboratory A bathymetric map of Hydrate Ridge.

vents are critically important in the same way. Virtually all other known life on Earth is ultimately dependent on the sun, either using it for energy directly (plants) or eating other links of the food pyramid (that would be you). Deep sea vents are a different story: Hundreds of meters down, sunlight is irrelevant, and organisms need to look elsewhere for food. Chemicals in fluids squeezed out of vents provide the right nutrients to sustain

an oasis of life in the middle of the seafloor desert. This kind of sun-independent ecosystem makes the idea of extraterrestrial life a bit more palatable because we know that even if the surface is too hostile (too hot, too cold, too dry, too much radiation), there may well be enough food beneath the surface for creative cells to work with. Our mission over the next couple of weeks is to learn more about the life forms at cold seep environments, how they interact with each other, how they shape our planet, and what they might mean for the possibility of life beyond earth.

We arrived yesterday morning as our driver/Astoria evangelist pointed out the highlights of this fading fishing town on the south bank of the Columbia River. Over there is where they filmed the orca in “Free Willy” jumping over the rocks. That was the first house in the country to have a flush toilet. This part of town had the largest Finnish population west of the Mississippi in the 1800s. I consider myself well prepared for the day “Astoria” appears as a “Jeopardy” category.

Jeffrey Marlow The deck of the Atlantis.

When we got to the dock, the blue-hulled Atlantis was a hive of activity, with suitcases, microscopes and tanks of liquid nitrogen being loaded on board. Atlantis is a 274-foot-long research powerhouse, owned by the United States Navy and operated by the Woods Hole Oceanographic Institution for the marine research community. Onboard, it’s “Deadliest Catch” meets “CSI,” as grizzled sailors and crew work alongside lab-coated scientists in the name of science. We’ll be setting sail (or, less romantically but more accurately, firing up the diesel-electric thrusters) early tomorrow morning, eager to get to work at Hydrate Ridge.