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Interactive comment on “Seasonal hydrography and surface outflow in a fjord with deep sill: the Reloncavi fjord, Chile” by M. I. Castillo et al.

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Ans 1 – Ref. #2:

We will incorporate in the new version of the manuscript (MS) comparative results with same fjords of the northern hemisphere, we think that one interesting issue to remarks is related with the specific comments made by the Reviewer, despite the southern Patagonian fjords are as deep as the Norwegian, Swedish or Canadian fjords here the deeper basin near their heads are mainly hypoxic ($< 2 \text{ mL L}^{-1}$) which is a combined result of a combination of physical and biogeochemical processes (Silva and Vargas, 2014).

Silva, N., Vargas, C.A., 2014. Hypoxia in Chilean Patagonian Fjords. Progress in

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Ans 2 – Ref. #2:

The work of Montero et al. (2012), compares regional winds (a pixel outside the Chiloe island) with the meteorological station in Puelo for the period August to November of 2008 they report positive and significant correlation between both data sets ($r = 0.44$, $p < 0.001$). Additionally, the seasonal pattern of the region (see Saavedra et al., 2010) coincide with the local pattern reported in this study. Typically, the data problems in these systems (Patagonian fjords) is how representative is the regional wind into the fjord systems (contrary to the observation), because within the fjords winds tend to be locally forced and along the axis of the fjord (Farmer and Freeland, 1983) thus a local weather station it is necessary to study the dynamics of the circulation. In the Reloncavi fjord, we observed that wind plays a key role in the modification of the gravitational along-fjord circulation (see Castillo et al., 2012). We also study the influence of the wind stress on the subtidal dynamics in a recent work in review on PlosONE, on there we analyzed how into the fjord winds event could perturb the pycnocline which then oscillates at the natural internal period (internal seiche oscillation) of the fjord which is nearly of 3 days.

Despite all the quoted studies, we make a simple analysis of the wind-stress into the fjord and outside the fjord, the magnitudes outside were major than the observed winds in Reloncavi (Fig. A3). We are aware that exist differences on magnitude, but the regional pattern persist on the seasonality of the winds inside the Reloncavi fjord.

Ans 3 – Ref. #2:

The problem was mainly analyzed from the physical oceanography because the study had that scope, analyzing the exchanges from a physical perspective, we design and use data to aboard the study of the dynamics of the fjord. Obviously we take measurements of Oxygen and Chl-a in which processes are involve biological and ecological factors beyond the pure physic. With our data is only possible speculate the implica-

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tions on the biology associated. We will incorporated on the new version a paragraph highlight the low DO near of the head of the fjord, and that issue must be taking into account for the policies makers to the use and control of the aquaculture on the head's of the fjord.

Ans 4 – Ref. #2:

Thanks for the comment about the grammars of the manuscript, after make the changes that the Reviewers suggest we will send the MS to be checked on by AJE (<https://www.aje.com/en>) highly recommended for scientific manuscripts like this.

Captions were checked and changed accordingly to the suggestion. The Fig. 2, contains the Cochamo discharge but is so small (ca. 20 m³ s⁻¹) that seems to be not included, we included on the caption a phrase which highlight that issue.

Thanks for your supplementary material which was helpful to improve the manuscript.

Interactive comment on Ocean Sci. Discuss., 12, 2535, 2015.

OSD

12, C1630–C1633, 2016

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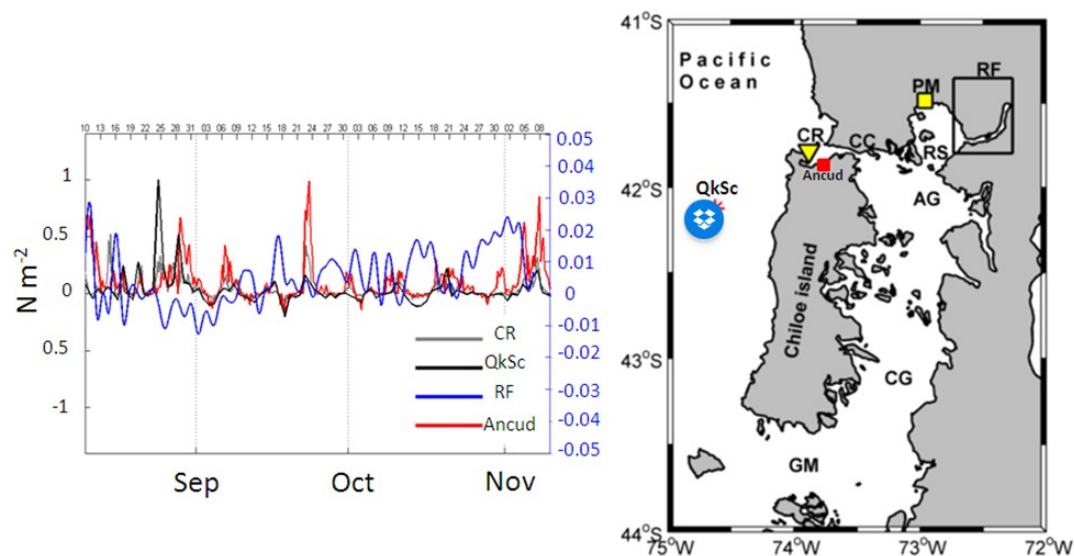
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Figure A3. Comparison between the regional along-fjord winds stress from different sources: QuickScat (black), Corona (gray), Ancud (red) and RF (blue).

Fig. 1. Comparison of winds.

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