Daily Report: Tracking the Plume of Dispersed Oil using Particle Size Distribution Measurements and Fluorescence Intensity Ratios

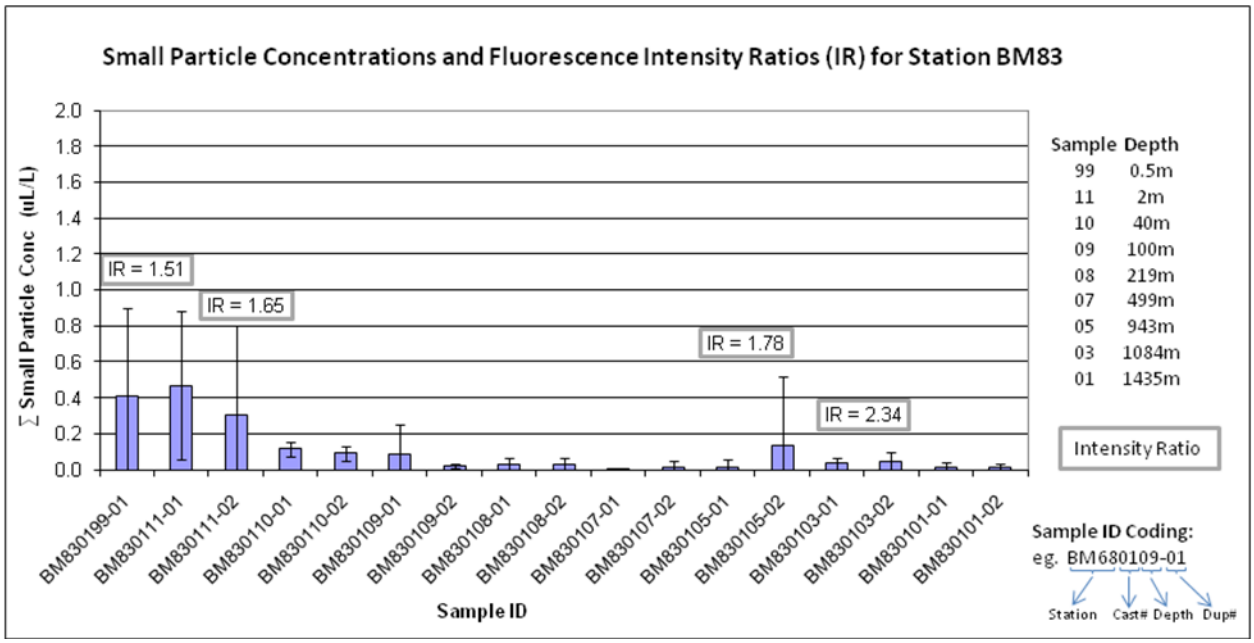
June 13, 2010

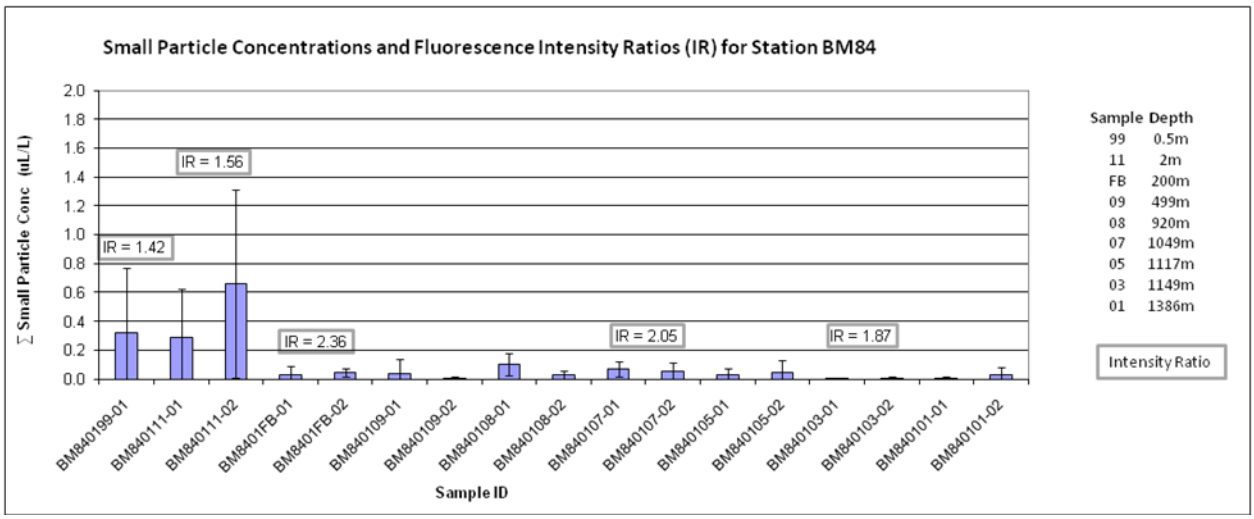
Water samples were collected at five stations for particle size distribution measurements using the LISST-100X particle counter. A total of 85 LISST samples were analyzed, including duplicates. Samples at depths of elevated fluorescence or other significance were selected from the CTD trace for fluorescence intensity ratio measurements and analyzed using a Quantech Life Sciences fixed wavelength fluorometer.

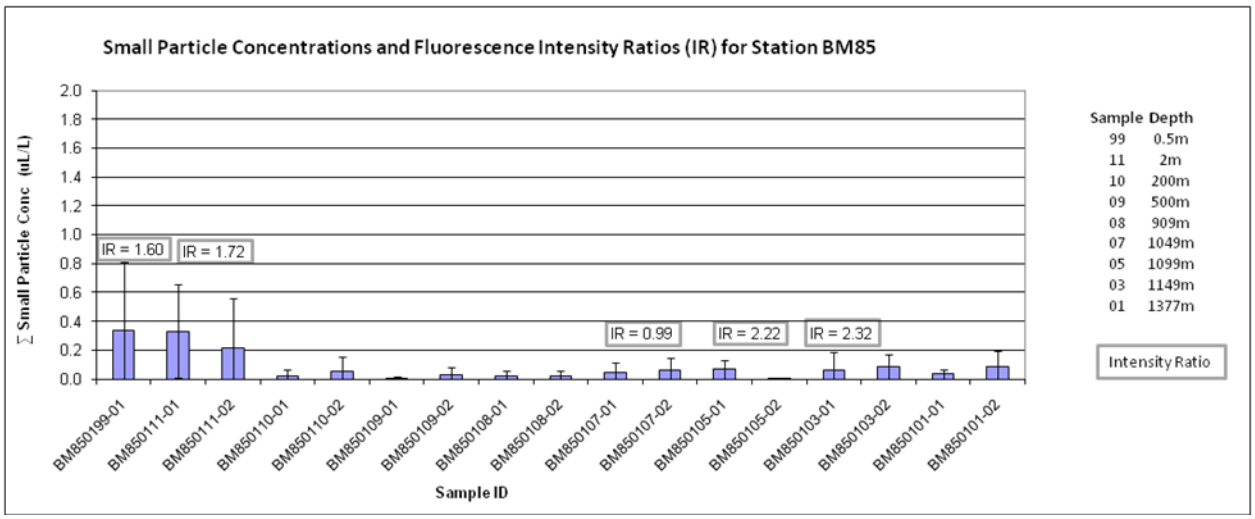
Figure 1 presents the small droplet (∑ 2.5 - 60μm) particle size data and fluorescence intensity ratios for stations BM83 through BM87. Station BM83 was 6km west-northwest (~275 degrees) of the wellhead, Station BM84 was 5km northwest (~315 degrees) of the wellhead, Station BM85 was 5km northwest (~325 degrees) of the wellhead, Station BM86 was 5km north-northwest (~335 degrees) of the wellhead, and Station BM87 was 5km north-northwest (~355 degrees) of the wellhead.

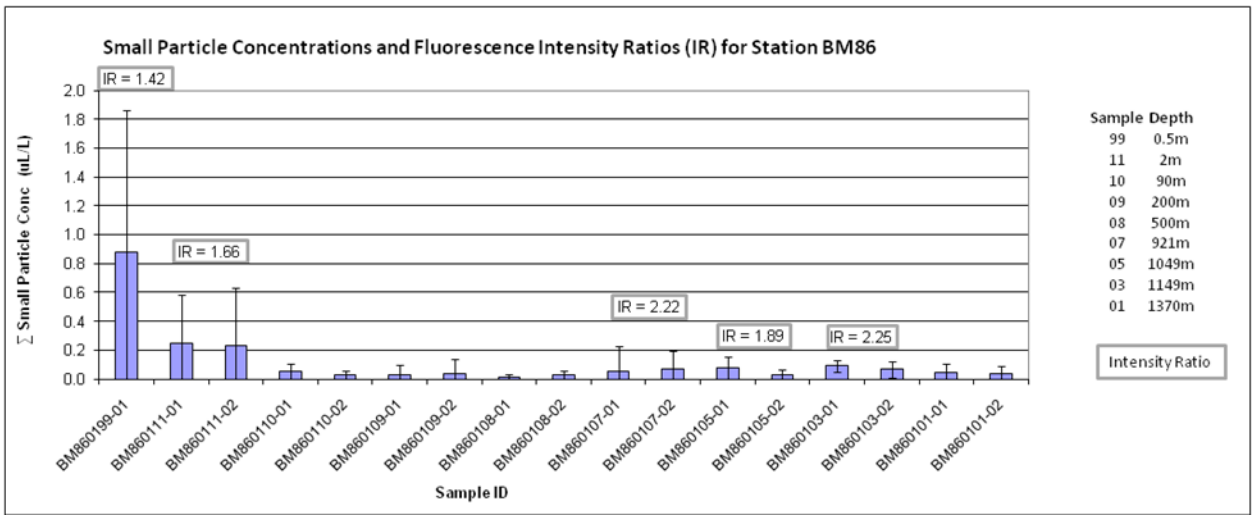
All 5 stations showed moderate-high small particle concentrations in the surface water layers (0-2m) and Station BM83 also showed a slight elevation at 40m depth. Multiple oil strata (up to 3 distinct layers) were observed at Stations BM84, BM85, BM86, and BM87 between 1050m and 1150m and noticeable increases in small particle concentrations were found at each of these strata. Station BM83 showed a single oil layer at 1084m depth but a minimal increase in small particle concentrations was associated with this layer.

All stations showed lower fluorescence intensity ratios in surface waters (0-2m) than at depth. Stations BM85, BM86, and BM87 showed noticeably lower fluorescence intensity ratios in the ~1050m oil layer than in the other strata measured. The surface sample collected at Station BM87 showed very high small particle counts but a very low fluorescence intensity ratio indicating good dispersal. Fluorescence intensity ratios observed at all 5 stations were generally lower than those observed on June 12.


Small Particle Concentrations and Fluorescence Intensity Ratios (IR) for Station BM83
Σ Small Particle Conc (uL/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
IR = 1.51
IR = 1.65
IR = 1.78
IR = 2.34
BM830199-01
BM830111-01
BM830111-02
BM830110-01
BM830110-02
BM830109-01
BM830109-02
BM830108-01
BM830108-02
BM830107-01
BM830107-02
BM830105-01
BM830105-02
BM830103-01
BM830103-02
BM830101-01
BM830101-02
Sample ID
Sample Depth
99 0.5m
11 2m
10 40m
09 100m
08 219m
07 499m
05 943m
03 1084m
01 1435m
Intensity Ratio
Sample ID Coding:
eg. BM680109-01
Station
Cast#
Depth
Dup#


Small Particle Concentrations and Fluorescence Intensity Ratios (IR) for Station BM84
Σ Small Particle Conc (uL/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
IR = 1.42
IR = 1.56
IR = 2.36
IR = 2.05
IR = 1.87
BM840199-01
BM840111-01
BM840111-02
BM8401FB-01
BM8401FB-02
BM840109-01
BM840109-02
BM840108-01
BM840108-02
BM840107-01
BM840107-02
BM840105-01
BM840105-02
BM840103-01
BM840103-02
BM840101-01
BM840101-02
Sample ID
Sample Depth
99 0.5m
11 2m
FB 200m
09 499m
08 920m
07 1049m
05 1117m
03 1149m
01 1386m
Intensity Ratio





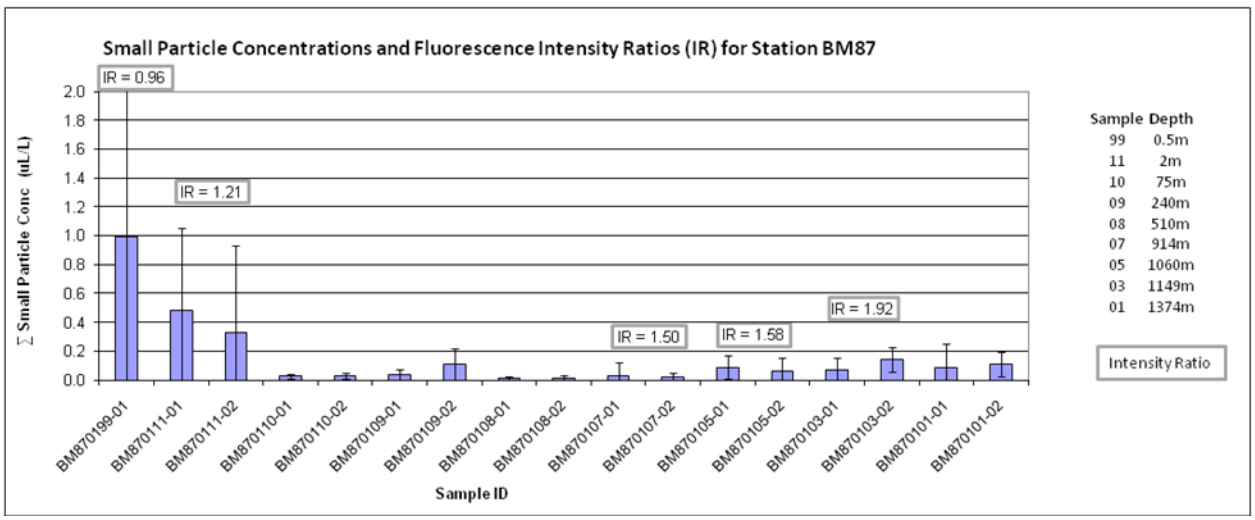


Figure 1: Average small particle concentrations and fluorescence intensity ratios as a function of depth for stations BM83 to BM87.