

## ***Interactive comment on “Inter-decadal changes in the intensity of the Oxygen Minimum Zone off Concepción, Chile ( $\sim 36$ S) over the last century” by B. Srain et al.***

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Srain and colleagues present the interesting results of their high-resolution analyses of multiple geochemical paleoceanographic proxies in a core of sediment from under the coastal upwelling area off Concepcion, Chile. Their proxies are selected to allow them to reconstruct the paleoredox and paleoproductivity conditions at this site and to infer changes in microbial communities in response to these conditions. Both trace metal and organic biomarkers are employed, which is an unusual and potentially very effective combination. The cored sediment represents the period 1900 to 2009, and it reveals important changes in paleoceanographic depositional conditions over this pe-

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riod. The authors interpret these changes to reflect principally the impacts of the PDO on upwelling and export production of organic matter, which in turn impact the oxygen demand at the seafloor and ultimately the whole microbial community. The study and its findings are consistent with other lines of evidence for recent paleoceanographic changes along the Pacific margin of South America, and they are unique in their combination of geochemical proxies. However, several elements of this contribution merit expansion, reconsideration, or correction before it can be considered a finished work. Several technical issues need to be addressed. Foremost among these is the curiously different patterns of behavior of the organic biomarkers presented in Figure 4. Only the bacterial biomarkers seem to conform well to the postulated PDO influences on the coring site; the sterols and the GDGTs do not seem to be affected by the PDO cycles, and the MAGEs appear to show some combination of the hopanoid and sterol patterns. These variations are glossed over in the Discussion, yet they may be evidence of other, equally important processes that affect the microbial communities at this location. Another issue, which is minor but still merits attention, is that Panel F in Figure 2 should have the same vertical 25 cm depth axis as the other panels, and it should show only the radiogenic lead dates that are the basis for the geochronology used in this study. Finally, many of the sampled intervals in the core are missing data. Were these proxies below their detection limit in these intervals, were there analytical problems, or were they simply not measured? Explain! A semi-technical issue is the authors' repeated use of the word “flux” when they report only concentrations. A flux is an amount per unit time, not a concentration. If fluxes were actually measured, they should be shown and discussed properly. Incorporations of mass accumulation rates would strengthen many parts of this study, but actual determination of these true fluxes is admittedly difficult and often not possible. Please correct or clarify this issue. A last issue that badly needs attention is that the paper is peppered with typographical and syntactical errors that interfere with its reading. The results of this interesting study deserve better presentation. The authors simply must more carefully edit its text!

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