

Daily Dam Operations and Subsurface Hydrogeology Control Hydrologic Exchange Flows Hot Spots and Hot Moments in a Regulated River Reach

Pin Shuai¹, Xingyuan Chen¹, Xuehang Song¹, Glenn E. Hammond², John Zachara¹, Patrick Royer¹, Huiying Ren¹, William A. Perkins¹, Marshall C. Richmond¹, and Maoyi Huang

¹Pacific Northwest National Laboratory, Richland, Washington, USA

²Sandia National Laboratories, Albuquerque, New Mexico, USA

Contents of this file

Figures S1 to S5

Additional Supporting Information (Files uploaded separately)

Movie S1. Animation of groundwater level contour over the simulation period from 2011 to 2015.

Movie S2. Animation of river water tracer plumes over the simulation period from 2011 to 2015.

Movie S3. Animation of exchange flux across the riverbed for the entire reach over the simulation period from 2011 to 2015.

Introduction

The supporting information provides the supplementary figures referenced in the main article. Figure S3-S5 provides the comparison of observed and simulated data including groundwater levels and specific conductance at selected wells. Please note those selected wells are not all inclusive, and many wells do not have continuous monitoring data and thus are not included here. For more well information, please go to <http://phoenix.pnnl.gov> or <https://www.hanford.gov/page.cfm/SoilGroundwaterAnnualReports>.

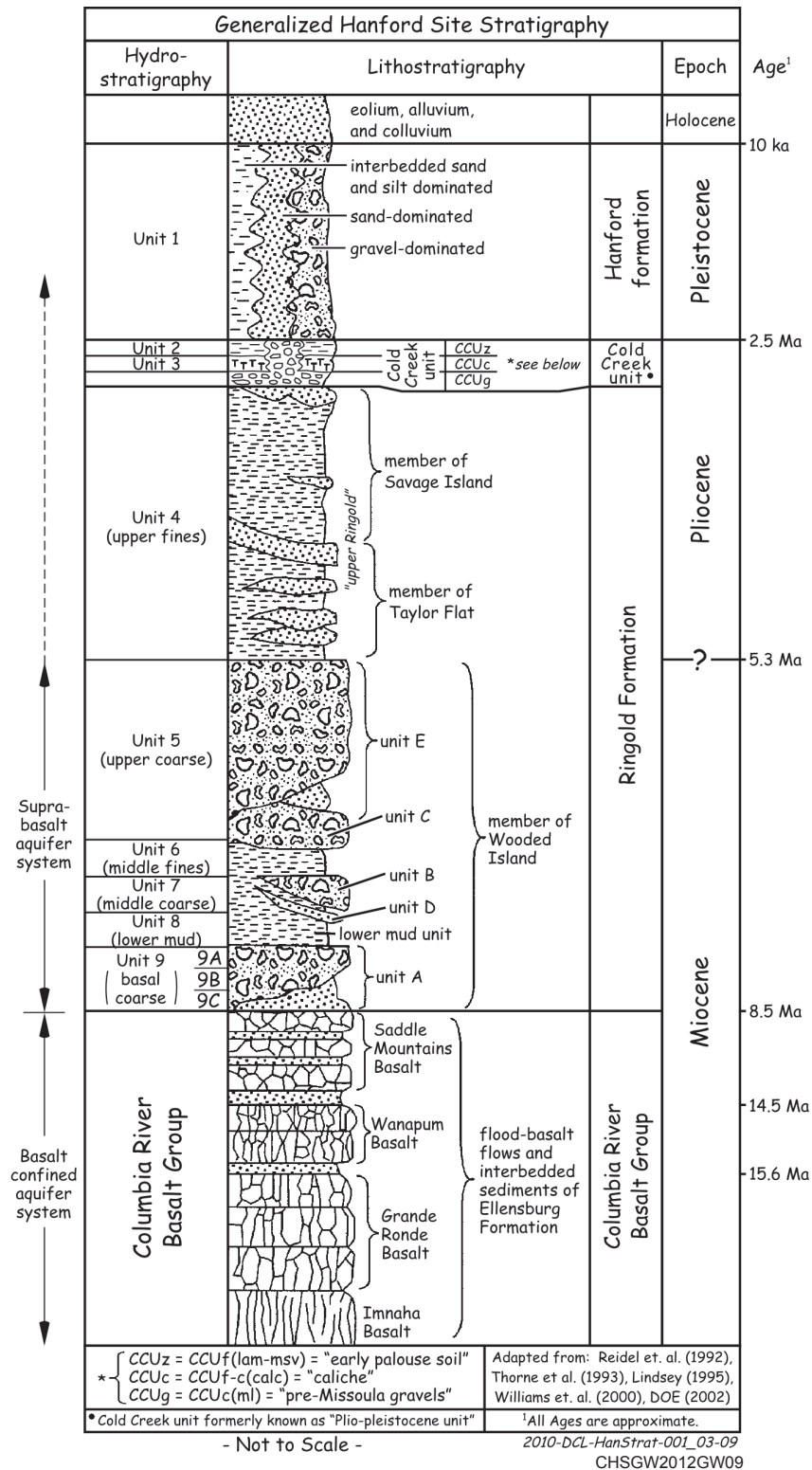


Figure S1. Generalized Hanford stratigraphy (from Hartman, 2016)

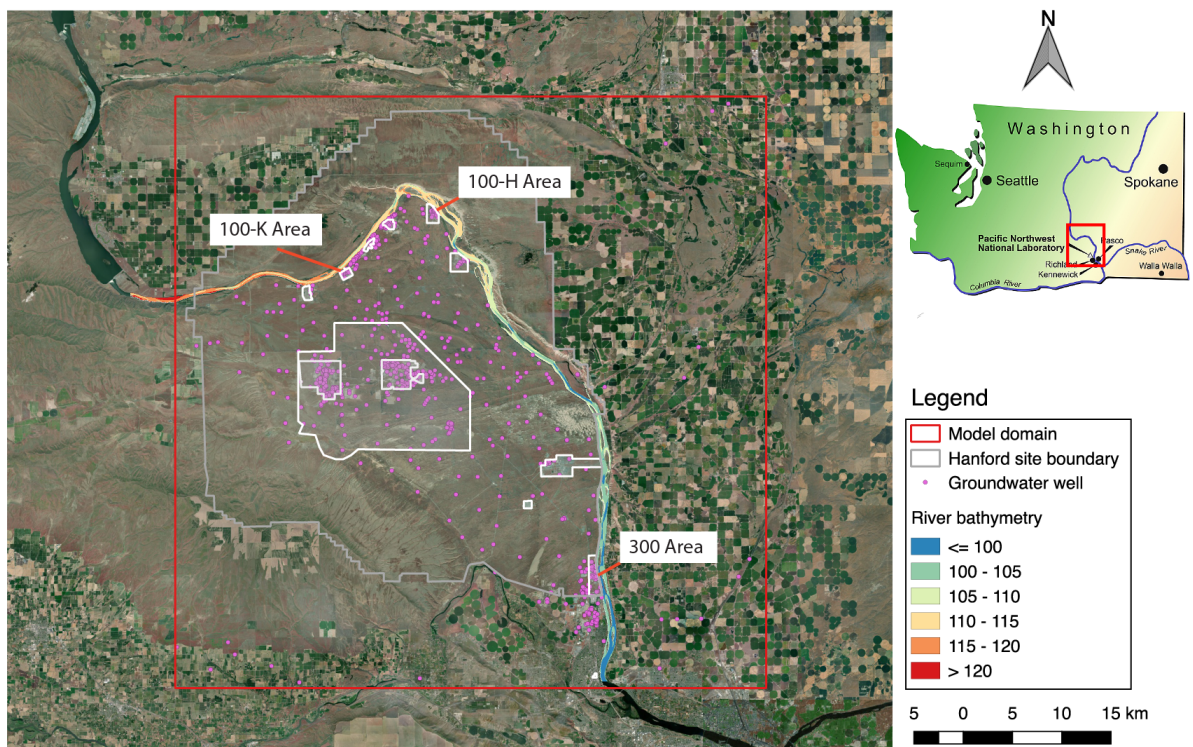


Figure S2. Study site showing Hanford Areas. Modified from Figure 1 in the manuscript.

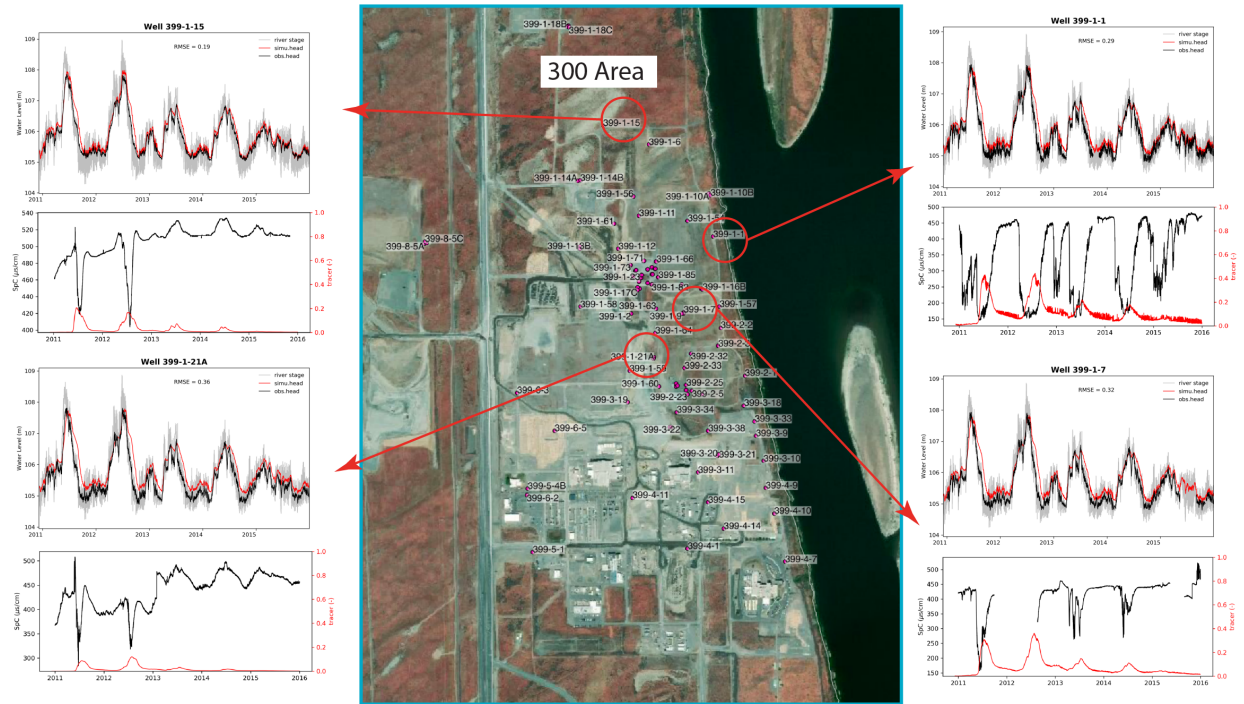


Figure S3. Selected groundwater monitoring wells showing observed versus simulated groundwater table and observed specific conductivity versus simulated river tracer concentration in 300 Area.

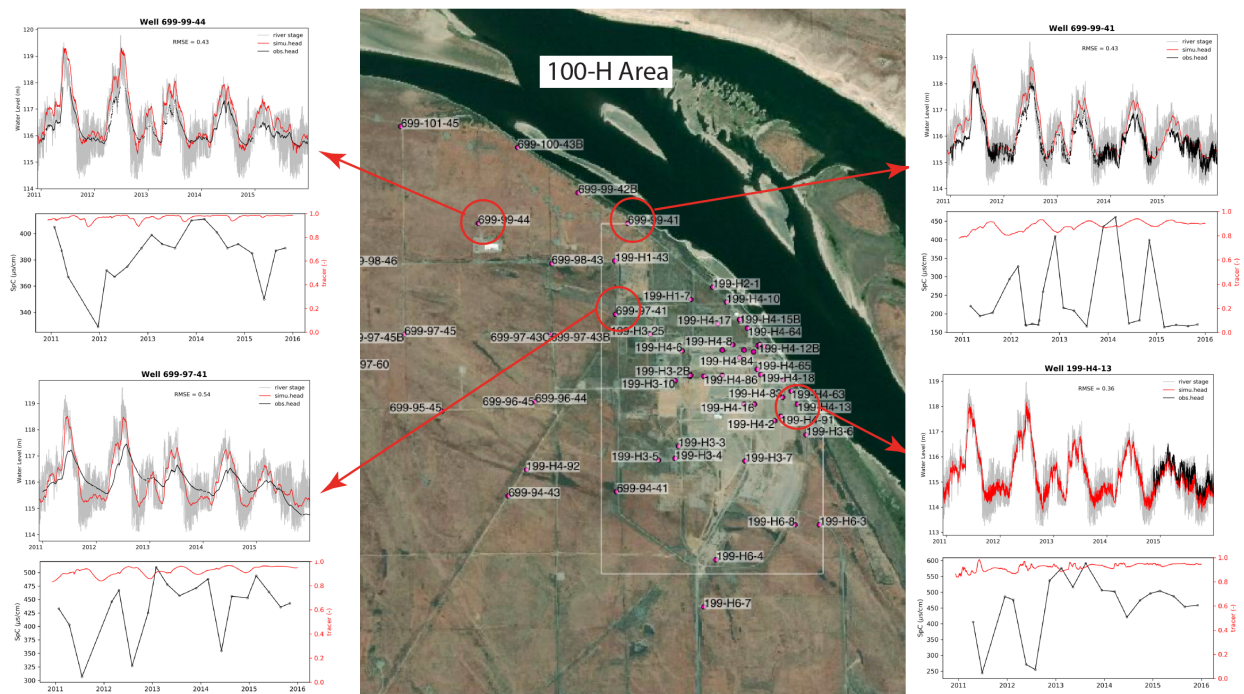


Figure S4. Selected groundwater monitoring wells showing observed versus simulated groundwater table and observed specific conductivity versus simulated river tracer concentration in 100-H Area.

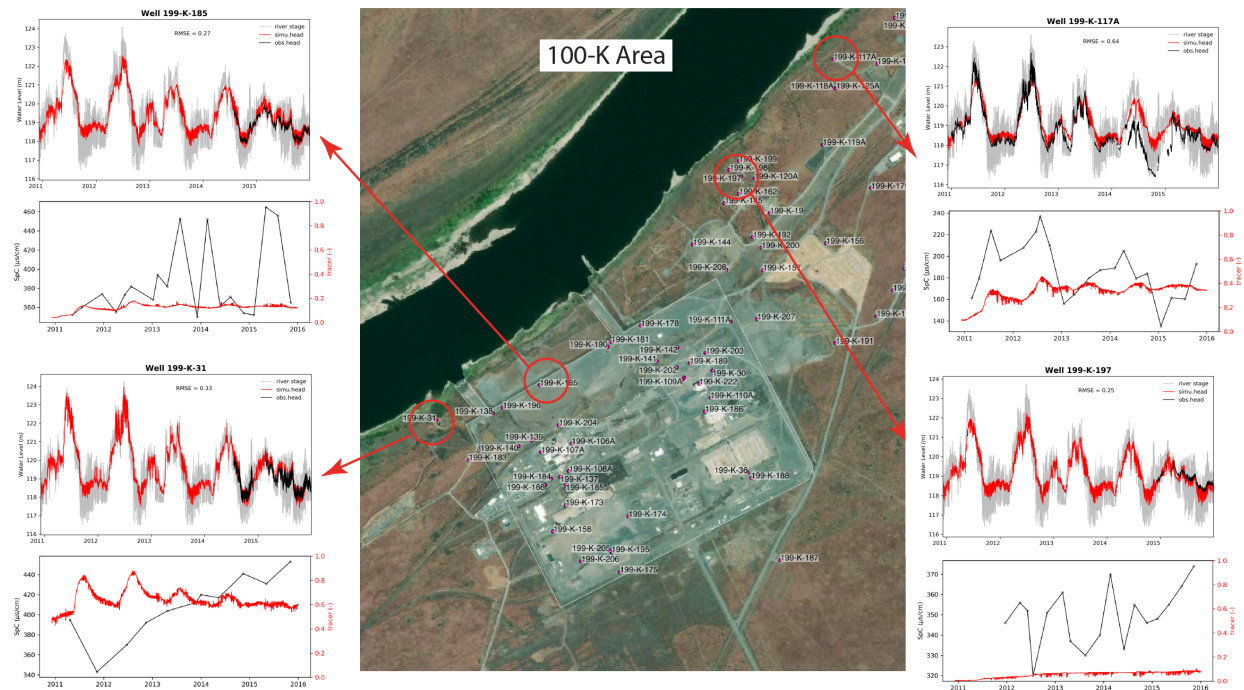


Figure S5. Selected groundwater monitoring wells showing observed versus simulated groundwater table and observed specific conductivity versus simulated river tracer concentration in 100-K Area.

Movie S1. Animation of groundwater level contour over the simulation period from 2011 to 2015.

Movie S2. Animation of river water tracer plumes over the simulation period from 2011 to 2015.

Movie S3. Animation of exchange flux across the riverbed for the entire reach over the simulation period from 2011 to 2015.