

## High-resolution characterization of the abiotic environment and disturbance regimes on the Great Barrier Reef, 1985–2017

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*Abstract.* This data compilation synthesizes 36 static environmental and spatial variables, and temporally explicit modeled estimates of three major disturbances to coral cover on the Great Barrier Reef (GBR): (1) coral bleaching, (2) tropical cyclones, and (3) outbreaks of the coral-eating crown-of-thorns starfish *Acanthaster cf. solaris*. Data are provided on a standardized grid ( $0.01^\circ \times 0.01^\circ \sim 1 \times 1$  km) for reef locations along the GBR, containing 15,928 pixels and excluding the northernmost sections ( $<12^\circ$  S) where empirical data were sparse. This compilation provides a consistent and high-resolution characterization of the abiotic environment and disturbance regimes for GBR reef locations at a fine spatial scale to be used in the development of complex ecosystem models. Static estimates of environmental variables (e.g., depth, bed shear stress, average temperature, temperature variation) originally developed by the Commonwealth of Australia's Environment Research Facility (CERF) Marine Biodiversity Hub were provided by Geoscience Australia. Annual (1985–2017) disturbance estimates were either interpolated from empirical data (*A. cf. solaris*), predicted from proxy indicators (e.g., degree heating weeks [DHW] as a proxy for bleaching severity), or explicitly modeled (e.g., wave height model for each cyclone). This data set synthesizes some of the most recent advances in remote sensing and modeling of environmental conditions on the GBR; yet it is not exhaustive and we highlight areas that should be expanded through future research. The characterization of abiotic and disturbance regimes presented here represent an essential tool for the development of complex regional scale models of the GBR; preventing redundancy between working groups and promoting collaboration, innovation, and consistency. When using the data set, we kindly request that you cite this article and/or the articles cited in the reference section, recognizing the work that went into compiling the data together and the original authors' willingness to make it publicly available.

*Key words:* Great Barrier Reef; disturbance; spatial modeling; bleaching; cyclones; crown-of-thorns starfish; environmental data.

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The complete data sets corresponding to abstracts published in the Data Papers section in the journal are published electronically as Supporting Information in the online version of this article at <http://onlinelibrary.wiley.com/doi/10.1002/ecy.2574/suppinfo>.

DATA AVAILABILITY

Associated code is available on Zenodo: <https://doi.org/10.5281/zenodo.1483014>

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