Supporting Information

Environmental screening of water associated with shale gas extraction by fluorescence Excitation Emission Matrix

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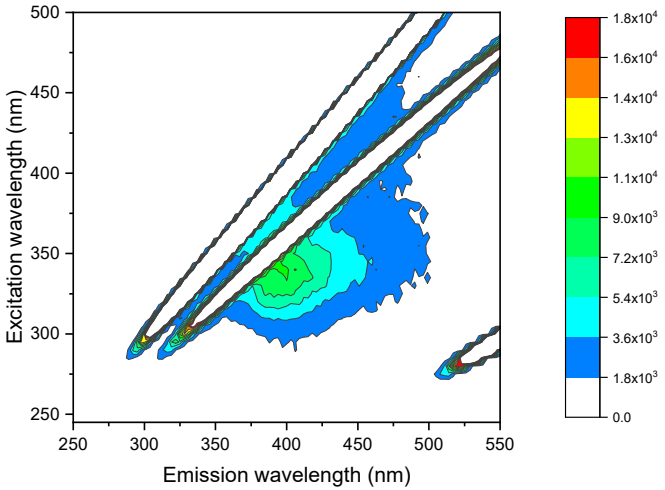
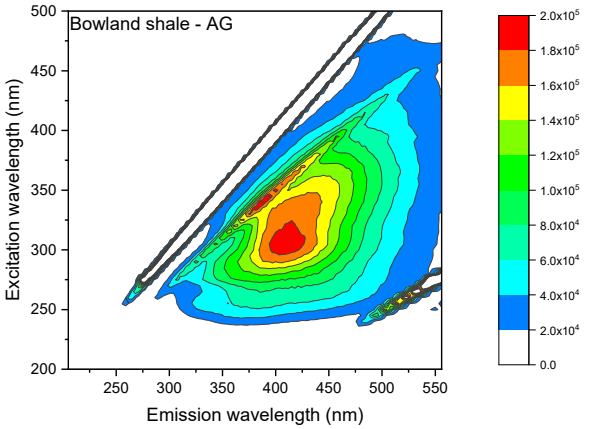
Supporting information S1: DOM analyses methods selected to include excitation and emission wavelength appropriate to analyse DOM present in various aquatic ecosystems (i.e. marine, surface water, river water, wetland and wastewater).

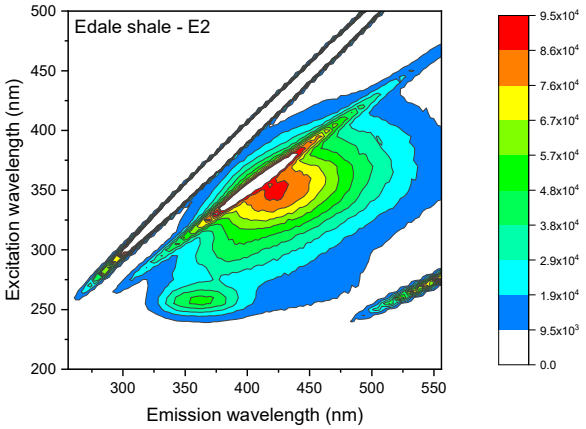
Sample type	Instrument and method	Excitation (nm)	Emission (nm)	*Reference*
River sample, sewage treatment works, effluent	Perkin-Elmer LS-50B luminescence spectrometer, slits sets to 5 nm band-pass for both excitation and emission	250 to 400, 5 nm interval	300 to 500, 0.5 nm interval	[1]
Landfill sites, groundwater	Perkin Elmer LS50B luminescence spectrophotometer	200 to 370	250 to 500	[2]
Source to sea samples	Perkin Elmer LS-050B luminescence spectrometer	5 nm interval		[3]
Deepwater Horizon oil rig in the northern Gulf of Mexico	Varian Eclipse spectrofluorometer, slit widths set at 5 nm, 0.0125 s integration time	220 to 400, 5 nm interval	260 to 450, 2 nm interval	[4]
Effluent, wetland effluent, salt river, river, drinking water and wastewater	Perkin-Elmer LS-50B luminescence spectrometer, slits sets to 10 nm band-pass for both excitation and emission	200 to 400, 5 nm interval	200 to 400, 0.5 nm interval	[5]
Marine	SLM Aminco SPF-500C spectrofluorometer	260 to 455	270 to 670	[6]
Coalbed methane produced water	Horiba Fluoromax 4 fluorometer, 10 nm and 2nm bandwidth, 0.25 s integration time	240 to 450, 10 nm interval	290 to 580	[7]
Natural waters	SLM AB2 luminescence spectrometer, 4 nm bandpass	fixed 355	365 to700	[8]
Surface seawater	Perkin Elmer 650-10S Fluorescence Spectrophotometer, 10 nm and 3 nm slit width	fixed 310	320 to 460	[9]
Landfill leachates	Perkin-Elmer LS55 luminescence spectrometer, slit widths10 nm, scan speed 1200 nm min.	200 to 450 nm, 10 nm interval	300 to 500	[10]
Wetland	Perking Elmer LS 50B luminescence spectrometer	260 to 560, 18 nm interval	260 to 560	[11]
Flowback water	Varian Cary-Bio100 spectrofluorometer			[12]
Rural, upland, headwater catchment	Perkin Elmer LS-50B luminescence spectrometer	200 to 500, 5 nm interval	200 to 600, 0.5 nm interval	[13]
Treated industry wastewaters	Perkin-Elmer LS-55 luminescence spectrometer	250 to 500	280 to 550	[14]
Deepwater Horizon oil rig in the northern Gulf of Mexico	Shimadzu RF-5301PC spectrofluorometer	220 to 400, 2 nm interval	240 to 680, 1 nm interval	[15]

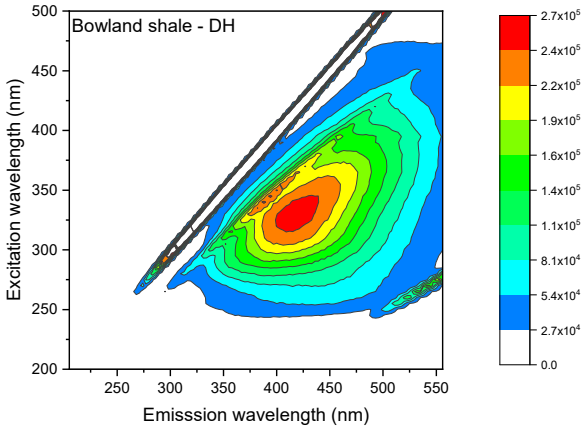
Supporting information S2: EEM DCM blank.

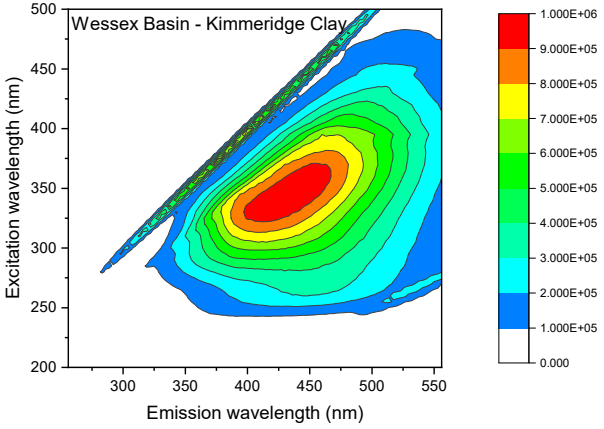


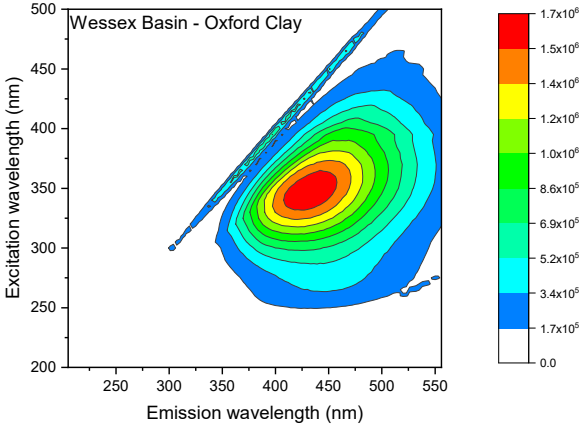
Supporting information S3: Laboratory shale leachate spectra.

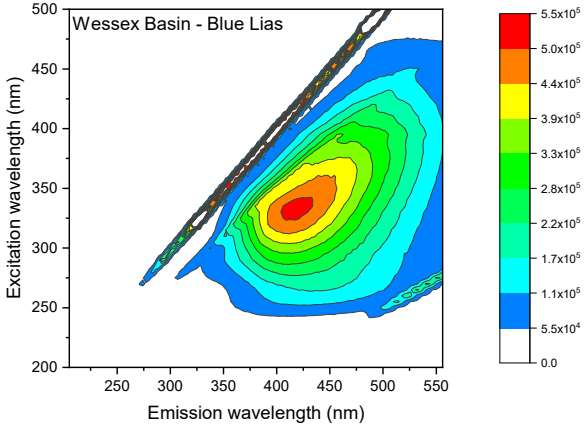


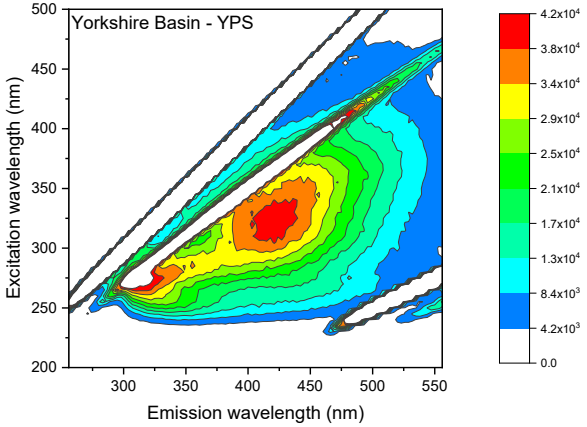


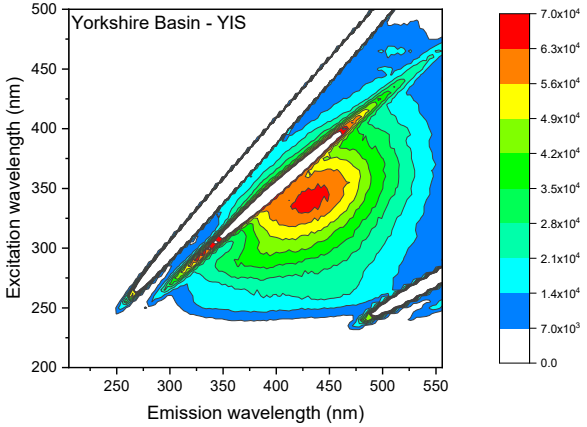


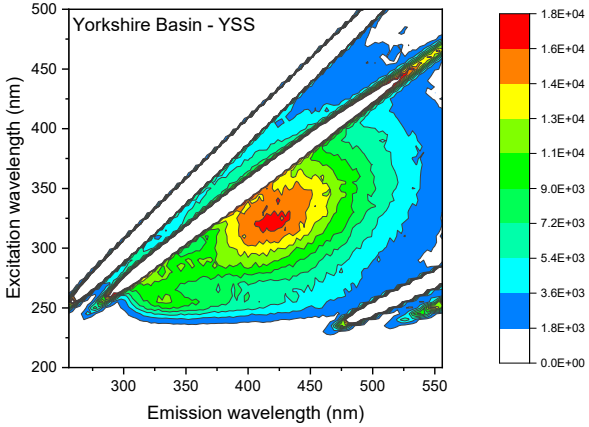


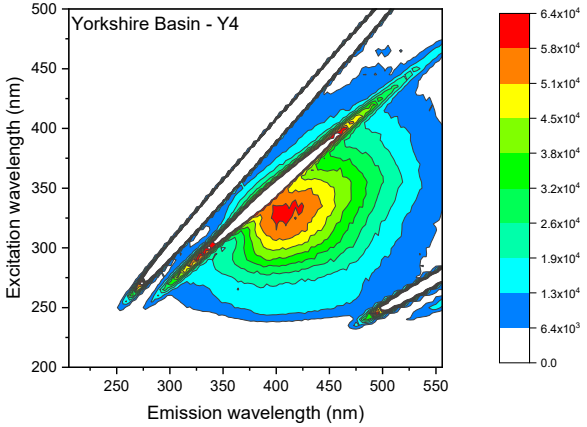





Yorkshire Basin - YPS
Excitation wavelength (nm)
Emission wavelength (nm)
500
450
400
350
300
250
200
300
350
400
450
500
550
4.2x10⁴
3.8x10⁴
3.4x10⁴
2.9x10⁴
2.5x10⁴
2.1x10⁴
1.7x10⁴
1.3x10⁴
8.4x10³
4.2x10³
0.0


Yorkshire Basin - YIS
Excitation wavelength (nm)
Emission wavelength (nm)
500
450
400
350
300
250
200
250
300
350
400
450
500
550
7.0x10⁴
6.3x10⁴
5.6x10⁴
4.9x10⁴
4.2x10⁴
3.5x10⁴
2.8x10⁴
2.1x10⁴
1.4x10⁴
7.0x10³
0.0


Yorkshire Basin - YSS
Excitation wavelength (nm)
Emission wavelength (nm)
500
450
400
350
300
250
200
300
350
400
450
500
550
1.8E+04
1.6E+04
1.4E+04
1.3E+04
1.1E+04
9.0E+03
7.2E+03
5.4E+03
3.6E+03
1.8E+03
0.0E+00


Yorkshire Basin - Y4
Excitation wavelength (nm)
Emission wavelength (nm)
500
450
400
350
300
250
200
250
300
350
400
450
500
550
6.4x10⁴
5.8x10⁴
5.1x10⁴
4.5x10⁴
3.8x10⁴
3.2x10⁴
2.6x10⁴
1.9x10⁴
1.3x10⁴
6.4x10³
0.0

References

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