Tuesday, October 9
Poster Session 2
10:30–12:30

Poster 26

STRONG LINK BETWEEN SURFACE PARTICLE SIZE AND DEEP CARBON FLUX SUGGESTED BY A FAST-GROWING, MULTI-OCEAN AUTONOMOUS DATASET OF OPTICAL BACKSCATTERING

The "biological pump", which transfers organic carbon to the deep ocean, is a major sink of atmospheric CO_2 and the foundation of deep ocean food webs. If ongoing global changes in ocean temperature, circulation, and ecosystems are affecting the biological pump, appropriate response will strongly depend on our ability to monitor the pump at global scale. For this reason, there would be great value in finding quantitative (and ideally mechanistic) relationships between deep carbon flux and surface properties that are measurable at global scale. Here we compare a multi-ocean, multi-year dataset of autonomous measurements of subsurface spikes in optical backscattering (a crude proxy for carbon flux) with corresponding surface estimates of chlorophyll, backscattering, and mean particle size. We find mean particle size in the upper 50 m alone to be a fairly strong predictor of our proxy for 200 m export flux ($r^2 = 0.66$) and a moderate predictor of 700 m "sequestration" flux ($r^2 = 0.5$). Correlation with surface backscattering coefficient was weaker (r^2=0.51 at 200 m and 0.45 at 700 m), and correlation with surface Chl fluorescence was weakest (r^2=0.28 at 200 m and 0.27 at 700 m). Further validation of our carbon flux proxy is necessary before these results can be used to accurately estimate global carbon export, but the finding of such simple, multi-basin relationships between surface and deep particle populations is encouraging.

Nathan Briggs, National Oceanography Centre, Southampton, natebriggs@gmail.com, https://orcid.org/0000-0003-1549-1386
Hervé Claustre, Laboratoire d'Oceanographie de Villefranche-sur-mer, claustre@obs-vlfr.fr
Stephanie Henson, National Oceanography Centre Southampton, shen@noc.ac.uk
Filipa Carvalho, National Oceanography Centre Southampton, filipa.carvalho@noc.ac.uk