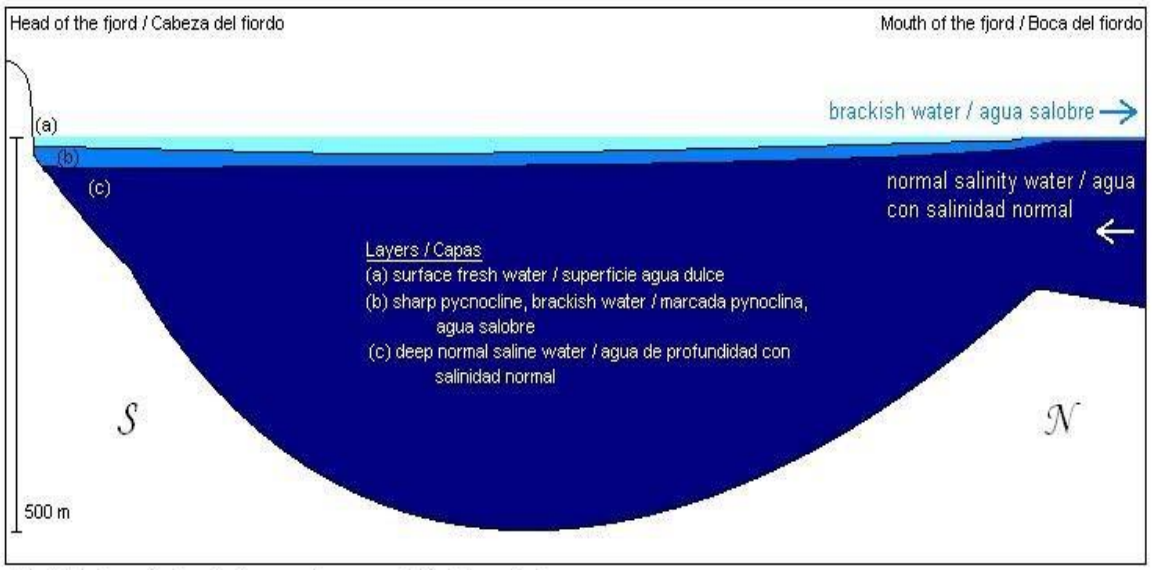
Oceanographic Conditions

The Comau Fjord features very large differences in vertical density; the vertical gradients are among the strongest found in the world. Three different layers can be distinguished: a surface layer, generally no deeper than 10 meters, with variable internal stratification that depends on recent fresh water input, local heating and cooling, and wind mixing. The salinity of this layer is at its minimum at the head of the fjord, and gradually increases towards the mouth. Seasonal variations in the local wind forces may cause an alteration of up to several meters in the depth of the surface layer at the inner end. These disturbances propagate as internal waves towards the mouth and a very sharp pycnocline below the surface layer. In the winter this is primarily caused by differences in salinity and in summer by both temperature and salinity. Due to this heavy stratification, the surface water can be very warm during the summer – over 20º C.

The deep water exhibits a temperature of around 11º C and salinity over 32 ppt – similar to the water outside of the fjord. Considering the fact that the depth along the whole fjord exceeds 400 meters, this is the layer with the greatest volume of water within the fjord. Longitudinal variations and currents within this water mass are small.

The circulation and water exchange within the area outside the fjord are governed by estuarine processes, meaning they are driven by fresh water influx from rivers and mixing across the pycnocline. The brackish surface water that exits at the mouth is replaced by a slow, compensating flow below the pycnocline and fresh water.

Even if the tidal range is over 7 meters at spring tides, the tidal currents are weak everywhere because of the wide mouth and the large depth throughout the fjord. The tidal current is only noticeable at the narrow entrance to the small Quintupeu Fjord.



Simplified schematic of water layers and movement of the Comau Fjord
Esquema simplificado de capas y movimiento de agua en el Fiordo Comau