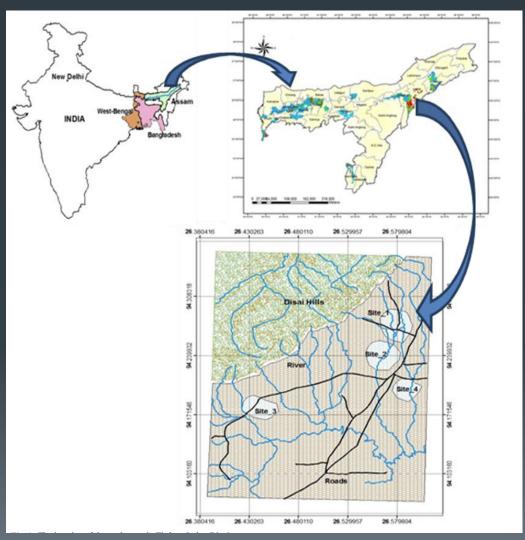
Arsenic mobilization In the Brahmaputra plains of Assam, India

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Background and Original Study

- Study conducted in the Titabor, Jorhat District in northeast India
- Six boreholes were drilled around two highly contaminated tube wells where 44 groundwater samples were collected
- WHO determined a limit of 10µg/L of As for safe drinking water, here we see averages of 210µg/ L and some instances of 440 µg/L



Background and Original Study

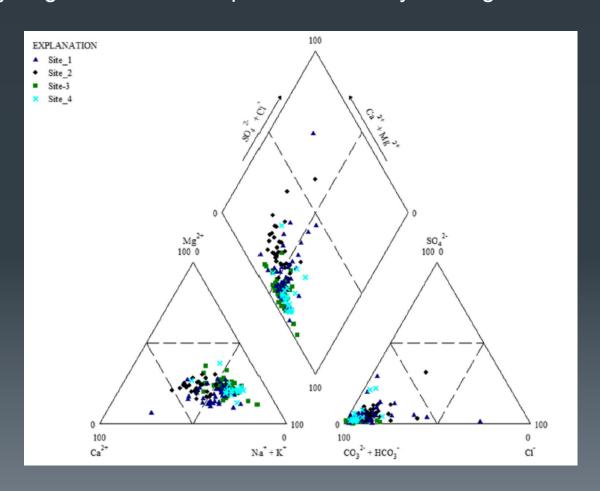
- The study used the model of reductive Iron oxides as the driving force behind as the Arsenic releasing mechanism.
- The study also looked into anion adsorption competition as an additional cause for Arsenic enrichment, more specifically Phosphate
- Phreeqc was used for solubility Indices and Speciation
- Atomic Absorption Spectroscopy (AAS) was used to measure Cations

Original Study

- Study models showed extremely high concentrations in HCO3-
- This points to a highly reductive system, meaning that Iron oxides are most likely the Major cause of movement
- The study also showed that Arsenic III, the more toxic of the species, was the major Arsenic species

Original Study

The figure below depicts a Pipper Diagram showing a hydrogeochemical composition of the systems groundwater



Purpose

- To use Phreeqc modeling to see the affect of Phosphate competitive adsorption on Arsenic enrichment
- Tested by altering levels of Phosphate to see if changes occur in Arsenic Species Solubility index and Concentration

Results

- With a 30% increase in phosphate drastic increases were seen in the species distribution along with higher saturation indices for all Arsenic species
- With Arsenolite jumping from an SI index of -22.64 to -19.27 and AS2O5 going from -28.15 to -24.78

Conclusion

- Increase in Phosphate concentration showed high levels of change in Arsenic species
- Dramtic change is caused
- Over fertilization, A problem in the region could lead to a rise in subsurface Phosphate levels
- Some Data unavailable, Temperature, full transportation information
- Possible program issues

Sources

 Sailo, L., Mahanta, C. 2014, Arsenic mobilization in the Brahmaputra plains of Assam: groundwater and sedimentary controls, ENVIRONMENTAL MONITORING AND ASSESSMENT, v. 186, p. 6805-6820