

# Mackenzie Canyon: a Submarine Oasis

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The ocean, one of the greatest mysteries of our world. We are only starting to discover the secret worlds that lie beneath the surface and to understand the impact that it has on our own lives. For example, did you know that 50 percent of the global fish catch comes from coastal regions that occupy just 1 percent of the ocean? These regions are characterized by a process called “upwelling”.

Remember that childhood experiment where you stacked oil over water over honey? These layers are very difficult to mix, aren't they? Similarly, the ocean is made up of layers of water stacked based on their densities, and water is only allowed to travel within their given layers with very minimal upward or downward movement.

Coastal upwelling is the process that occurs when winds push the top layers away from the coast, causing deeper layers to “well-up”. The rising waters bring nutrients from the deep ocean. The sudden influx of nutrients causes a boom of life and a feeding frenzy for local fish, whales, and birds!

But, even in regions where the layers are so tightly stacked that coastal upwelling is difficult, we still see patches of rich biodiversity. What's happening here? Well, upwelling caused by submarine canyons. One such “desert” is the Arctic Ocean, and its oasis is the Mackenzie Canyon.

The slide shows the underwater terrain off the coast of Canada in the Arctic Ocean, and the Mackenzie Canyon is the U-shaped valley.

My work explores the mechanisms that drive canyon upwelling inside the Mackenzie Canyon

using computer models. By analyzing our model results and comparing them to real-world observations, we can describe the circulation and upwelling in this region and conclude that the strong upwelling in the Mackenzie Canyon helps to promote a thriving biological oasis in the typically desert-like environment of the Arctic Ocean.

In a rapidly changing world, understanding the physical processes that influence biodiversity is critical for ensuring that the future of our oceans is protected.