

Private well installation trends and correlation of borehole stratigraphy with groundwater arsenic contamination in Kandal Province, Cambodia

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Arsenic (As) exposure via contaminated drinking water continues to threaten the health of millions of people worldwide. Despite recent advances in the prediction of As contaminated groundwater¹ and dissemination of the risks of As to human health, wells continue to be installed in regions with known groundwater contamination. In addition, manganese (Mn) exposure through drinking water poses health risks, and often occurs distinct from As contamination in groundwater.² We collected basic stratigraphic data (texture and color) at 3 m depth resolution from >500 wells installed in and near a known As- and Mn-affected region in Kandal Province, Cambodia, between 2013-2015. Sediment stratigraphy combined with an existing database of groundwater quality² shows trends in well installation (e.g. number of wells installed per year) in areas with known groundwater contamination following government and non-government (NGO) privately organized As education and awareness campaigns, providing insight on the effect of As awareness programs on new well installations in a known As-affected region. Further, by combining sediment stratigraphy with groundwater quality data, we also test show spatial correlation between sediment color, aqueous redox indicators (e.g. Fe(II) and Eh), and groundwater quality (As, Mn). Our hypothesis was that red, orange, and yellow sediments at the screened interval would be proximal to groundwater low in As and with high (oxidizing) Eh. Conversely, wells screened in blue, black or grey sands would be proximal to higher As concentrations and lower Eh. By incorporating results of intensely studied transects and groundwater flow models in the area^{3,4} with an expanded description of subsurface stratigraphy we aim to test additional sedimentary controls on the distribution of high As groundwater in Cambodia.

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