
Long-term monitoring of oceanic conditions in the Golfo de Penas



Blue Marine Foundation and Patagonia Projects

Project overview - June 2020



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Headlines

- Chile has 80,000km of coastline, and one of the largest fjord systems in the world.
- The Golfo de Penas is influenced by Pacific ocean currents, river runoff and glacial ice melt.
- Three tectonic plates meet at the Golfo de Penas (The Antarctic, South American and Nazca plates).
- The Golfo de Penas has high levels of primary productivity, which supports many different species in its ecosystem.
- El Nino conditions and human activity are impacting oceanographic conditions in the Golfo de Penas and need to be monitored.

Story

The Golfo de Penas sits on a tectonic triple junction and is part of one of the most extensive fjord systems in the world, characterised by river run-off that meets tidal currents and sometime ice-melt to cause nutrient-rich upwellings. This leads to high levels of primary productivity, which subsequently supports phyto- and zooplankton and their food chains. Primary productivity is impacted by environmental factors such as El Nino, which in turn can intensify Harmful Algal Blooms (HABs) like the ones that likely caused the mass sei whale mortalities and the hydrocoral die-offs in this area. To protect this area effectively, it is therefore crucial to understand the environmental factors that dictate the primary productivity in the area. This will also help to monitor the effects of glacial melting due to climate change, which will cause increased fresh water in the Golfo de Penas system. Patagonia Projects aims to achieve this by facilitating long-term monitoring of oceanic conditions through CTD (Conductivity, Temperature, Depth) data, on-land weather stations, and marine invertebrate sampling. In the past, Patagonia Projects has also facilitated geological studies, where scientists collected data to understand the age and stratification of the sea floor in the Golfo de Penas. This information all contributes to improving our knowledge of the oceanic environment and conditions in this unique area.



Top image: Invertebrate sampling. Credit: Isabella Clegg

This image: Dropping the CTD. Credit: Keri-Lee Pashuk

Front cover: A boat and glacier in the Golfo de Penas. Credit: Will Darwin

Papers

Directly from Patagonia Projects expeditions:

- Encinas, A., Moreira, R., Nielsen, S., & Bravo, X. (2015). Estratigrafía, edad y ambiente de sedimentación de los depósitos Neógenos del Golfo de Penas y Península de Taitao sur de Chile (47°S). In XIV Congreso geológico Chileno Coquimbo Actas 1e4 (Vol. 269).

Activities

- Take CTD (temperature, depth and salinity) data at multiple locations on each expedition.
- Sample marine invertebrates for species and abundance.
- Collect long-term weather data from land stations.

Targets

- Set up long-term, small land stations (have identified sponsors) to collect weather data.
- Collect several years worth of data on oceanographic conditions of the Golfo de Penas.

Outcomes

- Understand how primary productivity varies with sea temperature, salinity and depth.
- Understand whether primary productivity predicts whale abundance in season to season.
- Discover which marine invertebrates are present in the area and which species correlate with the sei whales' (and others') arrival.



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