

Artificial intelligence as a tool to study the 3D internal skeletal architecture in newly settled coral recruits: insights into the effect of Ocean Acidification on coral biomineralization

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Supplemental Figures

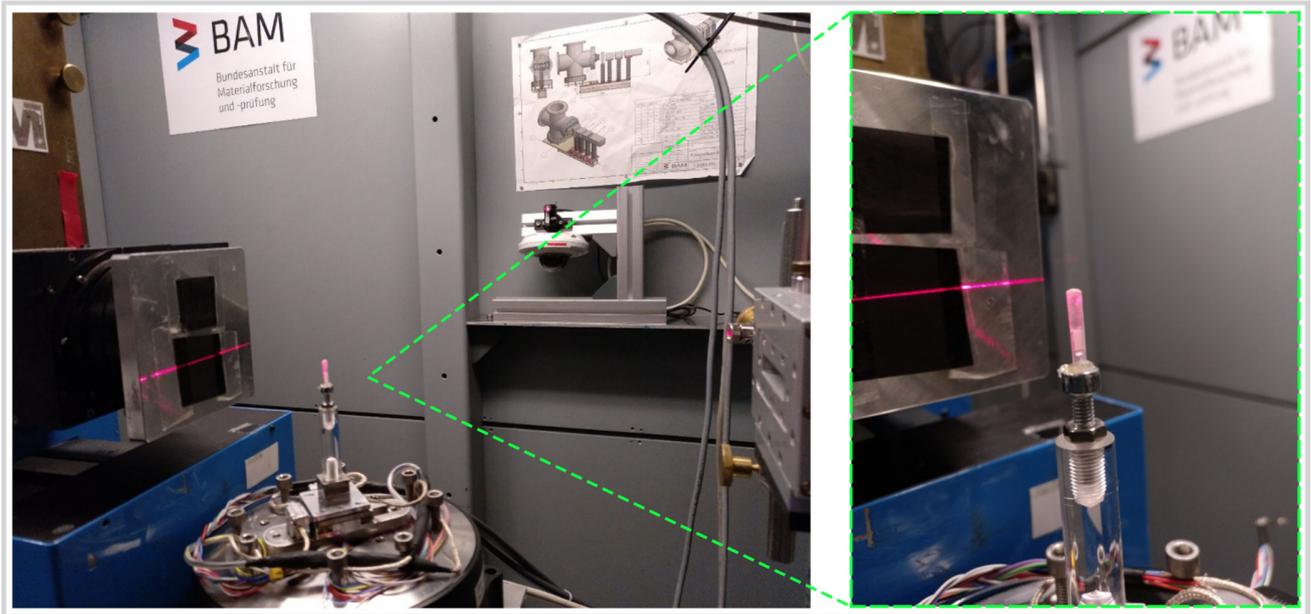


Figure S1. Coral sample fixed in the sample holder in front of the x-ray source. Each primary polyp was attached to a metal stub and scanned with repeated rotation on a high-resolution X-ray μ CT imaging sample stage at BAMline, the imaging beamline at BESSY (HZB - Helmholtz-Zentrum Berlin, Germany).

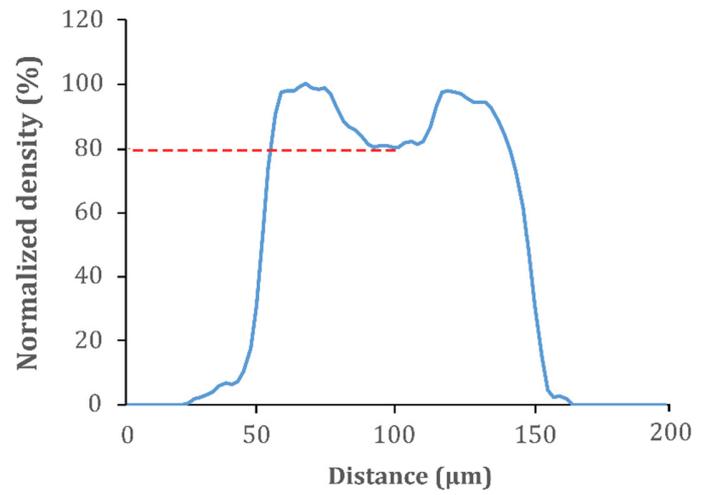
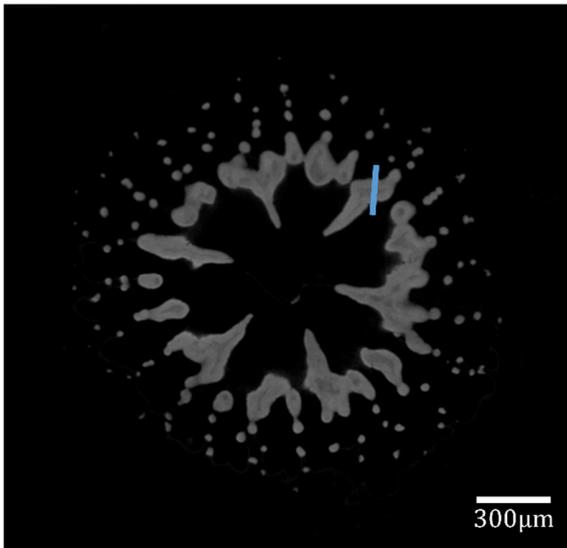


Figure S2. Density variation among RADs and TDs. Tomographic cross-sectional slice (acquired by X-ray μ CT in absorption imaging mode) of an example recruit skeleton and normalized density (expressed in %) of the skeleton measured across the section in blue. RADs (dark gray areas) are \sim 20% less dense (red dotted line in the graph) than the surrounding TDs (light gray areas).

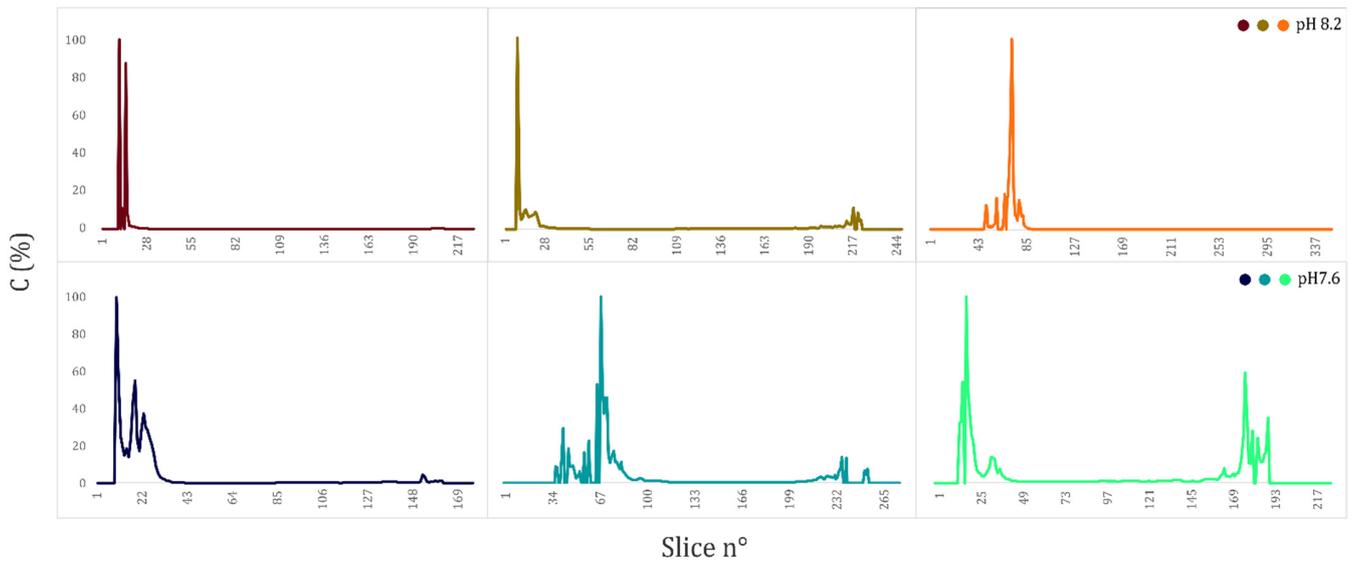


Figure S3. Skewness of the distributions of the per-slice RADS-TDs shape configuration across tomographic datasets. The ratio of the RADS perimeter/area over the TDs perimeter/area (“C”) was computed as an estimate of the relative shape of the skeletal features across the recruit’s skeletons, going from the base (i.e., slice 1) to the top. The skewness values (see Figure 8 in the main text) are used as a metric to evaluate the differences among distributions, i.e., the degree of the RADS-TDs shape variation.

Table S1. Parameters of the carbonate chemistry across experimental pH conditions. Carbonate seawater chemistry parameters were calculated from measured values of temperature (T), salinity (S), pH (NBS) and total alkalinity (TA). Measurements of pH, temperature and salinity were conducted three times a day, and measurements of total alkalinity were carried out once a day in triplicates for each experimental tank. Values are shown as means \pm SD. DIC, dissolved inorganic carbon; Ω_{ar} , aragonite saturation state.

Treatment	Tank	T (C°)	S (‰)	pH	CO ₂ (μmol/kg-SW)	pCO ₂ (μatm)	HCO ₃ ⁻ (μmol/kg-SW)	CO ₃ ²⁻ (μmol/kg-SW)	DIC (μmol/kg-SW)	TA (μmol/kg-SW)	Ω_{ar}
pH 8.2	1	22.08	39.9	8.16	14.5	486.5	2173.4	256.7	2444.6	2793.0	3.9
		± 0.20	± 0.4	± 0.04	± 1.4	± 47.4	± 41.6	± 16.7	± 26.9	± 8.4	± 0.2
	2	22.10	40.0	8.12	14.3	480.3	2134.7	251.3	2400.2	2743.2	3.8
		± 0.20	± 0.4	± 0.03	± 1.3	± 43.1	± 36.4	± 15.2	± 23.2	± 8.3	± 0.2
	3	22.23	40.2	8.14	14.7	495.4	2115.9	240.8	2371.4	2700.9	3.6
		± 0.14	± 0.5	± 0.03	± 1.1	± 35.6	± 27.2	± 11.0	± 19.5	± 13.6	± 0.2
pH 7.6	4	22.00	39.9	7.61	56.9	1997.7	2513.1	83.6	2656.2	2715.1	1.3
		± 0.31	± 0.4	± 0.05	± 7.2	± 234.8	± 20.3	± 8.1	± 19.8	± 8.8	± 0.1
	5	22.28	39.9	7.63	56.2	1901.4	2477.4	87.2	2620.8	2688.6	1.3
		± 0.08	± 0.3	± 0.06	9.0	± 300.8	± 29.9	± 11.3	± 27.6	± 7.7	± 0.2
	6	22.25	40.1	7.62	56.6	1913.7	2471.7	85.5	2613.8	2678.9	1.3
		± 0.08	± 0.4	± 0.04	5.4	± 179.2	± 18.2	± 6.9	± 16.8	± 6.0	± 0.1