



Contribution ID: 703

Type: Oral 20 Minutes

## Urban aquifer hydraulic conductivity estimation and uncertainty analysis

*Monday, 14 May 2018 14:25 (15 minutes)*

Urbanization in coastal areas has been on an increasing trend during the last century. In some coastal regions, groundwater is one of the major source of potable water for the population, the industry, and the agriculture with an average demand of 30 m<sup>3</sup>/s [1,2]. Sea-level rise has been recorded to be approximately 40 mm/yr [3] with the potential consequence to favor significant intrusion of seawater into potable coastal aquifers [4] and groundwater flooding of urban areas [5] and infrastructure. Despite some indicators of the interaction between infrastructures with urban coastal aquifers, few studies have been dedicated to develop methods and models to quantify this interaction [6,7].

Here, we report a study to investigate the interaction of a coastal urban aquifer with a sewer network. The area (Hoboken, NJ) is located in the North-East of the United States at the Hudson river estuary within the metropolitan area of New York city. The work was motivated by large concentration of fecal indicator bacteria in the river during dry weather suggesting groundwater inundation of the sewer. The watershed was implemented in MODFLOW with a geology determined by applying geostatistics on few localized geological data. Boundary data consisted of variable aquifer head and tidal river level. The hydraulic conductivity and the recharge were estimated through stochastic inverse modeling on the hydraulic head measurements within the domain of interest. By knowing the location of the sewer pipes and compared with the estimated groundwater table with uncertainty, the potential of groundwater inundation of the sewer was assigned to each part of the network.

### References

#### Reference

- [1] Pimentel et al. BioScience, 54, 909-918, 2004.
- [2] Owolabi Glob. Ini., 11, 69-87, 2017
- [3] Milne Astro. Geophys., 49, 224-228, 2008
- [4] Viquez-Su et al. Hydro. J. 13, 522-533, 2005.
- [5] Kane, H. H., et al. Reg. Environ Change, 15(8), 1679-1687
- [6] Prigiobbe and Giulianelli. Water Sci. Tech. 60, 727-735, 2009.
- [7] Karpf and Krebs. Water Research, 45, 3119-3136, 2011

### Acceptance of Terms and Conditions

[Click here to agree](#)

**Primary authors:** Ms SU, Xin; Dr PRIGIOBBE, Valentina

**Presenter:** Ms SU, Xin

**Session Classification:** Parallel 2-H

**Track Classification:** MS 1.16: Heterogeneity, uncertainty, and multiple scales in groundwater problems