EGU21-3075, updated on 02 Aug 2021
https://doi.org/10.5194/egusphere-egu21-3075
EGU General Assembly 2021

The coastal salinity budget of the Southeastern Pacific Ocean

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As one of the most productive ecosystems in the world, the Southeastern Pacific Ocean (SPO) coastal zone is economically important to the countries of the region. Dynamically the SPO coastal zone is influenced by the Patagonian Icefields and the large-scale circulation of the open Pacific Ocean, both of which are sensitive to climate change and modes of climate variability, particularly El Niño–Southern Oscillation (ENSO). Due to a paucity of observations, however, the dynamics of this region are still poorly understood. Here we use the coastal salinity budget as a means of investigating the dynamics of the SPO coastal zone and its relationship with the deeper ocean and Patagonian Icefields, through a combination of high-resolution ocean modelling, satellite observations, and reanalysis data. First, the long-term trends and interannual fluctuations, and their relationship to modes of climate variability are presented. Next, the salinity budget is examined, and the primary balances are quantified. We find that the salinity is primarily governed by the balance between freshwater input and horizontal advection. Finally, we assess the ability of satellite and in-situ observations and reanalysis products to diagnose SPO coastal salinity budget.