

**Characterization of natural aquatic colloids (< 5 nm) by flow  
field flow fractionation and atomic force microscopy**

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Supporting information include a comparison between AFM and FIFFF techniques  
using hard and roughly spherical iron oxide nanoparticles (4 Pages, 1 Figure and 1  
Table)

## **Results and Discussion**

Table S1 provides a comparison between both AFM and FIFFF techniques used in this paper. As shown, using a standard iron oxide nanoparticle (compact and roughly but not perfectly spherical), AFM and FIFFF measured values agree, with a d/h ratio of 1.02 (AFM:  $6.5 \pm 2.5$ ; FIFFF:  $6.7 \pm 2.7$ , values represent mean and standard deviation). The actual measured particle size distributions are given in Figure S1 below. For comparison the transmission electron microscopy (TEM) derived measurements are  $7.0 \pm 3.9$ . Dynamic light scattering results are slightly higher (*ca* 18 nm) because of the bias towards larger sizes and because it is sensitive towards the double layer around the particle. As AFM, TEM and FIFFF all agree very well, we accept this as the best estimate of the nanoparticle size. We also conclude that the AFM and FIFFF are in excellent agreement for nanoscale controls used.

|                         | AFM  | FFF  |
|-------------------------|--|--|
| Preparation method      | Sorption to a mica surface   | Direct injection to FIFFF  |
| Measured property       | Height form surface  | Diffusion coefficient  |
| Calculated property     | Radius estimated from sorbed height  | (hydrodynamic diameter can be calculated from Stokes-Einstein equation)                            |
| Assumptions             | Not applicable   | Hard sphere  |
| Measured distribution   | Number weighted distribution   | Volume weighted distribution (or similar)  |
| Calculated distribution | Volume weighted distribution   | Number weighted distribution   |
| Measurement medium      | Air  | Water  |
| Calibration             | Calibration grids and gold standards   | 20 nm polystyrene  |
| Control measure         | Iron oxide nanoparticles (Fig.S1a)<br>Number average (based on the NPSD) = $6.5 \pm 2.5$ | Iron oxide nanoparticles (Fig.S1b)<br>Number average (based on the converted NPSD) = $6.7 \pm 2.7$ |

Table S1. Comparison between AFM and FIFFF properties and measurement procedures.

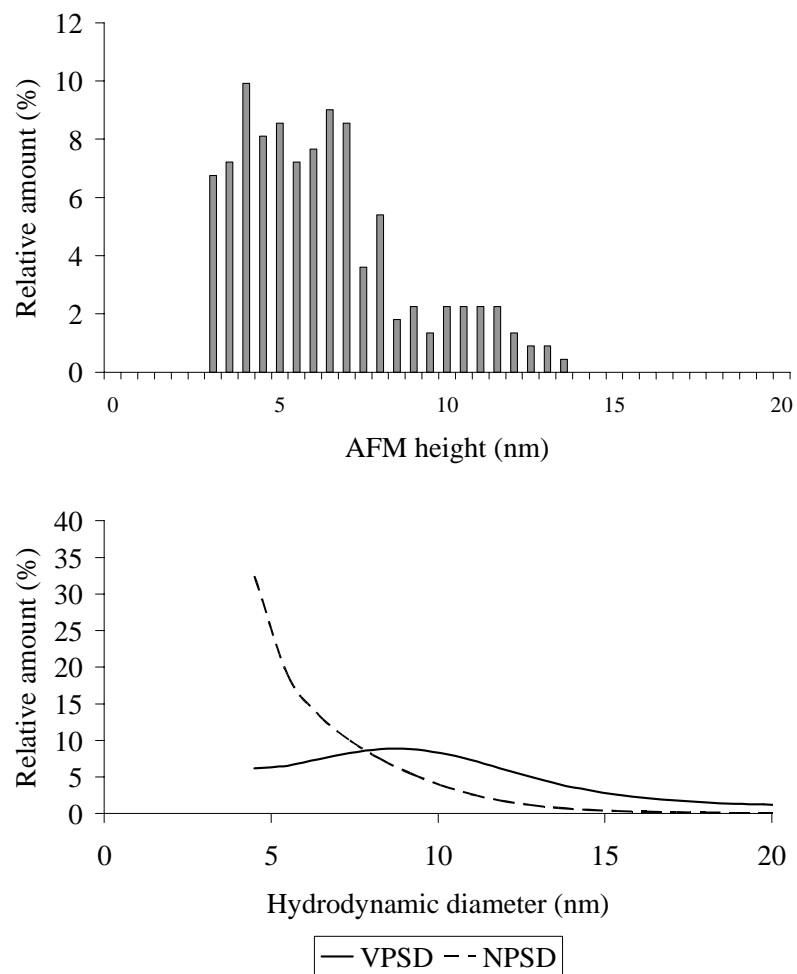


Figure S1. Particle size distribution of iron oxide nanoparticles: (a) NPSD by AFM and (b) VPSD and NPSD by FIFFF.