

Revision Notes and Questions

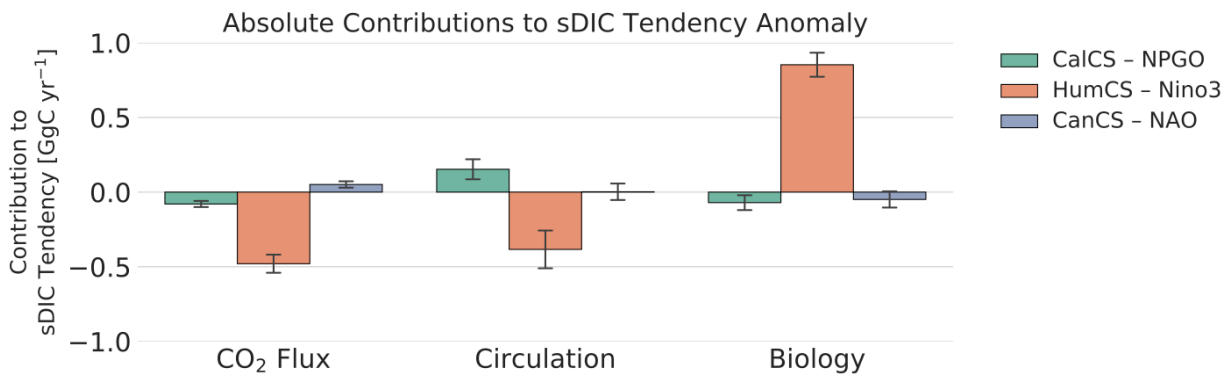
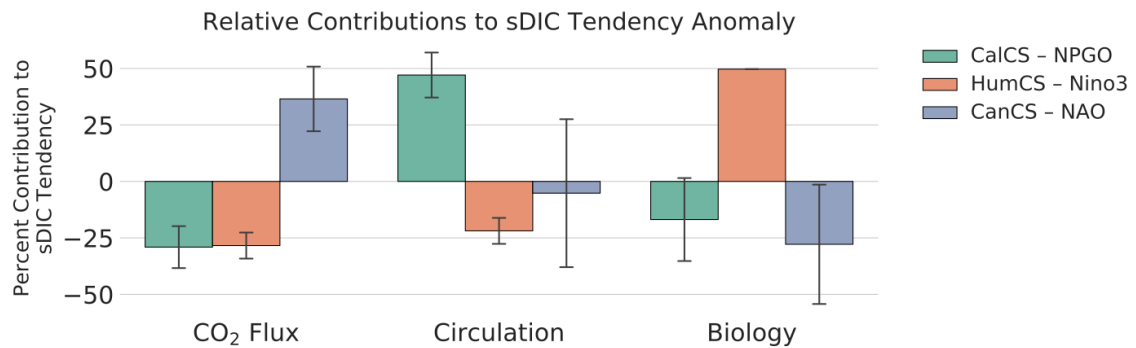
sDIC Decomposition Results

Table 1. Regression coefficients between given EBUS and climate index for anomaly time series of the estimated contributions toward the sDIC tendency integrated over the upper 100m and the total surface area of the system.

Term	CalCS – NPGO	HumCS – Nino3	CanCS -- NAO
CO ₂ Flux	-0.076 ± 0.020	-0.484 ± 0.061	0.051 ± 0.021
Circulation	0.147 ± 0.064	-0.387 ± 0.128	0.002 ± 0.056
Biology	-0.068 ± 0.048	0.861 ± 0.081	-0.049 ± 0.054
Σ terms	0.003	-0.010	0.004
sDIC Tendency	0.003 ± 0.001	-0.010 ± 0.002	0.004 ± 0.001

Units are Gg C yr⁻¹

Uncertainty is 1 std. dev. spread of the ensemble



In introduction paragraph 1:

“This process also supplies waters with an elevated dissolved inorganic carbon (DIC) content, which enhances the partial pressure of carbon dioxide $p\text{CO}_2$ and reduces the pH and carbonate ion concentration.”

Mike A. suggests we follow this with a sentence explaining why for non-BGC people. Is this necessary in Biogeosciences?

1. Mike A. suggests I compute the std. dev. For CESM-LENS and SOM-FFN to compare variability. Would have to use the same methods so don't do so by removing ensemble mean from CESM-LENS. Just do a linear detrend for instance and compute the std. dev.
 - a. However, this seems problematic since we know that SOM-FFN has suppressed variability. Would we expect it to be the same?
 - b. This would be in section 3.1.
2. To deal with the CalCS decomposition discrepancy, it was suggested I cite Long et al. 2013 and Doney et al. 2009, who say that the method used for decomposition barely changes the results, and also that cross-derivative terms are not important. However, doesn't the discrepancy itself suggest that cross-derivative and higher-order terms *are* important for this system, or is this just an issue with performing the analysis with monthly averages?
 - a. Should look at overhead map decompositions. Create a 3-panel plot with grid cell approximations, “true” total, and the difference to see if this is a spatially focused issue.
 - b. Also, what about the notion that our direct regression is faulty?
3. On sDIC decomposition... is it worth doing if biology at coarse resolution is way off? Only other thing this would do for us is give information on how much CO_2 fluxes influence DIC, and would allow us to frame the paper more toward “emissions impacts” instead of ocean acidification.