

## **The relationship between dissolved organic matter (DOM) and arsenic-release at two, hydrogeologically-contrasting, aquifers in Kandal Province, Cambodia**

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The contamination of drinking water sources with naturally-occurring arsenic impacts tens of millions of people globally [1]. In the highly-reducing, alluvial and deltaic aquifers of South East Asia, microbial-mediated reductive-dissolution of arsenic-bearing iron (oxy)hydroxides is thought to be the primary cause of arsenic-release into the aqueous-phase [2]. Organic matter (OM) plays a key part in this process, as a source of bioavailable electron donors and electron shuttles [3]; and in competitive sorption and complexation reactions [4].

Extensive characterisation of dissolved organic matter (DOM) was carried out on groundwaters sampled from eight 18 metre deep wells, drilled at two hydrogeologically-contrasting sites (a clay-dominated and a sand-dominated site, called “Clay Site” and “Sand Site”, respectively) southeast of Phnom Penh, Kandal Province, Cambodia. The hydrogeology of these sites has been characterised extensively in previous studies [5].

Excitation emission matrix (EEM) analysis showed that Clay Site DOM is characterised by a higher proportion of microbial-derived compounds (e.g. tryptophan-like) and of higher bio-availability; whereas Sand Site DOM is characterised by higher proportions of terrestrial-derived compounds (e.g. fulvic acid-like) and a lower bio-availability. These results are comparable with previous EEM studies of the DOM of the region [6]. Further analysis of the DOM from these sites (e.g. by Fourier Transform-Ion Cyclotron Resonance Mass Spectrometry – FTICR-MS) is planned in order to investigate the relationship between DOM molecular composition, bioavailability and arsenic-release. These findings will provide further insights into the role of OM in arsenic-release by reductive-dissolution, and help target further studies.

### **References:**

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