**Figure S1:** Relationship between δ¹³C (‰) and δ¹⁵N (atom %) for shell ANME-2/DSS after a 5-day incubation with ¹⁵N labeled ammonium or amino acids from (A) PC-55 (diamonds; n=6) and PC-76 (squares; n=10). ‘z’ symbol denotes paired δ³C /¹⁵N values for a mixed ANME-2/DSS aggregate. (B) Paired δ³C /¹⁵N values for PC-59 cell aggregates after 4-day incubation (open symbols) and 85-day incubation (closed symbols) with ammonium and amino acids. Shell aggregates are represented by a square symbol, mixed aggregates (triangle) and mono-specific ANME-2 clusters are represented by a circle. Plus signs denote ANME/DSS shell aggregates from control incubation without exogeneous ¹⁵N labeled nitrogen. In both panels, plotted values include heaviest δ¹³C (red) and lightest δ¹³C (black) data points for each ANME-2 or ANME/DSS aggregate measured during the FISH-SIMS analysis. An example of a mono-species ANME-2 and shell ANME-2/DSS aggregate are highlighted (dashed ellipse).
Figure S2: Comparison of the relationship between aggregate size and enrichment in $^{15}$N (atom %) for shell ANME-2/DSS consortia. A) Maximum $^{15}$N enrichment after 5-day incubation for shell aggregates in PC-76 and PC-55 B) Box plot of $^{15}$N value (atom %), range, and 95% confidence intervals for same PC-76 and PC-55 shell aggregate data binned into small (diameters between 2-7µm) and large size class (between 7µm and 20µm). Average $^{15}$N value for each size class represented by horizontal bar (small aggregate mean $^{15}$N atom % = 1.8, n=9 and large aggregate mean $^{15}$N atom % = 1.4, n=6). C) Maximum $^{15}$N enrichment after 112-day incubation for shell aggregates in PC-76 (note difference in scale for y axis). Although a general trend of greater $^{15}$N assimilation by smaller shell aggregates was present, the statistical significance of aggregate size and $^{15}$N enrichment was not observed (P=0.44, Wilcoxon test).