Optically resolving size and density distributions of particles in the dissolved-particulate continuum from 20 nm to 20 mm to improve the estimate of carbon flux

SCIENCE GOAL
• How variations in particle size composition impact the estimate of carbon export

OBJECTIVES
• Measure vertical distribution of volume scattering functions
• Estimate the size and density distributions of particles of sizes from 20 nm – 20 mm using VSF-inversion and imaging methods
• Estimate total and size-fractioned mass flux using PSD and density distributions
• Statistical analysis on how does VSF-based carbon estimate relate to the total flux out of the surface layer

TEAM MEMBERS
Xiaodong Zhang, PI: VSF-inversion
Deric Gray, Co-I: VSF measurements
Yannick Huot, Co-I: IFC
Lionel Guidi, Co-I: UVP
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LOGISTICS

Survey Ship (4 berths)

Water samples from CTD (10 L per sample)

Frequency: min. 2/day, desired 3-4/day

Depths: min. 3 at surface, DCM, deep; desired 2 additional depths above DCM/Pycnocline

Process on-board

LISST-100X

Spectral Volume Scattering Meter (VSF from 0.5 – 179 at 8 wavelengths)

LISST-VSF (VSF from 0.1 – 150 at 532 nm)

Manta ViewSizer (dynamic light scattering, PSD from 0.02 – 1 µm)

Imaging flow cytometer