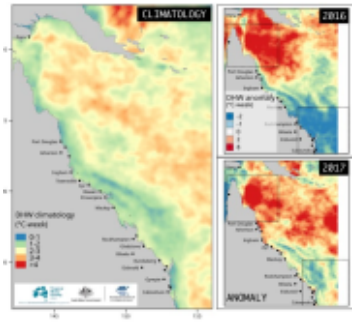
EATLAS DATA CATALOGUE (AIMS)



Oceanographic drivers of bleaching in the GBR: Hazard maps for 2016 - 2017 (NESP TWQ 4.2, AIMS)

Metadata | Metadata (XML)
| Visualization service URL (WMS) () |

Title	Oceanographic drivers of bleaching in the GBR: Hazard maps for 2016 - 2017 (NESP TWQ 4.2, AIMS)
Date	2020-12-18
Date type	Publication
Abstract	This dataset explores a new approach to predict coral bleaching events. It uses a temperature anomaly map to create a spatially dynamic temperature threshold for the calculation of degree heating weeks (DHW) instead of using a static constant. The dynamic threshold was used to classifies map areas with low, medium or high risk of coral bleaching for years 2016 and 2017. Methods: Understanding that the combination of several variables could provide better explanatory value than each individual variable by itself, we used a classification tree prediction model (Breiman et al, 1984) to select the relevant variables and determine the threshold values for each of them as the best prediction solution for the bleaching category. Using the data from 2016 and 2017 aerial bleaching surveys at specific reefs, we derived the corresponding anomaly values and paired them with the estimated bleaching response. The classification tree algorithm will select the values of the variables that produce the most efficient partition of the data into the bleaching categories. The algorithm was trained using a randomly selected sample of 80% of the survey locations (training set), and the remaining 20% was used for validation of the results (test set). The accuracy of the classification system was calculated comparing the predicted bleaching category of the test set and comparing it with the observed bleaching category. Using a recursive partition approach we were able to create a system that correctly classified more than 66% of the reef bleaching conditions. The importance of the variables in the classification procedure according to the number of splits attributed to that variable is DHWmax anomaly > MHW count anomaly > Proportion of the mixed water column > PAR anomaly > Upwelling anomaly > MHW duration anomaly. Having a DHWmax anomaly of 4.4 °C-week above the expected climatological value and 0.3 °C above the expected value for the upwelling anomaly are the conditions linked to a severe bleaching in any reef. No or mild bleaching occurs when DHWmax anomaly was below 4.4 °C-week, and the water column was mostly stratified. Format: The data is in geoTIFF format. CRS: EPSG:4326 - WGS 84 - Geographic References:

	eReefs THREDDS catalogue https://data.aims.ereefs.org.au/thredds/ NOAA Coral Reef Watch Daily 5km Satellite Coral Bleaching Heat Stress Monitoring Products (Version 3.1) https://coralreefwatch.noaa.gov/product/5km/index.php#data_access Dataset References: Beaman, R.J. 2017. High-resolution depth model for the Great Barrier Reef - 30 m. Geoscience Australia, Canberra. http://dx.doi.org/10.4225/25/5a207b36022d2 Simpson, J. H., Tett, P. B., Argote-Espinoza, M. L., Edwards, A., Jones, K. J., and Savidge, G. (1982). Mixing and phytoplankton growth around an island in a stratified sea. Continental Shelf Research 1, 15–31. doi:10.1016/0278-4343(82)90030-9. Steven AD, Baird ME, Brinkman R, Car NJ, Cox SJ, Herzfeld M, Hodge J, Jones E, King E, Margvelashvili N, Robillot C. eReefs: an operational information system for managing the Great Barrier Reef. Journal of Operational Oceanography. 2019 Nov 20;12(sup2):S12-28. Liu, G., Heron, S., Eakin, C., Muller-Karger, F., Vega-Rodriguez, M., Guild, L., et al. (2014). Reef-Scale Thermal Stress Monitoring of Coral Ecosystems: New 5-km Global Products from NOAA Coral Reef Watch. Remote Sensing 6, 11579–11606. Doi:10.3390/rs61111579. Liu, G., Strong, A. E., and Skirving, W. (2003). Remote sensing of sea surface temperatures during 2002 Barrier Reef coral bleaching. Eos, Transactions American Geophysical Union 84, 137–141. Doi:10.1029/2003EO150001. Breiman L., Friedman J. H., Olshen R. A., and Stone, C. J. (1984) Classification and Regression Trees. Wadsworth. Benazzouz, A., Mordane, S., Orbi, A., Chagdali, M., Hilmi, K., Atillah, A., et al. (2014). An improved coastal upwelling index from sea surface temperature using satellite-based approach – The case of the Canary Current upwelling system. Continental Shelf Research 81, 38–54. Doi:10.1016/j.csr.2014.03.012. Data Location: This dataset is filed in the eAtlas enduring data repository at: data\custodian\2018-2021-NESP-TWQ-4\4.2_Oceanographic-drivers-of-bleaching

Metadata language	eng
Character set	UTF8
Hierarchy level	Dataset

OnLine resource

Linkage	https://eatlas.org.au/data/uuid/e74bbe32-10f9-4edb-affd-834932583be2
Protocol	WWW:LINK-1.0-http--metadata-URL
Linkage	https://data.aims.ereefs.org.au/thredds/
Protocol	WWW:LINK-1.0-http--related
Linkage	https://coralreefwatch.noaa.gov/product/5km/index.php#data_access
Protocol	WWW:LINK-1.0-http--related
Linkage	https://eatlas.org.au/data/uuid/71127e4d-9f14-4c57-9845-1dce0b541d8d
Protocol	WWW:LINK-1.0-http--related
Linkage	https://nesptropical.edu.au/index.php/round-4-projects/project-4-2/
Protocol	WWW:LINK-1.0-http--related

Linkage	https://eatlas.org.au/nesp-twq-4/drivers-of-bleaching-4-2
Protocol	WWW:LINK-1.0-http--related
Linkage	https://eatlas.org.au/pydio/public/gbr-nesp-twq-4-2-aims-hazard-maps-bleaching-hazard-20201218
Protocol	WWW:LINK-1.0-http--downloaddata
Linkage	https://eatlas.org.au/pydio/public/gbr-nesp-twq-4-2-aims-hazard-maps-dhw-anomaly-20201218
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Linkage	https://eatlas.org.au/pydio/public/gbr-nesp-twq-4-2-aims-hazard-maps-proportion-of-mixed-water-column-20201218
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Linkage	https://eatlas.org.au/pydio/public/gbr-nesp-twq-4-2-aims-hazard-maps-upwelling-anomaly-20201218
Protocol	WWW:LINK-1.0-http--downloaddata
Linkage	https://maps.eatlas.org.au/index.html?intro=false&z=5&ll=148.25268,-16.62604&l0=ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-dhw-anomaly_20201218_Maximum-degree-heating-week-dhwmax-climatology-1985-2012,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-dhw-anomaly_20201218_Maximum-degree-heating-week-dhwmax-2016-anomaly,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-dhw-anomaly_20201218_Maximum-degree-heating-week-dhwmax-2017-anomaly,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-proportion-of-mixed-water-column_20201218_Average-proportion-of-mixed-water-column-2015-2020,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-bleaching-hazard_20201218_Bleaching-risk-low-2016,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-bleaching-hazard_20201218_Bleaching-risk-medium-2016,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-bleaching-hazard_20201218_Bleaching-risk-high-2016,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-bleaching-hazard_20201218_Bleaching-risk-low-2017,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-bleaching-hazard_20201218_Bleaching-risk-medium-2017,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-bleaching-hazard_20201218_Bleaching-risk-high-2017,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-upwelling-anomaly_20201218_Upwelling-climatology-2010-2020,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-upwelling-anomaly_20201218_Upwelling-anomaly-2016,ea_nesp4%3AGBR_NESP-TWQ-4.2_AIMS_Hazard-maps-upwelling-anomaly_20201218_Upwelling-anomaly-2017,ea_ea-be%3AWorld_Bright-Earth-e-Atlas-basemap&v0=,f,f,f,f,f,f,f,f,f,f,f,f
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Protocol	OGC:WMS-1.1.1-http-get-map

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Topic category	Biota

Extent

Description	Great Barrier Reef and Coral Sea, Australia

File identifier	e74bbe32-10f9-4edb-affd-834932583be2
Metadata language	eng

Character set	UTF8

Metadata author

Individual name	eAtlas Data Manager
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Role	metadataContact
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