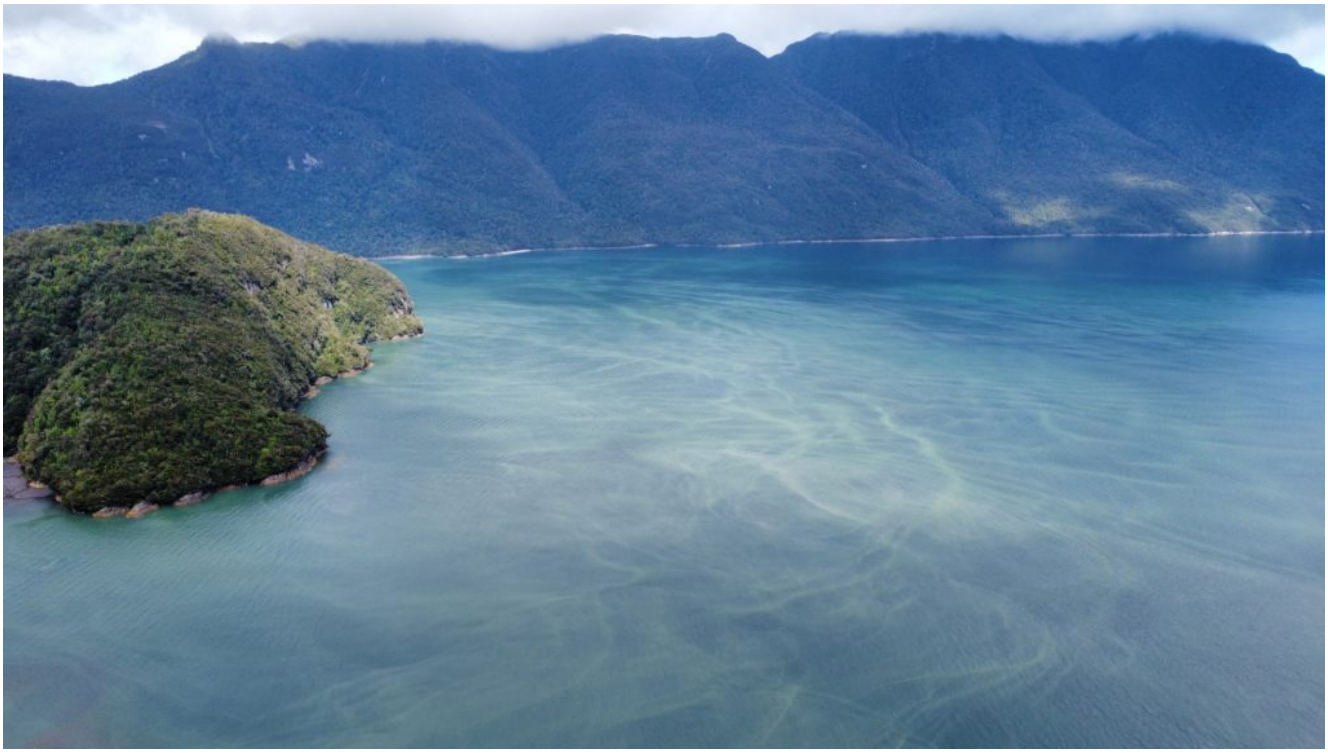
ONR Global Gaining Insight into the Effects of Glacial Melting in Coastal Regions



The Office of Naval Research is studying how melting glaciers in Patagonia can affect the coastal environment. *ONR*

A research project from the Office of Naval Research (ONR) Global is providing valuable information about the effects of melting glaciers in Patagonia that feed into coastal fjords, transporting sediments, freshwater and nutrients.

Dr. Chris Konek, science advisor at ONR Global in Chile, said the research will help the Department of the Navy understand the effects of a changing climate on the coastal environment.

“That’s the kind of the thing the Marines need to be able to handle,” he said. “It’s basic research and so it will help provide a fundamental understanding of this aspect of coastal systems where you can expect more things like this to happen in the future – more glacial melting as opposed to less.”

Konek said sediment trapped in the melting glaciers creates higher density in the water that feeds into the fjords, creating stratification and internal waves.

“When we have those waves between different layers in the water in the ocean, we call those internal waves,” Konek said. “So then the idea of the project is that you have this glacial plume, the sediment and the internal waves, and you’re looking to see how these different features interact with one another.”

Cristian Escauriaza, professor, Pontificia Universidad Católica de Chile, is the principal investigator along with his university colleague, Megan Williams. They are working with the Filantropía Cortés-Solari, a conservation organization that owns and manages the Melimoyu Elemental Reserve in northern Patagonia.

Escauriaza said, “We are interested in understanding the changes in the physical environment produced by the large input of glacial rivers to the coast. In these sub-Antarctic regions, and similarly near the Arctic, the effects of the fresh water in the coastal ocean can change the physical properties and dynamics of the flow in the adjacent fjords.”

Patagonia is largely remote with a diverse ecosystem and a rich array of wildlife, including penguins and blue whales. Konek said ONR Global is interested in Escauriaza’s project for its potential to inform what’s happening to that ecosystem, which can also help inform what’s happening to other coastal regions experiencing the same challenges.

While the project in Patagonia was awarded about a year ago, Escuariaza’s team recently carried out field measurements.

“Early information has shown that measurements of the tide amplitudes, river discharge variability, temperature and salinity are critical to identify the leading mechanisms of the formation and propagation of internal waves,” Escuariaza

said.

He added, “The fjords and river systems in Patagonia are a critical part of the sub-Antarctic region and understanding their dynamics is vital to addressing the challenges posed by climate change. Our goal is to provide new insights into the processes that govern these coastal systems, which will help develop sustainable strategies for their management.”

Researchers from Stanford and Stonybrook Universities, Oliver Fringer, Stephen Monismith and Jacqueline McSweeney, are also taking part in the study.

Konek said collaboration among the scientific community is key to what ONR Global is able to accomplish through its research awards.

“We’ve got two people at the Naval Research Lab that are really supportive of the project. One of them was recently promoted to technical director of the Naval Meteorology and Oceanography Command, so we’re hoping that kind of collaboration continues and expands.”

In addition to measuring the effects of glacial waters in Patagonia’s coastal fjords, Konek said ONR Global is sponsoring another project on climate change with the same university for the prediction of heat waves across both North and South America.