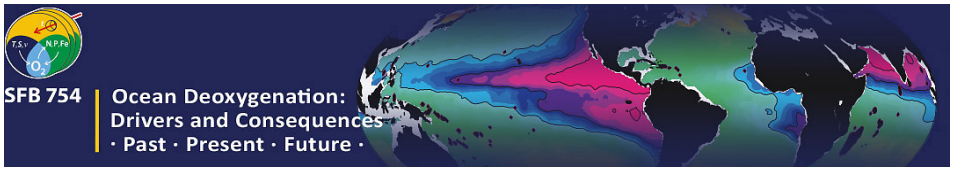

Contribution ID : **245** Type : **Oral**

VARIABILITY AND TRENDS OF THE OXYGEN MINIMUM ZONE AT THE COASTAL UPWELLING SYSTEM OFF PERU

Wednesday, 5 September 2018 14:30 (15)

The Humboldt Current upwelling ecosystem, particularly the northern component off the coast of Peru is considered a hot spot for the scientific community because of its unique characteristics: it is the upwelling system with the biggest catch productivity despite the fact it is embedded in a shallow and intense oxygen minimum zone (OMZ). It is also an area of intense biogeochemistry activity and experiences one of the large interannual variability associated with the equatorial remote forcing. The present work aims to present a detailed study of the spatial and temporal distribution of dissolved oxygen off Perú since 1960 to recent years. The dataset offers the unique opportunity to explore longer timescales of variability expected from the complex of processes involved. Overall, our results illustrate the rich spectrum of OMZ variability. In particular suggests the strong connection at seasonal scale with the coastal upwelling dynamics, water masses distribution, and biology; while at interannual scale but also a low-frequency a connection with the equatorial forcing and the El Niño events. The spatial analysis of the OMZ time series put in evidence the large amplitude of the oxygen variability in the northern zone compared with a more stable environment in the center and south of Peru. Important decadal changes associated with the OMZ contraction or expansion appears associated with the Pacific Decadal Oscillation (PDO) and the variability of the El Niño events. From 2000 a long-term deepening of the oxygen-deficient waters appears in the data in contrast to the long-term open ocean deoxygenation trend observed over the last decades in the eastern tropical Pacific. This suggests that either the oxygen variability in the coastal area could be not representative of the changes in the offshore OMZ. This would deserve further investigation. A better understanding of the natural variability is essential to understand changes in nutrients and finally predicting the productivity and distribution of marine resources. In addition, maintain monitoring and fix points are essential in the context of the Climatic variability and Climate change and need to be coupled with experimentation design and modeling which needs to be taken into account for future work.

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Session Classification : 05 Major Upwelling Systems

Track Classification : 05 Major Upwelling Systems