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Abstract

Contribution for the Understanding of Coral Bleaching Events: The Case of *Palythoa caribaeorum* off Porto Belo, South Brazil †

Rafael Schroeder [1,2,*,‡], Lucas Gavazzoni [1], Carlos E. N. de Oliveira [3], Pedro H. M. L. Marques [3] and Ewerton Wegener [3]

[1] Laboratório de Estudos Marinhos Aplicados, Escola do Mar, Ciência e Tecnologia, Universidade do Vale do Itajaí (UNIVALI), Itajaí 88302-901, Brazil; gavazzonilucas@gmail.com
[2] Centro Interdisciplinar de Investigação Marinha e Ambiental (CIIMAR), 4550-208 Matosinhos, Portugal
[3] Laboratório de Mergulho Submarino, Escola do Mar, Ciência e Tecnologia, Universidade do Vale do Itajaí (UNIVALI), Itajaí 88302-901, Brazil; kadunemitz@univali.br (C.E.N.d.O.); pedro_marques@univali.br (P.H.M.L.M.); ewerton.wegener@univali.br (E.W.)
* Correspondence: schroederichthys@gmail.com
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‡ Presenting author (Poster presentation).

Abstract: The white encrusting zoanthid *Palythoa caribaeorum* is known to form large colonies, which serve as aggregators of marine fauna. In Porto Belo, south Brazil (27.158° S, 48.553° W), the fish community was more abundant over *P. caribaeorum* grounds and more diverse, as described by traditional ecological descriptors, beta-diversity index, and discriminant analysis. In addition to its important ecological role, it is of great economic relevance, as it is conducive to the establishment of underwater diving trails. In the last 20 years, however, the bleaching of this zoanthid was observed within the study area. As suggested in the literature, we evaluated environmental temperature from three different sources: 1. Meteorological stations (MS) between 1961 and 2019; 2. Satellite images (SI) (1993–2019), and 3. Water temperature (WT) obtained in situ with dive computers, between February and September 2018. Initially, a Pearson correlation coefficient was calculated for temperature values obtained in MS and by SI (between 1993 and 2018) and between temperature values obtained by SI and by dive computers (February to September 2018—WT). Subsequently, the temperatures obtained in MS and in SI were standardized in additive generalized models for location scale and shape. The temperature values obtained in MS and by SI showed perfect correlation (R = 1). In the comparison between temperature values obtained by SI and WT, the correlation coefficient was 0.92, indicating that air, sea surface, and water temperatures showed the same increasing trend. The adjusted temperature values for the weather stations showed an average increase of 1.68 °C between 1961 and 2018 and 0.64 °C between 1993 and 2018 for the values adjusted from SI. The results obtained in a distance-based redundancy analysis showed the spatial distribution of fish species sighted at Porto Belo during the monitoring conducted between February and September 2018 was significant for the preferred temperature of these species. Despite the lack of available estimates for preferential temperature of *P. caribaeorum*, this progressive increase in temperature is one of the main causes for the bleaching of several coral species, as reported in the literature.

Keywords: marine spatial planning; ecosystem impact; marine tourism; habitat modification; fish community

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