

Radiocarbon Analysis of RNA to Determine the Sustainability of Pleistocene Aquifers in Bangladesh

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In Bangladesh, Pleistocene-aged aquifers are typically low in Arsenic (As) concentrations. Wells that tap the deep Pleistocene aquifers are used to mitigate the damaging public health effects from consuming groundwater from high As Holocene-aged aquifers. However, a small number of wells tapping the Pleistocene aquifer contain elevated levels of As. This study analyzes the source of carbon fueling microbial respiration in a high-risk Pleistocene aquifer. Groundwater has been collected from Araihasar, Bangladesh located 25km east of the urban capital, Dhaka. Samples have been collected for extraction and radiocarbon analysis of microbial RNA along with groundwater chemistry. The radiocarbon date may indicate whether the microbes metabolize young organic carbon (OC) from the Holocene aquifer, or old carbon from the overlying clay layer. A young OC age may be a sensitive indicator that the Pleistocene aquifer is not sealed, and that heavy pumping around Dhaka could cause vertical drawdown of organic sub-surface carbon. 350 and 750µg of nucleic acid was extracted from two wells, enough for three separate radiocarbon dates. These dates may provide insight into the long-term sustainability of the use of Pleistocene-aged aquifers.