

Table 1 Sample information and $\delta^{15}\text{N}$ data

Ocean Region	Coral Location	Coral core/colony #	Latitude	Longitude	Depth (m)	Coral species	Year of collection	Number of coral samples analyzed in each core	Sampling time-scale	Core-average skeletal $\delta^{15}\text{N}$ (‰, $\pm 1\sigma$)	Site-average skeletal $\delta^{15}\text{N}$ (‰, $\pm 1\sigma$)	$\delta^{15}\text{N}$ of oceanic N supply to the reefs (‰, $\pm 1\sigma$)	References for the $\delta^{15}\text{N}$ of oceanic N supply
North Atlantic	Bermuda ¹	1	32.46 N	64.83 W	10	<i>Diploria labyrinthiformis</i>	2005	10	annual, 1995-2005	3.7 \pm 0.5	4.1 \pm 0.5	2.5 \pm 0.2	Knapp et al., 2005
		2	32.46 N	64.83 W	10	<i>Diploria labyrinthiformis</i>	2005	10	annual, 1995-2005	3.9 \pm 0.4			
		3	32.46 N	64.83 W	10	<i>Diploria labyrinthiformis</i>	2005	10	annual, 1995-2005	3.5 \pm 0.5			
		4	32.40 N	64.79 W	4	<i>Diploria labyrinthiformis</i>	2005	10	annual, 1995-2005	4.4 \pm 0.5			
		5	32.40 N	64.79 W	4	<i>Diploria labyrinthiformis</i>	2005	10	annual, 1995-2005	4.5 \pm 0.2			
		6	32.40 N	64.79 W	4	<i>Diploria labyrinthiformis</i>	2005	10	annual, 1995-2005	4.7 \pm 0.5			
South Atlantic	Brazil margin ²	1	23.78 S	45.13 W	4-6	<i>Mussismilia hispida</i>	2013	2	multiyear	8.3 \pm 0.2	8.8 \pm 0.8	6.8 \pm 0.2	Frame 2011, Smart et al., 2015
		2	23.78 S	45.13 W	4-6	<i>Madracis decactis</i>	2013	2	multiyear	9.4 \pm 0.1			
Central Equatorial Pacific ³	Kiritimati Island	1	1.87 N	157.40 W	9	<i>Porites. sp</i>	1998	20	annual, 1977-1997	13.4 \pm 0.5	13.4 \pm 0.5	11.0 \pm 0.5/16.2 \pm 1.8	Rafter and Sigman, 2016
South Pacific	Northern Great Barrier Reef	1	12.38 S	143.74 E	3-5	<i>Porites. sp</i>	1990	30	semi-annual, 1975-1990	5.9 \pm 0.2	6.2 \pm 0.4	6.1 \pm 0.2	Yoshikawa et al., 2015
		2	13.33 S	143.96 E	3-5	<i>Porites. sp</i>	1990	32	semi-annual, 1974-1990	6.6 \pm 0.3			
	New Caledonia	1	20.42 S	164.03 E	5	<i>Isopora palifera</i>	1995	2	multiyear	6.2 \pm 0.3	6.2 \pm 0.3	6.1 \pm 0.2	Yoshikawa et al., 2015
North Pacific	Green Island	1	22.65 N	121.47 E	6	<i>Porites. sp</i>	2013	18	seasonal, 2009-2013	4.2 \pm 0.6	4.2 \pm 0.6	3.9 \pm 1.0	Ren et al., unpublished data
South China Sea	Dongsha Atoll	1	20.76 N	116.79 E	1	<i>Porites. sp</i>	2013	18	seasonal, 2009-2013	5.7 \pm 0.5	5.9 \pm 0.5	5.5 \pm 0.3	Ren et al., unpublished data
		2	20.70 N	116.89 E	1	<i>Porites. sp</i>	2013	18	seasonal, 2009-2013	5.6 \pm 0.4			
		3	20.74 N	116.75 E	4	<i>Porites. sp</i>	2013	18	seasonal, 2009-2013	6.5 \pm 0.3			
Arabian Sea	Oman margin	1	17.50 N	55.7 E	3	<i>Porites. sp</i>	1996	12	seasonal, 1984-1985 & 1993-1995	10.1 \pm 0.2	10.1 \pm 0.2	9.0 \pm 1.0	Brandes et al., 1998

1. At Bermuda, 10 coral cores/colonies from 4 sites were analyzed for skeletal $\delta^{15}\text{N}$, but only the two offshore sites data are shown here because we seek to compare the skeletal $\delta^{15}\text{N}$ to the $\delta^{15}\text{N}$ of open ocean nitrate supplied to the reefs. Please refer to Wang et al. (2015) for further details.
2. At the Brazil margin, two species of corals adjacent to each other were analyzed for skeletal $\delta^{15}\text{N}$.
3. In the central equatorial Pacific, the surface nitrate is only partially consumed; thus both nitrate assimilation and feeding may contribute to the N sources of the Kiritimati coral. Here, the coral skeletal $\delta^{15}\text{N}$ is compared with both the mixed layer nitrate $\delta^{15}\text{N}$ (16.2 \pm 1.8‰) measured at a set of stations adjacent to Kiritimati (155°W, 0-1°N) and the $\delta^{15}\text{N}$ of instantaneously produced PON (11.0 \pm 0.5‰) calculated from Rayleigh model. Please refer to Figure 3 for more details.