Chemical Footprints of Urbanization upon River Compositions

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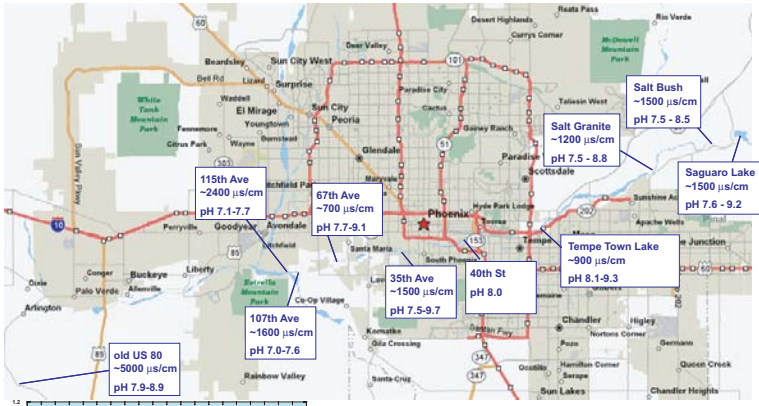
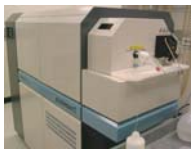


INTRODUCTION

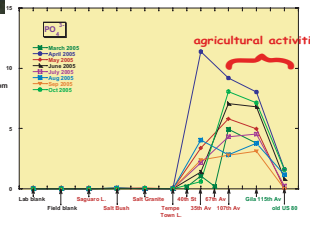
In 2005 (until March), the Salt and Gila rivers flowed through the Phoenix metropolitan area, and provided a 'natural' laboratory to investigate chemical footprints of cities upon rivers and urbanization effects on biogeochemical cycles of metals. In this study, we identify distribution patterns of chemical compositions of the rivers, and attempt to distinguish human and non-human impacts. Water samples are collected monthly from upstream to downstream, and analyzed for major, minor and trace elements with ion chromatography (IC) and high resolution inductively coupled plasma mass spectrometry (HR-ICP-MS).

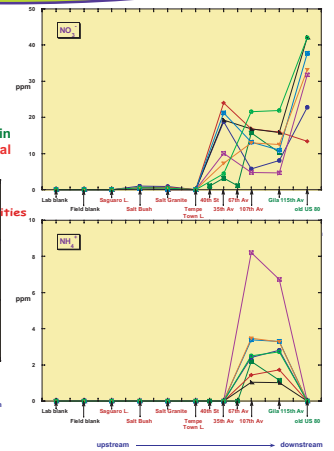


~ Site Specific ~

Other trace elements and ions: Cu, V, As, U, Cd, Se, PO_4^{3-}, NO_3^- and NH_4^+ exhibit differing systematic patterns that are site specific.

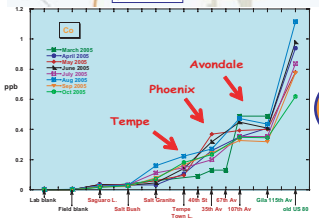
Elevated PO_4^{3-}, NO_3^-, NH_4^+ contents in certain locations seem to correlate with agricultural activities.





~ Urbanization Effect ~

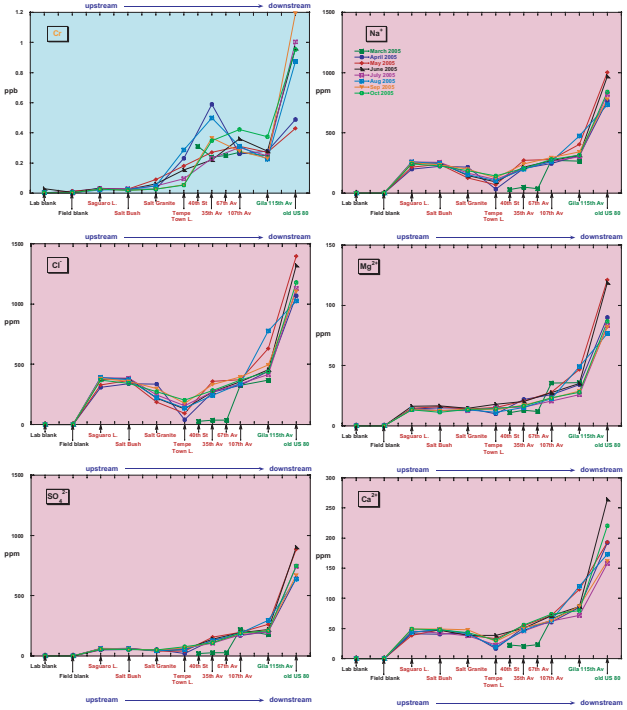
Preliminary results show increases in most major elemental and several trace elemental concentrations as the rivers pass through the city.

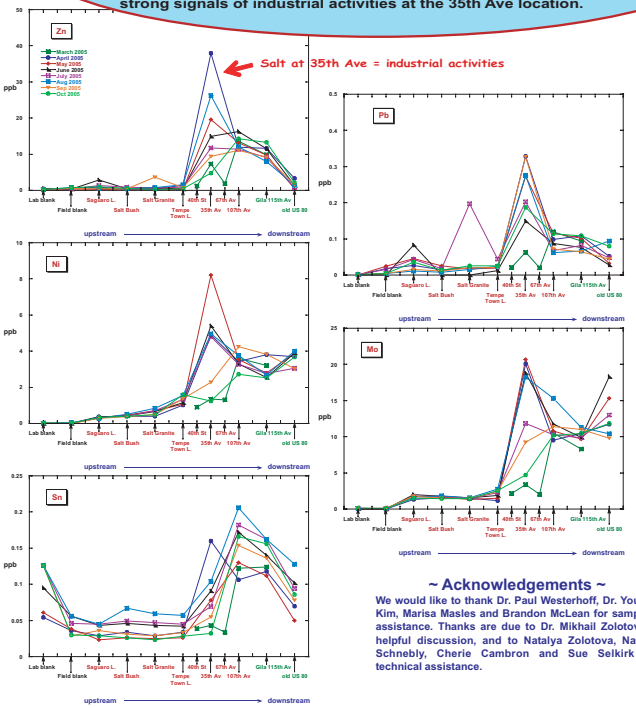


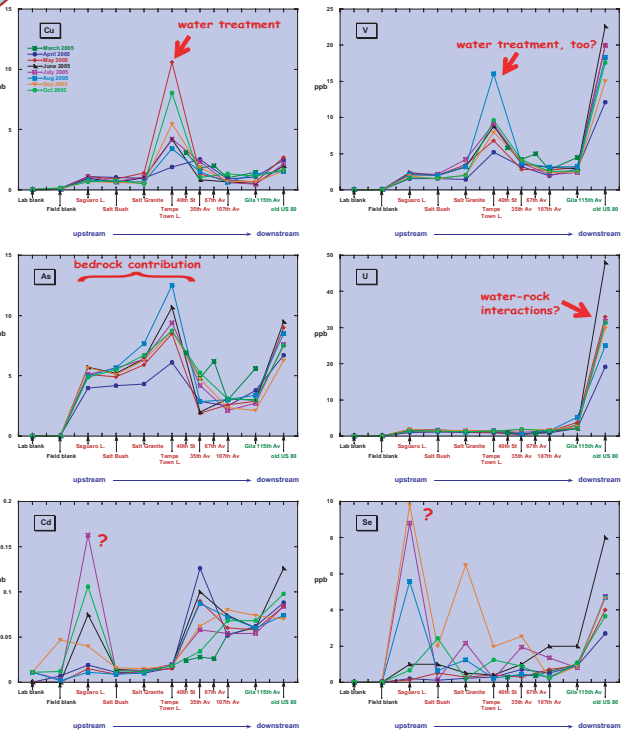
~ Industrial Impact ~

Increases in concentrations as a result of urbanization are also observed for other trace elements, as revealed by high concentrations of Pb, Zn, Sn, Fe, W, Mn, Ni, Mo and Sb in the city and immediately downstream. Among these elements, Pb, Zn, Sn, Ni and Mo show strong signals of industrial activities at the 35th Ave location.

Distribution of Cu, V, As, U, Cd and Se is believed to correlate with water treatment and water-rock interactions. Information on water sources, bedrock types and geologic structures will be incorporated to understand the distribution patterns of the chemical compositions.







~ Acknowledgements ~

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