Demography of coral in the future and various physical parameter predictions.

Website: https://www.bco-dmo.org/dataset/735069
Data Type: Other Field Results
Version: 1
Version Date: 2018-09-18

Project
» The ecophysiological basis of the response of coral larvae and early life history stages to global climate change (Climate_Coral_Larvae)

Contributors	Affiliation	Role
Edmunds, Peter J.	California State University Northridge (CSUN)	Principal Investigator
Bramanti, Lorenzo	Laboratoire d'Écogéochimie des Environnements Benthiques (LECOB)	Scientist
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Abstract
Demography of coral in the future and various physical parameter predictions.

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Coverage

Spatial Extent: **Lat**:21.942 **Lon**:120.748

Dataset Description

Data published in Coral Reefs paper entitled “Using demographic models to project the effects of climate change on scleractinian corals: Pocillopora damicornis as a case study”.

Methods & Sampling

Methodology described in the associated paper.

Data Processing Description

BCO-DMO processing notes:
- Reformatted column names to comply with BCO-DMO standards

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Data Files

File
simulations.csv (Comma Separated Values (.csv), 30.83 KB) MD5:b8a9c80a3bea8f242c8775cfbec84e19 Primary data file for dataset ID 735069

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Related Publications

Bramanti, L., Iannelli, M., Fan, T. Y., & Edmunds, P. J. (2015). Using demographic models to project the effects of climate change on scleractinian corals: Pocillopora damicornis as a case study. Coral Reefs, 34(2), 505–515. doi:10.1007/s00338-015-1269-z
Results

,
Methods

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Parameters

Parameter	Description	Units
Simulation	Type of simulation	unitless
Year	Year of simulation	count
colony_density_stocastic1	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_stocastic2	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_stocastic3	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_stocastic4	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count

colony_density_stocastic5	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_stocastic6	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_stocastic7	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_stocastic8	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_stocastic9	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_stocastic10	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count
colony_density_deterministic11	11 simulations, 10 of which based on the variability of the parameters fecundity and survival	Reference: percent survival; Temperature: Celsius; pCO2: Pa; Metapopulation: count

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Deployments

lab_Edmunds_NMMBA

Website	https://www.bco-dmo.org/deployment/58892
Platform	Natl Museum Mar. Bio. and Aquar. Taiwan
Start Date	2010-03-18
End Date	2010-03-24
Description	Experiments related to the research project: 'RUI- The ecophysiological basis of the response of coral larvae and early life history stages to global climate change' were conducted at the laboratories of the National Museum of Marine Biology and Aquarium in Southern Taiwan.

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Project Information

The ecophysiological basis of the response of coral larvae and early life history stages to global climate change (Climate_Coral_Larvae)

Coverage: Moorea, French Polynesia; Southern Taiwan; California State University Northridge

Tropical coral reefs face a suite of environmental assaults ranging from anchor damage to the effects of global climate change (GCC). The consequences are evident throughout the tropics, where many coral reefs have lost a substantial fraction of their coral cover in a few decades. Notwithstanding the importance of reducing the impacts of environmental stresses, the only means by which these ecosystems can recover (or simply persist) is through the recruitment of scleractinians, which is a function of successful larval development, delivery, settlement, metamorphosis, and post-settlement events. Despite wide recognition of the importance of these processes, there are few pertinent empirical data, and virtually none that address the mechanisms mediating the success of early coral life stages in a physical environmental varying at multiple spatio-temporal scales.

The objective of this research is to complete one of the first comprehensive ecophysiological analyses of the early life stages of corals through a description of: (1) their functionality under 'normal' conditions, and (2) their response to the main drivers of GCC. These analyses will be completed for 2 species representative of a brooding life history strategy, and the experiments will be completed in two locations, one (Taiwan) that provides unrivalled experience in coral reproductive biology, and superb microcosm facilities, and the other (Moorea), with access to a relatively pristine environment, a well described ecological and oceanographic context (through the MCR-LTER), and the capacity to bring a strong biogeographic contrast to the project. The results of the study will be integrated through modeling to explore the effects of GCC on coral community structure over the next century.

The following publications and data resulted from this project:

2013 Wall CB, Fan TY, Edmunds PJ. Ocean acidification has no effect on thermal bleaching in the coral *Seriatopora caliendrum*. Coral Reefs 33: 119-130.
Symbiodinium_Seriatopora photosynthesis
Symbiodinium_Seriatopora PI curve
Symbiodinium_Seriatopora temp-salinity-light
Symbiodinium_Seriatopora water chemistry
- Download complete data for this publication (Excel file)

2013 Wall CB, Edmunds PJ. *In situ* effects of low pH and elevated HCO3- on juvenile *Porites* spp. in Moorea, French Polynesia. Biological Bulletin 225:92-101.
Data at MCR and PANGEA: doi.pangaea.de/10.1594/PANGAEA.833913
- Download complete data for this publication (Excel file)

2013 Vivian R Cumbo, Peter J Edmunds, Christopher B Wall, Tung-Yung Fan. Brooded coral larvae differ in their response to high temperature and elevated pCO2 depending on the day of release. Marine Biology DOI 10.1007/s00227-013-2280-y.
Data also at PANGEA: doi.pangaea.de/10.1594/PANGAEA.831612
brooded coral larvae 2 - carbonate chemistry
brooded coral larvae 2 - larval release March 2003-2008
brooded coral larvae 2 - respiration_photosyth_mortality
- Download complete data for this publication (Excel file)

2013 Edmunds PJ, Cumbo VR, Fan TY. Metabolic costs of larval settlement and metamorphosis in the coral *Seriatopora caliendrum* under ambient and elevated pCO2. Journal Experimental Marine Biology and Ecology 443: 33-38 Data also at PANGEA: doi:10.1594/PANGAEA.821644
Coral post-settlement physiology
- Download complete data for this publication (Excel file)

2013 Aaron M Dufault, Aaron Ninokawa, Lorenzo Bramanti, Vivian R Cumbo, Tung-Yung Fan, Peter J Edmunds. The role of light in mediating the effects of ocean acidification on coral calcification. Journal of Experimental Biology 216: 1570-1577.
coral-light expt.- PAR
coral-light expt.- carbonate chemistry
coral-light expt.- temp_salinity
coral-light expt.- growth
coral-light expt.- protein
coral-light expt.- survival
- Download complete data for this publication (Excel file)

2012 Cumbo, VR, Fan TY, Edmunds PJ. Effects of exposure duration on the response of *Pocillopora*

damicornis larvae to elevated temperature and high pCO2. J Exp Mar Biol Ecol 439: 100-107.
Data is also at PANGEA: doi:10.1594/PANGAEA.823582
brooded coral larvae 3 - carbonate chemistry
brooded coral larvae 3 - light
brooded coral larvae 3 - mortality
brooded coral larvae 3 - protein
brooded coral larvae 3 - respiration and protein
brooded coral larvae 3 - respiration raw data
brooded coral larvae 3 - symbiont density
brooded coral larvae 3 - tank temperature
- Download part 1 of data for this publication (Excel file)
- Download tank parameters data for this publication (Excel file)

2012 Cumbo, VR, Fan TY, Edmunds PJ. Physiological development of brooded larvae from two pocilloporid corals in Taiwan. Marine Biology 159: 2853-2866.
brooded coral - carbonate chemistry
brooded coral - release
brooded coral - respiration
brooded coral - settlement competency
brooded coral - size_July
brooded coral - size_protein_symbionts_photosynth
- Download complete data for this publication (Excel file)

2012 Dufault, Aaron M; Vivian R Cumbo; Tung-Yung Fan; Peter J Edmunds. Effects of diurnally oscillating pCO2 on the calcification and survival of coral recruits. Royal Society of London (B) 279: 2951-2958. doi:10.1098/rspb.2011.2545
Data is also at PANGEA: doi:10.1594/PANGAEA.830185
recruit_growth_area
recruit_growth_weight
recruit_seawater_chemistry
recruit_survival
- Download complete data for this publication (Excel file)

2011 Edmunds PJ, Cumbo V, Fan TY. Effects of temperature on the respiration of brooded larvae from tropical reef corals. Journal of Experimental Biology 214: 2783-2790.
CoralLarvae_comparison_respir
CoralLarvae_release
CoralLarvae_respir
CoralLarvae_size
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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0844785

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