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Characterization of freshwater natural aquatic colloids by atomic force microscopy (AFM)

Page S-1 Methodology description (equations for calculating number- and weight-average heights).

Page S-2 Table S-1: Heights and polydispersities of discrete colloids measured in AFM images of samples taken from the River Tame and a tributary of the River Tame 6th August 2003. Weight and number average heights are defined in the text. No data is available for the Site 2, pH10 and Site 4 pH10 due to a lack of discrete peak in AFM analysis

Page S-3 Figure S1a-c AFM images from samples taken from the River Tame and a tributary of the River Tame, West Midlands, UK. Samples were taken on the 6th August 2003. (1) sedimented sample taken from the River Tame, site 4, (2) enlarged image of aggregate present in image A. and (3) sedimented sample taken from site 3. See methodology for site description

Page S-4. Figure S2a-h to S): Particle size distributions for discrete particles in AFM images from samples taken from the River Tame and a tributary of the river tame. All samples were taken 6th August 2003. See methodology for site descriptions. Due to the lack of any discrete particles in the images for sites 2 and 4 altered to pH 10 no graph could be produced for these sites. (A) site 2, ambient conditions, (B) site 2, sedimented, (C) site 2, altered to pH4, (D) site 2, altered to pH10, (E) site 4, ambient conditions, (F) site 4, sedimented, (G) site 4, altered to pH4 and (H) site 4, altered to pH10.

Methodology

Images from AFM were analysed quantitatively for size distribution, and polydispersity. Size distributions were taken from the heights (Z_i) of only one type of observed colloid conformation (see later discussion). Both weight-average ($S(z)$) and number-average ($N(z)$) heights were calculated by the following equations:

$$S(z) = \frac{\sum_i n_i z_i^2}{\sum_i n_i z_i}$$

$$N(z) = \frac{\sum_i n_i z_i}{\sum_i n_i}$$

And the ratio of $S(z)$: $N(z)$ was used to calculate polydispersity (18).

Results and Discussion

Table S-1: Heights and polydispersities of discrete colloids measured in AFM images of samples taken from the River Tame and a tributary of the River Tame 6th August 2003. Weight and number average heights are defined in the text. No data is available for the Site 2, pH10 and Site 4 pH10 due to a lack of discrete peak in AFM analysis

Site & Sample	Number of measurements	Weight average height	Number average height	Polydispersity
Site 2, unsedimented	56	18.58	12.67	1.47
Site 2, sedimented	100	8.44	7.22	1.17
Site 2, pH 4	0	12.86	12.01	1.07
Site 2, pH 10	0	X	X	X
Site 4, unsedimented	59	8.94	6.44	1.39
Site 4, sedimented	54	13.49	6.59	2.05
Site 4, pH 4	85	18.42	14.69	1.25
Site 4, pH 10	0	X	X	X

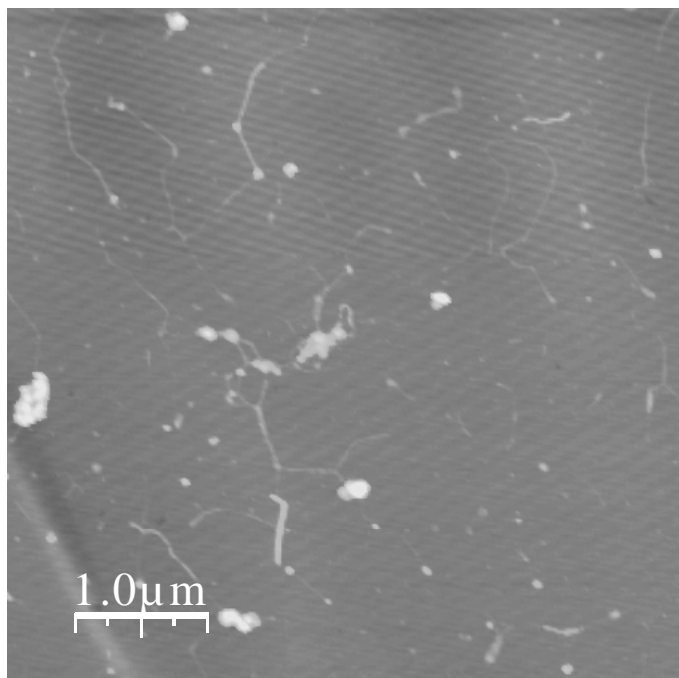


Figure S1a

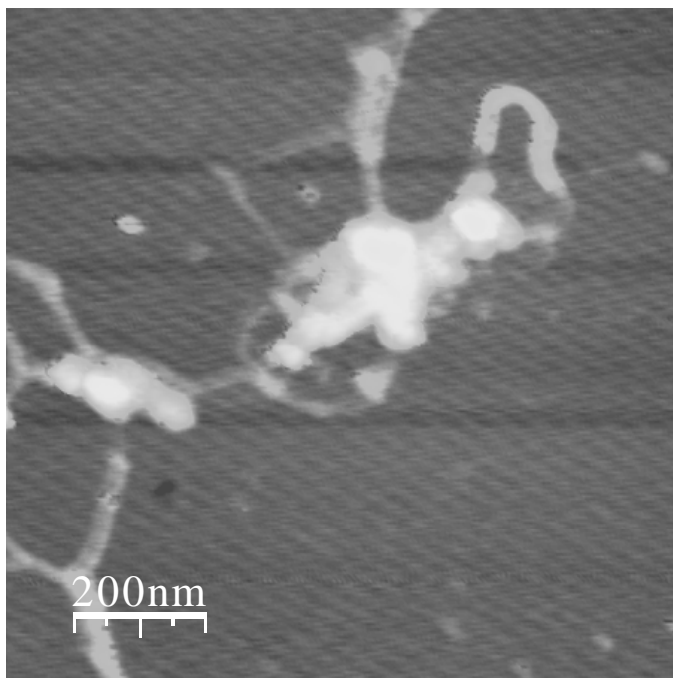


Figure S1b

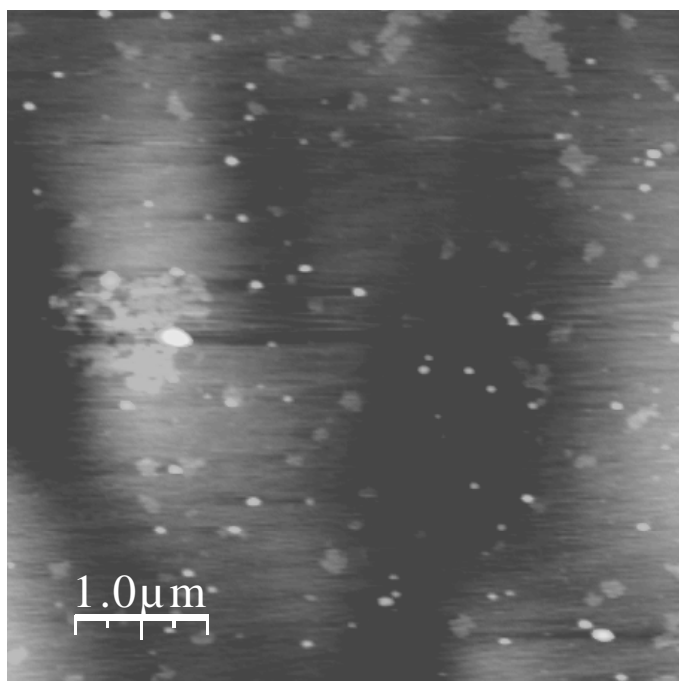


Figure S1c

Figure S1a-c AFM images from samples taken from the River Tame and a tributary of the River Tame, West Midlands, UK. Samples were taken on the 6th August 2003. (1) sedimented sample taken from the River Tame, site 4, (2) enlarged image of aggregate present in image A. and (3) sedimented sample taken from site 3. See methodology for site description.

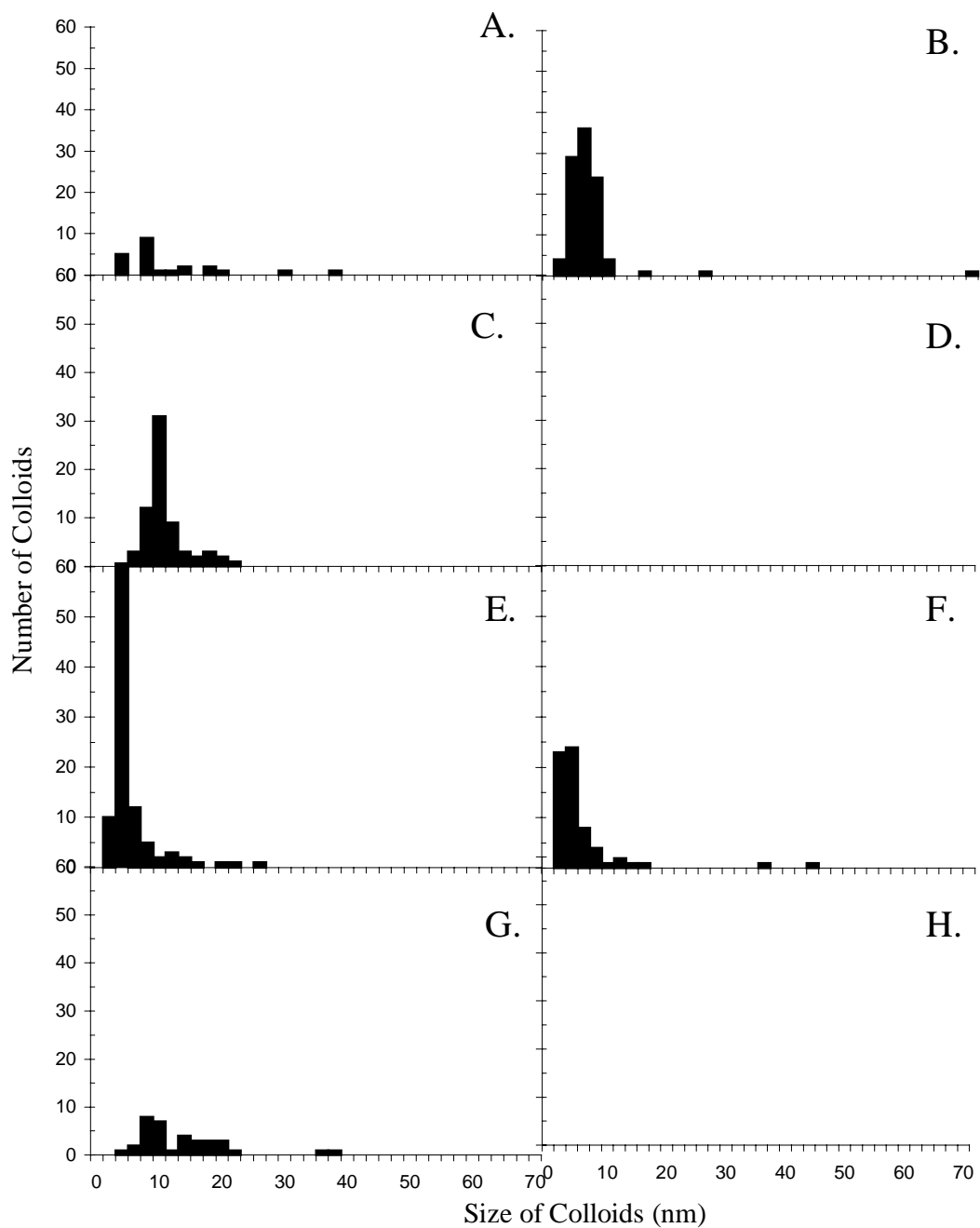


Figure S2a-h to S): Particle size distributions for discrete particles in AFM images from samples taken from the River Tame and a tributary of the river tame. All samples were taken 6th August 2003. See methodology for site descriptions. Due to the lack of any discrete particles in the images for sites 2 and 4 altered to pH 10 no graph could be produced for these sites. (A) site 2, ambient conditions, (B) site 2, sedimented, (C) site 2, altered to pH4, (D) site 2, altered to pH10, (E) site 4, ambient conditions, (F) site 4, sedimented, (G) site 4, altered to pH4 and (H) site 4, altered to pH10.