

## **Adsorption kinetics of dissolve organic matter at the water-air interface**

Gilboa Arye and Wei Zhang

Ben-Gurion University of the Negev, Jacob Blaustein Institutes for Desert Research, Agriculture and Biotechnology of Drylands, Sede Boqer Campus, Israel (aryeg@bgu.ac.il)

The surface active nature of humic substances and naturally occurring dissolved organic matter (DOM), has been confirmed by a growing number of studies. The main quantity from which the surface activity has been deduced obtained from measurements of surface-tension (ST,  $\text{mN m}^{-1}$ ) at the water/air interface. All studies demonstrated the decay in the ST of water ( $72.5 \text{ mN m}^{-1}$  at  $25 [U+F0B0] \text{ C}$ ) with increased aqueous concentrations of dissolved organic carbon (DOC). The ST values reported for DOM should be defined as equilibrium ST, when the adsorption and orientation of the amphipathic molecule at the water/air interface have reached equilibrium state. However, for any amphipathic molecule the adsorption kinetics at the water/air interface is not reached instantaneously and may range from seconds up to several hours. The time depended ST started from the time where a new water/air interface is formed. Thereafter, amphipathic molecules need first to diffuse from the bulk solution to the interface, subsequently adsorb and simultaneously achieving the correct orientation at the interface. The consequence of this process will be expressed in a decay of the ST as a function of time until it will reach the equilibrium the surface tension. The main objective of this study was to quantify the rate and extent of DOM adsorption kinetics at the water-air interface through dynamic surface tension measurement, using the pendant drop method. The applicability of a diffusion-only model to describe the results will be presented and discussed.