Role of MARINE GEL in scavenging and stabilizing SILICA NANOPARTICLES in the MARINE ENVIRONMENT

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EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

ARBRE MOBIEU
BETWEEN ATOM AND CELL

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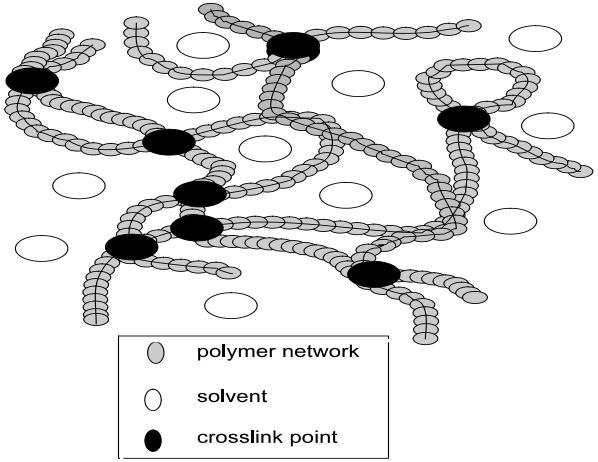
Marine gel

three-dimensional networks of biopolymers imbedded in seawater

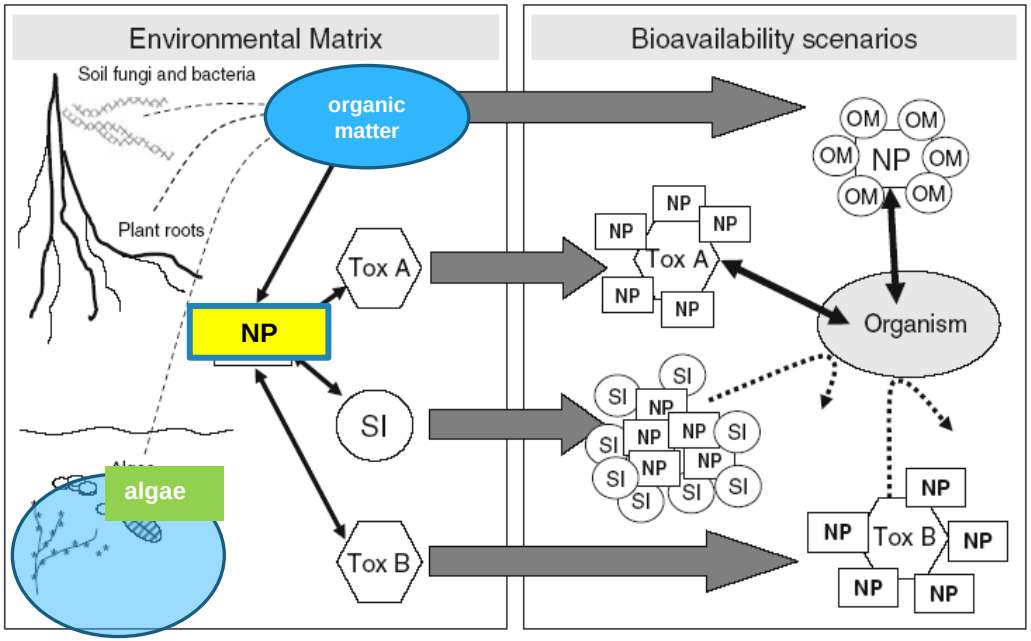


10 % of marine dissolved organic matter can spontaneously assemble to form polymer gels (~70 x 10^{15} g of organic carbon)

> global biomass of marine organisms

Chin W.C. et al. *Nature*, 1998
Verdugo P. et al. *Mar. Chem.* , 2004

Nanoparticles in environmental matrix – interactions



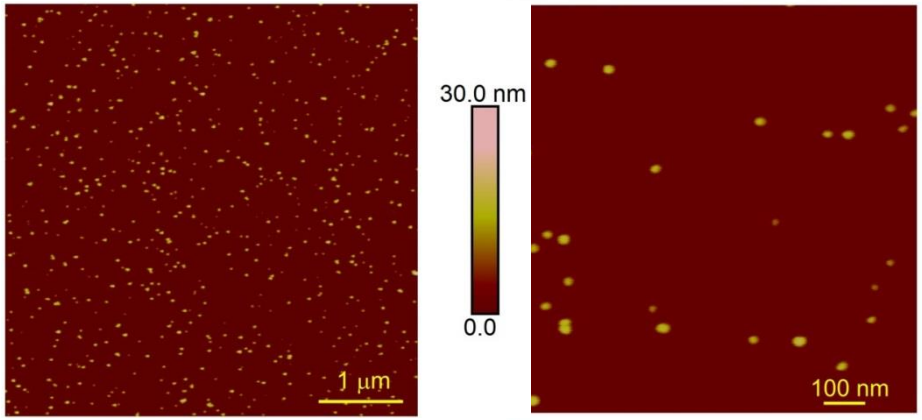
Navarro et al. *Ecotoxicology* , 2008

Interactions between NPs and OM greatly determine the NPs' fate in aquatic systems

SiO_2 NPs – among major components of global NPs production

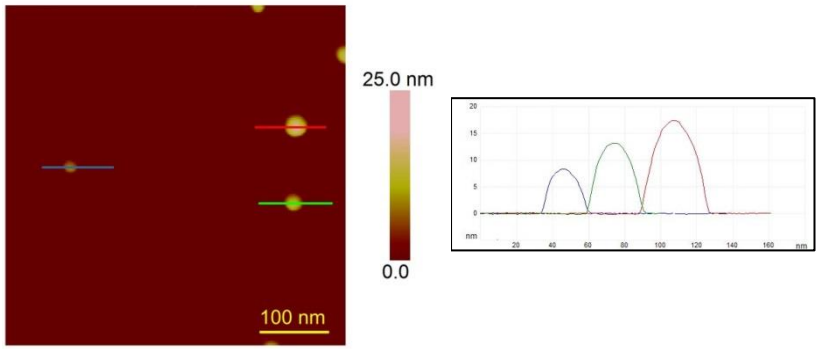
SiO_2 NPs in ultrapure water and in sewater - AFM study

SiO_2 NPs in UPW (10µg/mL)



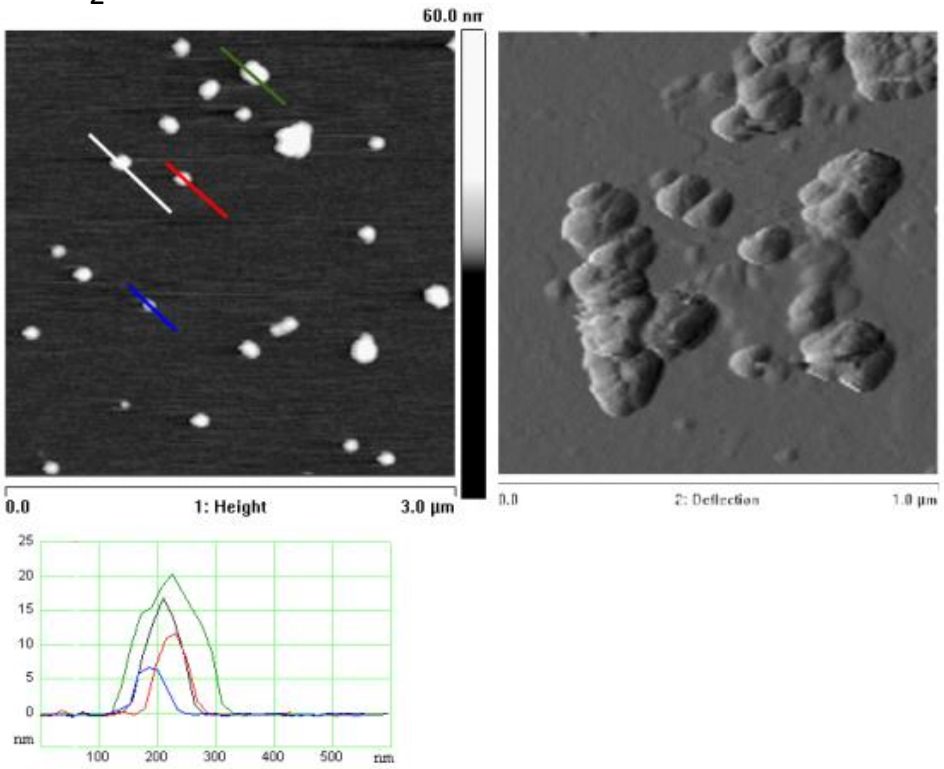
5 µm x 5 µm

1µm x 1 µm



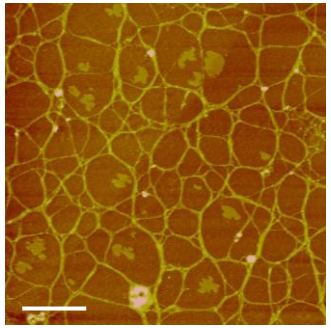
500 nm x 500 nm

SiO_2 NPs in SW (10µg/mL)



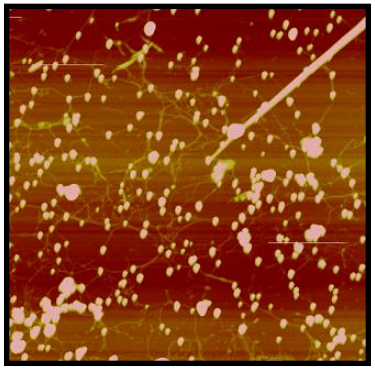
Marine gel and SiO_2 NPs – AFM study

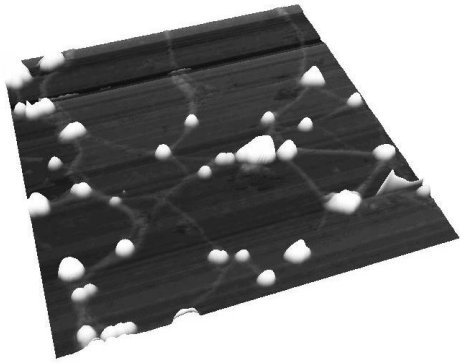
before SiO_2 NPs addition



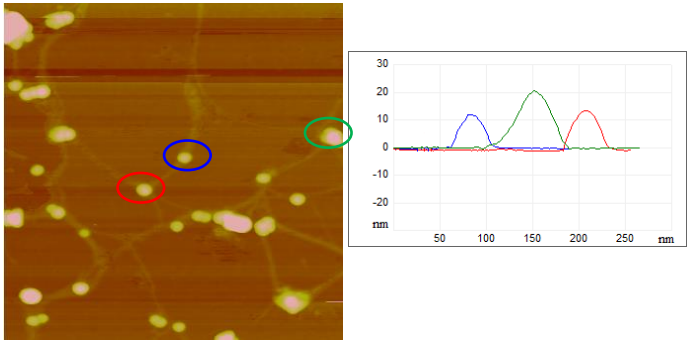
5µm x 5 µm x 10 nm

after SiO_2 NPs addition (10µg/mL)

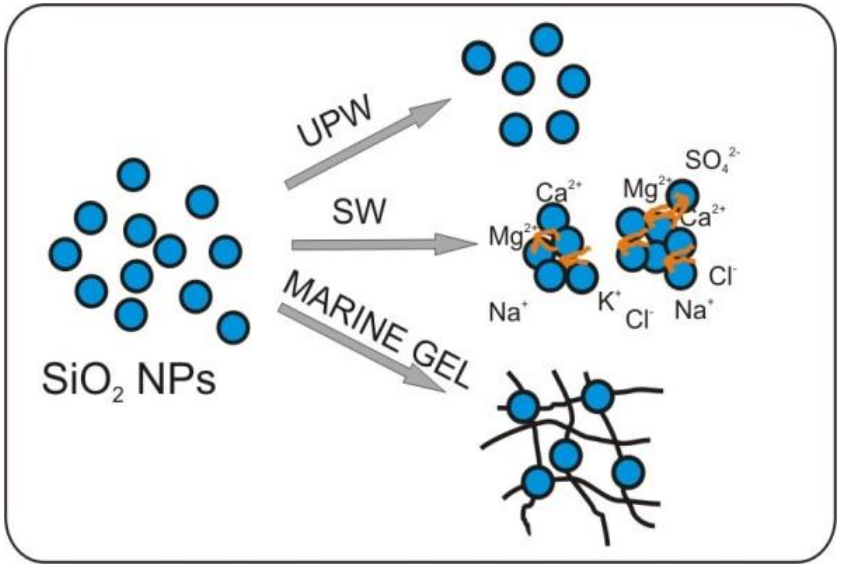




3 µm x 3 µm x 15 nm



Stability of SiO_2 nanoparticles in the marine environment



Thank you!