

Carbon chemistry on inshore reefs of the Great Barrier Reef 2011 - 2012 (NERP TE 5.2, AIMS)



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Title	Carbon chemistry on inshore reefs of the Great Barrier Reef 2011 - 2012 (NERP TE 5.2, AIMS)
Date	2015-09-24
Date type	Publication
Abstract	<p>This dataset contains data on carbon chemistry on inshore reefs of the Great Barrier Reef (GBR). Main parameters measured were temperature, total alkalinity and dissolved inorganic carbon. The data was collected six times over two years (September 2011 - June 2012) covering a comprehensive latitudinal range.</p> <p>The aim of this study was to investigate carbon chemistry on inshore reefs, and compare it to offshore reefs and historical data.</p> <p>Research to date on reef calcification and inorganic carbon dynamics within the GBR system has largely focused upon on-reef processes on mid- and outer-shelf reefs. Relatively little work has been done on the shelf-scale dynamics of inorganic carbon in the GBR system and almost no consideration has been given to the many inshore reefs close to the coast that are under the greatest threat from increases in runoff of sediment, nutrients and pesticides. The ratio of primary productivity and respiration (P/R) of inshore reefs are often lower than on reefs further from the coast due to decreased light availability associated with greater turbidity inshore. Because of this, inshore reefs may be less able to buffer rising dissolved inorganic carbon (DIC) by photosynthesis.</p> <p>Method:</p> <p>Water sampling for inshore chemical characteristics was carried out at 14 nearshore fringing reefs at islands between 16 and 23° S. Twelve of the 14 core sites are within 15 km of the mainland and all are directly affected on a seasonal or episodic basis by terrestrial runoff. Sampling at the inshore core reef sites (Visits, n = 6) was conducted at four-monthly intervals over two years (September 2011–June 2013) in the late dry season (September–October), wet season (February) and early dry season (June). The GBR region has a monsoonal climate with most (ca. 60–80%) rainfall falling in the January to March period. All samples were collected during the day time.</p> <p>Water samples for analysis of Total Alkalinity (TA) and Dissolved Inorganic Carbon (DIC) were collected at the 14 core reefs. At each of the inshore locations, surface (~1 m water depth) and near-bottom (average depth 9.4 m, 1 SD = 3.1 m) water samples were collected from the R/V Cape Ferguson using 10 L Niskin bottles. These open water stations were 0.3–2 km from the neighbouring reef. In addition, divers collected water near-bottom (average depth 6.5 m) on the reef slopes of the coral reef at each inshore site.</p> <p>Duplicate aliquots (250 ml) were carefully drawn from the Niskin bottles for TA and DIC analysis, taking care to avoid bubble formation and minimize headspace. Samples were fixed with 125 µl of saturated HgCl₂. Samples for TA and DIC were analysed using a VINDTA 3C</p>

titrator (Marianda, Germany) at the Australian Institute of Marine Science (AIMS). Alkalinity was determined by acid titration and DIC by acidification and coulometric detection (UIC 5105 Coulometer) of the evolved CO₂. The VINDTA titrator was calibrated with Certified Reference seawaters (A. G. Dickson, Scripps Institute of Oceanography, Dixon, Batch 106).

Further details can be found in this publication:

Uthicke S, Furnas M, Lønborg C (2014) Coral Reefs on the Edge? Carbon Chemistry on Inshore Reefs of the Great Barrier Reef. PLoS ONE 9(10): e109092. doi: 10.1371/journal.pone.0109092

Limitations:

Data are limited to GBR inshore reefs.

Format:

The data is text in csv format, Uthicke et al NERP 5_2 carbon chemistry data.csv

Data Dictionary:

- Station: a unique station code from the AIMS database
- Island: sample location
- Code: a depth related code
- Depth (in m): actual sampling depth, 0m=surface sample, assumed to be on average from 1m depth
- Dupl.: duplicate number
- Temp.: temperature (°C)
- Sal.: salinity
- DIC: dissolved inorganic carbon (µmol kg⁻¹)
- TA: Total Alkalinity (µmol kg⁻¹)
- Date: collection date
- S_Cl:
- pH: calculated pH on total scale
- pCO₂: calculated partial pressure of CO₂ (µatm)
- ?ar : saturation state of aragonite
- Time: time of sample collection.

Metadata language	eng
Character set	UTF8
Hierarchy level	Dataset

OnLine resource

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Linkage	https://eatlas.org.au/nerp-te/gbr-aims-combined-water-quality-climate-effects-5-2
Protocol	WWW:LINK-1.0-http--related
Linkage	http://doi.org/10.1371/journal.pone.0109092.s001
Protocol	WWW:LINK-1.0-http--downloaddata
Linkage	http://doi.org/10.1371/journal.pone.0109092
Protocol	WWW:LINK-1.0-http--link
Linkage	https://eatlas.org.au/pydio/data/public/nerp-te_5-2_aims_carbonchemistrydata_2011-2013-zip.php
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Protocol	WWW:LINK-1.0-http--related

Linkage	https://maps.eatlas.org.au/index.html?intro=false&z=7&ll=147.16779,-19.98662&l0=ea_ea%3AGBR_AIMS_WQ-summary,ea_ea-be%3AWorld_Bright-Earth-e-Atlas-basemap,google_HYBRID,google_TERRAIN,google_SATELLITE,google_ROADMAP&v0=,,f,f,f,f
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Protocol	WWW:LINK-1.0-http--related
Linkage	https://maps.eatlas.org.au/maps/wms
Protocol	OGC:WMS-1.1.1-http-get-map

Point of contact

Individual name	Uthicke, Sven, Dr
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Role	Point of contact
Topic category	Oceans

Keyword

Keyword	inshore reefs
Keyword	carbon chemistry
Keyword	alkalinity
Keyword	dissolved inorganic compounds
Keyword	Great Barrier Reef
Type	

File identifier	425a21ad-4857-42e8-a8da-a523c4de055d
Metadata language	eng
Character set	UTF8

Metadata author

Individual name	eAtlas Data Manager
Organisation name	Australian Institute of Marine Science (AIMS)
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