Groundwater Modeling and More 2026: *From Raindrop to Reservoir!*



June 7-10, 2026 at Princeton University

Conference: Monday, June 8 – Wednesday, June 10, 2026

Short Courses: Friday, June 5 – Sunday, June 7, 2026;
and Thursday, June 11 – Friday, June 12, 2026

Integrated GroundWater Modeling Center

#GWM²

Welcome to Groundwater Modeling and More 2026: *From Raindrop to Reservoir!*

Giving a new name to the "MODFLOW and More" conference and short course series. GWM^2 reflects a more inclusive and forward-looking vision for the discipline of groundwater modeling, while preserving the long-established emphasis and traditions of this very special conference. As in previous renditions, this conference will provide an open and engaging forum for researchers, developers, practitioners, and regulators in the groundwater modeling community to convene, share experiences, and propagate ideas.

Keynote presentations will be given by:

- **Dr. Taikan Oki,** University of Tokyo, Japan
- **Dr. Steven Loheide,** 2026 Darcy Distinguished Lecturer, University of Wisconsin, Madison

Sustainability Lunch Panelists introduced and moderated by Dr. Matthew J. Tonkin:

The Role of Models in Adjudications and Other Water Rights Disputes

- **Russell McGlothlin,** O'Melveny & Myers LLP
- **Sorab Panday,** GSI Environmental
- **Emily Lodolce,** Arizona Department of Water Resources
- **Doug Bartlett,** Clear Creek Associates (a Geo-Logic Company)

The conference includes featured presentations by:

- **Dr. Laura Condon**, *Developing the next generation US integrated hydrologic model: recent progress and the path forward to a terrestrial hydrology digital twin*
- **Dr. Jeremy White**, *Purpose and complexity in applied groundwater modeling*
- **Dr. Sorab Panday**, *Scientific Story Telling for the Non-Expert*
- **Dr. Otto Strack**, *An exact solution for steady subsurface irrigation with free boundary*
- **Dr. Nick Engdahl**, *Bridging the gap to quantum-computing based hydrological modeling with uncertainty aware simulation tools*
- **Dr. Holly Michael**, *Not your average Ghyben-Herzberg interface: How fresh groundwater gets offshore and why it matters*
- **Dr. Lauren Foster**, *Conceptual Modeling in the Age of AI*
- **James Rumbaugh**, *Groundwater Models Supporting Consumptive Use Permit Decisions in Florida*
- **Dr. Christopher Green**, *Challenges and opportunities in reactive transport at regional scales*
- **Dr. Chunmiao Zheng**, *Four Decades of Research at the MADE Site and Beyond: Advancing Understanding Through Modeling*

General sessions are on the following topics:

- **Coastal Hydrology:** Groundwater and Saltwater Intrusion
- **General Applications of Groundwater Models**
- Special Session: **GWEX Global Groundwater Network Community Forum**
- **Hydrology Education and Outreach:** Creative Approaches and Tools for Community Engagement and Learning
- **It's All Connected:** Surface Water Groundwater Interactions
- Special Session: **MODFLOW as a Community-Based Development Effort**
- **Contaminants and Water Quality**
- **Machine Learning and Next-Generation Computing**
- **Hydrogeology, Vadose Zone, Case Studies, and Reactive Transport**
- **Making Models Better:** Calibrations, Inference, and Uncertainty
- **Sustainable Water Management:** The Role of Safe vs. Sustainable Yield in Groundwater Systems
- **Water Management in Mining and Energy**

CONTENTS

Welcome to Groundwater Modeling and More 2026: *From Raindrop to Reservoir!* 2
Conference Organizing Committee 3
Integrated GroundWater Modeling Center (IGWMC) – Scientific Advisory Committee 4
SCHEDULE – Sunday, June 7 and Monday, June 8 7
Software Demonstration – Monday, June 8 10
Poster Session – Monday, June 8 12
SCHEDULE – Tuesday, June 9, 2026 14
Poster Reception – Tuesday, June 9, 2026 18
SCHEDULE – Wednesday, June 10, 2026 20
Sponsor Appreciation 22

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President and Principal Hydrogeologist



MODFLOW Panelist and Short Course Co-Instructor: MODFLOW 6 and FLoPy

Christian D. Langevin, PhD
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Short Course Instructors: Contaminant Transport Modeling



Vivek Bedekar, PhD, PE
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Featured Software

GroundWater Desktop

Texture2Par

Attending, presentating, and/or staffing SSP&A's sponsor booth



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Senior Project Hydrogeologist

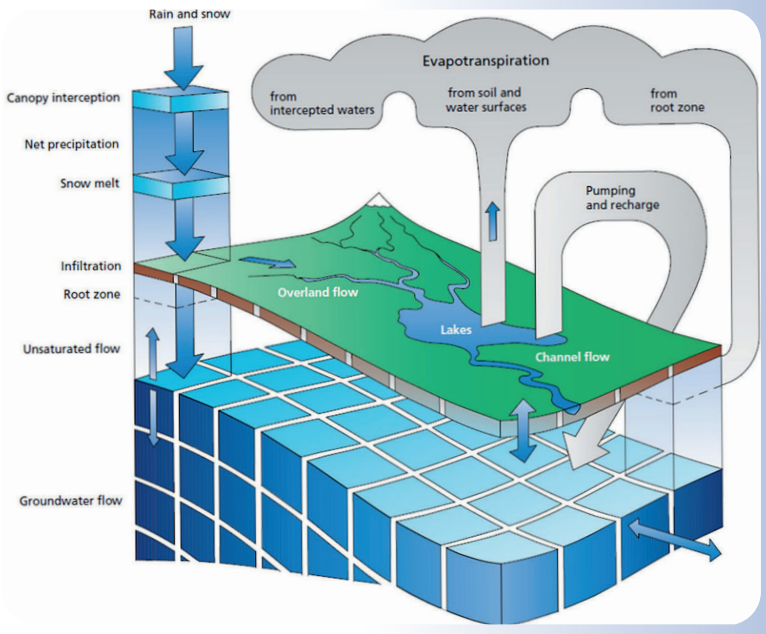


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SUNDAY, JUNE 7

16:30	**Conference Check-in:** Begins Sunday, June 7, at 4:30pm Eastern
17:00 – 18:30	**Welcome Reception:** Refreshments and Hors D'oeuvres

MONDAY, JUNE 8

TIME	Friend 101		COS 104	
08:00 – 08:25	**Welcome and Opening Address** *Featured Presentation:* **Developing the next generation US integrated hydrologic model: recent progress and the path forward to a terrestrial hydrology digital twin**, by Laura Condon		*Opening and Featured Presentation in Friend 101*	
08:30 – 10:00	**General Applications of Groundwater Models** (1 of 2) Session chairs: **Jim Rumbaugh**, **Jeremy White**		**It's All Connected: Surface Water/Groundwater Interactions** (1 of 2) Session chairs: **Nick Engdahl**, **Holly Michael**	
08:30 – 08:45	Metin Ozbek, Nathan Voorhies, Tad Fox	Multi-Objective Optimization of Groundwater Extraction and Hydraulic Containment at a Complex Alluvial Site	Dirk Kassenaar, E.J Wexler	Integrated surface water and groundwater simulations for sustainable community design: Insights from the response to Hurricane Ian
08:45 – 09:00	Barret Kurylyk, R. Bailey Strong, Rob Jamieson, Julia Guimond, Aaron Mohammed, Jeffrey McKenzie, Victor Bense	Cryohydrogeological Modeling: An Overview of Advances, Challenges, and Emerging Opportunities	Marcia Achiaa Frempong, Anner Paldor	The Impact of River Geomorphic Processes on Groundwater Availability: Insights from Integrated Hydrologic Modeling
09:00 – 09:15	Aaron Mohammed, Ruta Basijokaite, Rebecca Rowe, Jeffrey McKenzie	Simulating variably-saturated subsurface flow and reactive transport in thawing permafrost environments	Jonathan Traylor, Jesse Dickinson, Steve Regan	Sensitivity of surface and subsurface water exchanges to model structure and coupling scheme in integrated models
09:15 – 09:30	Qing He, Naota Hanasaki, Akiko Matsumura, Edwin H. Sutanudjaja, Taikan Oki	Global groundwater decline trend simulated by H08-GMv1.0	Amelia Peeples, Nicholas Jadallah, Marie Joe Sawma, Reed Maxwell	Channel Width Uncertainty in Integrated Hydrologic Modeling: Scale-Dependent Impacts on Simulated Streamflow
09:30 – 09:45	Katie Fogg, Eric Morway, Alden Provost, Christian Langevin, Joseph Hughes, Martijn Russcher	The PBST Utility: A Process-Based Approach for Stream Temperature Modeling in MODFLOW 6	Kurt Zeiler, Brett Oliver	Combining NHDPlus HR and Lidar for Improved Streambed Elevation Estimates in Agricultural, Suburban, and Urban Areas
09:45 – 10:00	Hussain Palagiri, Manali Pal *WITHDRAWN*	Basin-Scale Delineation and Validation of Groundwater Potential Zones Using an Integrated AHP-GIS Framework: Krishna River Basin, India	Rama Rani	Modeling Groundwater-Surface Water Interactions During River and Floodplain Restoration in the Kissimmee Basin, Florida
10:00 – 10:15	Coffee Break			

MONDAY, JUNE 8

TIME	Friend 101		COS 104	
10:20 – 10:40	*Featured Presentation:* **Purpose and complexity in applied groundwater modeling**, by Jeremy White		*Featured Presentation in Friend 101*	
10:45 – 12:00	**General Applications of Groundwater Models** (2 of 2) Session chairs: **Sorab Panday**, **Jeremy White**		**It's All Connected: Surface Water/Groundwater Interactions** (2 of 2) Session chairs: **Christopher Green**, **Holly Michael**	
10:45 – 11:00	Raoul Collenteur, Cas Neyens, Davíd Brakenhoff, Mark Bakker	Rain or shine, improve your aquifer test data using time series analysis	Nicholas Jadallah, Mary Michael O'Neill, Reed Maxwell	Remote Sensing-Constrained Hydrologic Simulations Quantify Groundwater Pumping Impacts in the Upper Colorado River Basin
11:00 – 11:15	Helen Siegel, Hai Pham, Trevor Budge, Veronica Yonce	Next-Generation Groundwater Modeling for the Hanford 100 Areas: Integrated Parent-Child Framework with Predictive Uncertainty	Varut Guvanasen, Teresa Pilato	Development of an Integrated Surface Water/Groundwater Model to Enhance the Accuracy of Convective Storm Prediction
11:15 – 11:30	Aoqi Sun, Wenjie Xu, Chen Yang	Progressive groundwater decoupling may drive a shift toward faster and shallower terrestrial water cycling	Janet Barclay, Lauren Koenig, Jeremy Diaz, Samantha Oliver, Magdalen Bresee, Yingda Fan, Xiaowei Jia, Alison Appling, Galen Gorski	Enhancements to a national stream temperature model to better represent groundwater-dominated temperature regimes and small streams
11:30 – 11:45	Alastair Black	When Groundwater Models Leave the Modeller: Evidence, Precaution and Decision	Harry Stone, Maria Pereira Fleury, Michael Gallagher, Adam Atchley, Reed Maxwell	Disentangling Topographic-Hydrologic Controls on Forest Growth using Drone-Based Remote Sensing
11:45 – 12:00	Frank Tsai, Yuqi Song, Sharfaraj Khadam	A Framework for CONUS MODFLOW Model Development	Joseph Hughes, Jeremy White, Wesley Zell, Mohamed Hayek, Katherine Markovich	Groundwater Pumpage-Induced Streamflow Capture in the Continental United States
12:10 – 13:40	Lunch – Mentor Lunch		*Commons D301*	
13:45 – 14:45	*Sustainability Lunch Panel:* **The Role of Models in Adjudications and Other Water Rights Disputes** Panel: **Sorab Panday** (GSI Environmental), **Russell McGlothlin** (O'Melveny & Myers LLP), **Emily Lodolce** (Arizona Department of Water Resources), **Doug Bartlett** (Clear Creek Associates, a Geo-Logic Company) Moderator: **Matt Tonkin** This panel brings together technical, knowledge transfer, and legal experts at the forefront of water resource analysis to engage in an open, moderated discussion on the use of models in water rights disputes and adjudications. The session opens with a 15-minute talk covering key technical concepts, including approaches to estimating available water resources, resolving methodological differences, the concept of "Adversarial Collaboration," and the strategies for managing and communicating model limitations. Panelists will represent a range of perspectives, from technical modeling and policy transfer to legal practice, offering attendees a rich, cross-disciplinary dialogue on how models shape and inform high-stakes water rights decisions.			
14:45 – 15:00	Coffee Break			

MONDAY, JUNE 8

TIME	Friend 101	COS 104	
15:05 – 15:25	*Featured Presentation:* **Scientific Story Telling for the Non-Expert**, by Sorab Panday	*Featured Presentation in Friend 101*	
15:30 – 16:30	*Special Session:* **GWEX Global Groundwater Network Community Forum** Session chairs: **Laura Condon, Katie Markovich, Chunmiao Zheng** This session will be an interactive community forum discussing the ongoing work of the GEWX Global Groundwater Network to bring together the groundwater modeling, climate and earth systems modeling communities. Our goal is to improve groundwater representation in global simulations. In this session we will be discussing: 1. The physical processes, spatial scales and hydrogeologic settings that are most critical to better represent hydrologic exchanges with the subsurface at the global scale; 2. Pathways to better connect the groundwater community and its work with global modeling; and 3. Blockers to scientific exchanges between our communities.	**Hydrology Education and Outreach: Creative Approaches and Tools for Community Engagement and Learning** Session chairs: **Lauren Foster, Sorab Panday**	
15:30 – 15:45		Lisa Gallagher, Reed Maxwell	Learning, creating, and sharing: A science communication framework for water and climate education
15:45 – 16:00		Hikari Fukuda, Anh Cao, Kei Yoshimura	Evaluating Flood Preparedness Education Using Structural Equation Modelling: A Comparative Study of Japan and the Philippines
16:00 – 16:15		Jasmine Pinchinat, Lisa Gallagher, Mario Soriano, Reed Maxwell	Integrating Creative Evaluation Tools into Climate and Water Education: A Multi-Year Look at Student Engagement and Learning
16:15 – 16:30		Fleford Redoloza, Trevor Budge	System Model of the Hanford Site Central Plateau Pump-and-Treat System
16:40 – 17:00	Software Demonstration Introductions		
17:30 – 19:30	SOFTWARE DEMONSTRATIONS	POSTER SESSION	

Software demonstrations are listed on program pages 10 and 11, and the poster presentations are listed on page 12; both will be held at the Carl A. Fields Center.

Software Demonstration – Monday, June 8

Featured Software:

1. Groundwater Modeling System (GMS), *by Alan Lemon (Aquaveo)*

Aquaveo's flagship desktop environment for developing, simulating, and visualizing 3D groundwater flow and contaminant transport models. Developed in close collaboration with the modeling community (USACE, USGS), GMS provides an integrated workflow from raw site data to a calibrated, decision-ready model. Key features include: Pre-processing: Grid-independent conceptual modeling on a GIS map, with the numerical grid regenerated as the design evolves; Subsurface Characterization: Boreholes, cross sections, TINs, solids, and 3D stratigraphic models built from field data; Modeling Engines: Full MODFLOW family (MF6, USG-Transport, etc.), MT3D family, SEAWAT, MODPATH, mod-PATH3DU, and HydroGeoSphere; Meshing & Gridding: Structured grids, unstructured Voronoi grids, quadtree refinement, and finite-element meshes; Calibration & Uncertainty: PEST with parallel runs, pilot points, sensitivity analysis, and Monte Carlo; and Visualization: Animated contours, particle tracking, fence diagrams, isosurfaces, and 3D fly-throughs.

GMS is used worldwide for water-resource planning, wellhead protection, mine dewatering, contaminant remediation, and regulatory compliance.

2. Timflow, *by Mark Bakker and Davíd Brakenhoff, (Delft University of Technology and Artesia)*

Timflow is a new open-source analytic element model for the simulation of both steady and transient flow in multi-aquifer systems. Timflow gives quick answers as there is no grid and no time stepping. Groundwater features are represented directly with analytic elements including wells, rivers, and leaky walls. Applications vary from designing well fields (including horizontal wells) and capture zone delineation to pumping test analysis and construction site dewatering.

3. Pastas, *by Raoul Collenteur, Mark Bakker, and Davíd Brakenhoff (Hydroconsult, Delft University of Technology, and Artesia)*

Pastas is an open source Python package for processing, modeling, and analyzing groundwater time series. With Pastas you can efficiently model your hydraulic head time series to better understand the groundwater system and the stresses impacting the groundwater fluctuations. Data-driven models can be created, calibrated, and analyzed with just a few lines of Python code with the built-in optimization, visualization, and statistical analysis tools. This year, we will be introducing Pastas 2.0, along with all its new features, such as the forecasting and scenario module.

4. arti3d, *by Ali Meyal and Devi Gurung (Anchor QEA)*

arti3d offers a modern, integrated GUI for reactive transport modeling, supporting MODFLOW-based codes (MODFLOW, MT3DMS and PHT3D), MODFLOW-USG (with transport), and muFlowRT a next-generation engine that integrates OpenFOAM with PhreeqcRM. Features include unstructured grids for variably saturated and multiphase flow and transport.

5. MIKE SHE, *by Philipp Huttner (DHI)*

MIKE SHE is a fully integrated hydrological and groundwater simulation software system designed to model the whole water cycle incl. bilateral coupling of all water components. It combines surface water, unsaturated zone, groundwater, evapotranspiration, irrigation and river interactions within a single, physically-based framework. In addition, MIKE SHE can be used as an addon tool for other groundwater models by deactivating the 3D groundwater module. This turns MIKE SHE into a powerful soil water balance model that can produce spatially and temporarily varying groundwater recharge with high resolution for your MODFLOW or FEFLOW groundwater model.

6. GSFLOW-USG, *by Sorab Panday (GSI Environmental Inc.)*

GSFLOW USG represents coupled watershed and groundwater processes within a fully integrated, three dimensional framework, enabling simulation of tightly linked surface–subsurface interactions across complex hydrogeologic settings. The approach supports flexible, unstructured discretization, allowing independent representation of surface and subsurface domains to capture heterogeneity in topography, stratigraphy, and hydraulic properties. Surface runoff, snow accumulation and melt, lateral hillslope flows, and soil zone water balances are solved simultaneously with groundwater flow, while allowing two way exchange between surface and subsurface and among stream networks and aquifers. The framework further supports three dimensional transport of solutes and heat, and density dependent flow, along with explicit representation of preferential flow paths such as wells or fractures. Together, these capabilities provide a mass conserving platform for evaluating dynamic feedbacks among hydrologic processes and assessing system response under changing natural or managed conditions.

7. ModelMuse, *by Richard B. Winston*

ModelMuse is a graphical user interface (GUI) for several versions of MODFLOW, SUTRA, and other models. This software package provides a GUI for creating the input files for the models, running the models, and displaying the output from the models. In ModelMuse, the spatial data for the model are independent of the grid, and the temporal data are independent of the stress periods. Being able to input these data independently allows the user to redefine the spatial and temporal discretization at will. ModelMuse supports parameter estimation with PEST in MODFLOW and SUTRA models.

8. HydroFrame, *by Amy Defnet, George Artavanis, and Bill Hasling (Princeton University)*

HydroFrame is a platform to facilitate easy interaction with large computationally intensive hydrologic models and massive simulated outputs. Our tools enable users to subset model inputs and outputs for any watershed in the US, run their own simulations, and visualize and analyze existing model outputs or newly generated results and forecasting. We also develop free educational tools and lesson plans to teach students of all ages about groundwater and the hydrologic cycle.

9. ParFlow-CLM, *by Nick Jadallah and Amelia (Mia) Peeples (Princeton University)*

ParFlow-CLM is a numerical model that simulates the hydrologic cycle from the bedrock to the top of the plant canopy. It integrates 3D variably-saturated subsurface flow with overland flow (ParFlow) and land surface processes (CLM) using physically-based equations to rigorously simulate fluxes of water and energy in complex real-world systems. ParFlow-CLM is a computationally advanced model that can run on laptops and supercomputers and has been used in hundreds of studies evaluating hydrologic processes from the hillslope to the continental scale. ParFlow-CLM code is open source, and we promote a community of active users and developers interested in advancing computational hydrology and improving hydrologic understanding. In addition to core capabilities, we will highlight many new model advancements that include a complete Python integration (including running in Jupyter Notebooks), many different output formats (including NetCDF), and full GPU back-end capability.

10. ModelWatcher, *by Lauren Foster (Neptune Inc.)*

ModelWatcher provides a transparent, reproducible, and easy-to-follow framework for organizing and visualizing results of an optimization algorithm coupled with a physics-based model. The pipeline is triggered whenever new output is detected, providing real-time and automatic visualization of calibration results. ModelWatcher enhances modeling workflows by encouraging collaboration among team members on custom visuals, enabling early and efficient decision making within the calibration process, and ultimately increasing the payoff and efficiency of calibration efforts.

11. GroundWater Desktop (GWD), *by Marinko Karanovic (S.S. Papadopulos & Associates, Inc.)*

GroundWater Desktop is a 3D Windows application built for groundwater modelers, environmental scientists, and engineers. It provides a versatile, intuitive interface to explore and visualize complex geological and spatial data.

Leverage robust analysis tools specifically developed for hydrogeologic investigations, groundwater mapping, and the management of contaminated sites.

GWD is used in small and large environmental consulting companies as well as government agencies worldwide. With a freely-available 3D viewer, GWD provides an effective means to present and share your data and visualization files with colleagues and clients.

12. Texture2Par, *by Vivek Bedekar (S.S. Papadopulos & Associates, Inc.)*

Texture2Par is a software tool developed by S.S. Papadopulos & Associates for the California Department of Water Resources that converts geologic and geophysical information, including well logs and airborne electromagnetic (AEM) data, into spatially distributed texture models and aquifer properties for groundwater models. The software uses geostatistical methods such as kriging and cokriging together with zonation, anisotropy, depth-dependent transformations, and upscaling techniques to generate texture models that help identify and evaluate potential managed aquifer recharge (MAR) sites, as well as model-ready hydraulic conductivity and storage parameter fields for groundwater models that are consistent with available subsurface data and hydrogeologic understanding.

13. Visual MODFLOW Flex, *by Colton Lanthier (Waterloo Hydrogeologic)*

Waterloo Hydrogeologic's Visual MODFLOW Flex is a comprehensive groundwater modelling platform designed to support the development, calibration, and visualization of complex hydrogeologic MODFLOW models. Built on an intuitive and flexible interface, it integrates conceptual modelling, numerical simulation, and advanced data management tools to help environmental and water resource professionals make informed decisions with confidence. Supporting industry-standard engines such as MODFLOW, MT3DMS, and SEAWAT, Visual MODFLOW Flex is widely used for groundwater flow, contaminant transport, and remediation projects around the world.

14. Hydrology Information Sources & Databases, *by Willow Dressel and Zac Painter (Princeton University)*

Willow Dressel and Zac Painter are STEM librarians in the Princeton University Library. Filling in for Emily Wild, Chemistry and Geosciences Librarian, they will be providing conference attendees with hydrology information sources, library research guides, data management information, and demonstrations of access to water data, imagery, and bibliographic databases.

Poster Session – Monday, June 8

Poster Presentations, by topic

General Applications of Groundwater Models	
Simin Akbariyeh, Marti Bayer-Raich, Jon Whitley, Eric Hicks, Mackenzie Hirt, Matthew Zenker	Capture-Based Optimization and Remediation Time Analysis of a Pump-and-Treat System at a PFAS-Impacted Aquifer
Marti Bayer-Raich, Simin Akbariyeh, Jon Whitley, Eric Hicks, Mackenzie Hirt, Matthew J. Zenke	Estimating mass extraction and remediation time for pump-and-treat schemes with capture zone analyses
Charalampos Ntigkakis, Josh Roberts, Alastair Black	Using the Source Impact Library to quantify environmental impacts from abstraction shutdown in UK regional models
Sunny Titus, Alden Provost, Martijn Russcher, Christian Langevin	UTVD: A new advection scheme for unstructured grids in MODFLOW 6
Martijn Russcher, Alden Provost, Christian Langevin, Sunny Titus	Incorporating boundary-flow location information for more accurate simulation of flow and transport
Micheal Keester, Philip Webster, James Beach, Chris Drabek, Ye Hong Chen	Incorporating New Core-Derived Consolidation Data into a Regional MODFLOW 6 Aquifer Compaction Model of the Greater Houston Area, Texas, USA
Stacia Prazen, Daniel Walters, Rebecca Anderson, Steve Young, Matt Seigler, Allison Johnston	Simulating Recharge of Recycled Water to Inform Managed Aquifer Recharge Decisions in the Treasure Valley
Hai Pham, Robin Weatherl, Michelle Pedrazas, Cheng Cheng	From Vadose Zone to Saturated Zone: A Coupled Modeling Approach for Evaluating Cr(VI) Remedial Designs at the Hanford 100-HR-3 Operable Unit
Gertrudis Carolina Sayago Bautista, Skyler Sorsby, Roselyne Laboso, William Gottobrio	Raindrop to Recharge: A Comparison of Recharge Estimation Methods in a Nevada Desert Aquifer System
Esra Gulsen, Max Hillermann, Pu Xia, Allan Jones	Floodwaters Rising
Zhaowei (Jack) Wang, Louis Manzella, Christopher Muffels, Vivek Bedekar	An Appealing Approach to Represent Hydraulic Barrier Wall: Using the Connected Linear Network (CLN) Package
Jianfeng Su, Ruta Basijokaite, Aaron A Mohammed, Tao Wen	Three-Dimensional Contaminant Transport Modeling of a Surface Spill in Fractured Appalachian Plateaus Bedrock
Reed Maxwell	Compensatory Root Water Uptake and PFT-Aware Water Stress: Improving Groundwater-Vegetation Coupling in ParFlow-CLM
Reed Maxwell	Solar-Zenith-Modulated Fractional Snow Cover Resolves the Peak-Accuracy vs Melt-Timing Trade-Off in ParFlow-CLM
It's All Connected: Surface Water / Groundwater Interactions	
Hang Chen, Chen Xiong	Geophysics-informed hydrologic modeling reveals contrasting shallow and bedrock responses of headwater catchments to warming
Joseph Wilder, Tayyab Mehmood, John Lope	Simulating Flood and Drought Response in South Florida Using a Unified Integrated Modeling Framework: Surface-Subsurface Process Controls Across Hydrologic Extremes
Grace Pleasant, Stephen Saller	From Aquifer to Estuary: Groundwater-Surface Water Interactions Governing Pollutant Loading to Biscayne Bay
Omowumi Erukubami, Austin Farnum, Dannielle Pratt, Holly Michael, Paul Imhoff, Larry Trout, Tyler Barber, Chris Overcash, Carolyn Voter	Examining the Impacts of Bidirectional Interactions Between Surface and Subsurface Systems in a Coupled Coastal Urban Hydrologic Model
Wes Zell, James McCreight	Does coupling the National Hydrologic Model to MODFLOW improve stream discharge simulation performance in an agriculturally intensive regional river basin?
Ali Gebril	Modeling Groundwater Development in Eureka, Montana: A Tool for Mitigation Planning
Aynaz Ghasemi, Nick Engdahl	The Role of Heterogeneity in Shaping Transport Behaviors Through a High-Alpine Headwaters Catchment
Ayane Ataka, Naota Hanasaki, Kei Yoshimura	Identifying Groundwater Supply Constraints in the Global Hydrological Model H08

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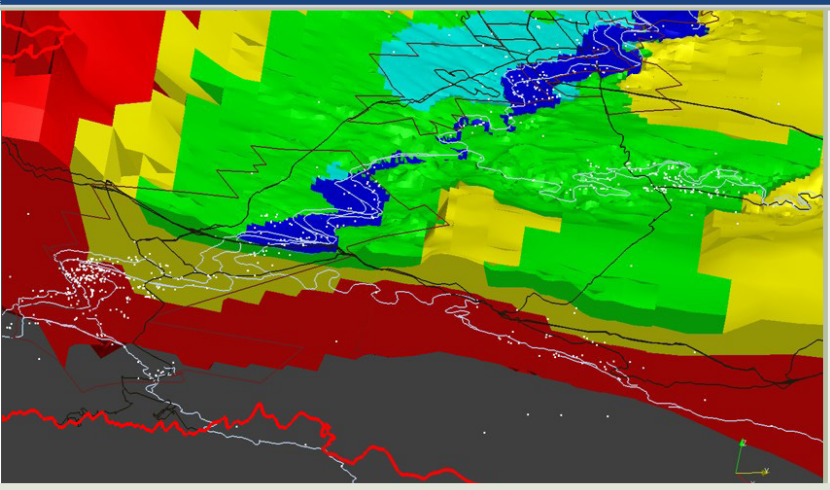
- > Water Resources Modeling
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- > Stormwater Management
- > PFAS
- > Sustainable Groundwater Management
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TUESDAY, JUNE 9

TIME	Friend 101	COS 104	
08:00 – 08:25	Opening and Featured Presentation *Featured Presentation:* **Bridging the gap to quantum-computing based hydrological modeling with uncertainty aware simulation tools**, by Nick Engdahl	*Opening and Featured Presentation in Friend 101*	
08:30 – 10:00	*Special Session:* **MODFLOW as a Community-Based Development Effort** Session Chairs: **Alden M. Provost**, **Eric D. Morway** MODFLOW supports science, policy, and water-resource decisions across government, consulting, and research worldwide. Recent changes at the USGS and the emergence of a formal governance model have raised questions about what the future of MODFLOW looks like and how the hydrologic modeling community can shape it. This special session brings together developers, practitioners, and stakeholders for a close look at the present state and future of MODFLOW. Participants will hear the latest updates directly from core contributors, learn how the new governance structure secures stability and transparency, and see how community-driven development is strengthening the platform. In addition to technical talks, the session features an interactive component where attendees can ask questions, discuss priorities, and explore opportunities to engage in MODFLOW's long-term roadmap. This session includes: ▪ Introduction: Stability, Stewardship, and the Future of MODFLOW 6, by Michael N. Fienen, U.S. Geological Survey ▪ Community Contributions: Past, Present, and Future, by Christian D. Langevin, S.S. Papadopulos & Associates, Inc. ▪ Parallel MODFLOW 6 – Designed to Get You the Speedup Without the Headache, by Martijn J. Russcher, Deltares ▪ MODFLOW 6 as the Foundation for the Netherlands' Next-Generation Regional and National Groundwater Models, by Timo Kroon, Deltares and the Netherlands Hydrological Instrument (NHI) ▪ Q&A Session with MODFLOW 6 Development Team, moderated by Janet Barclay, U.S. Geological Survey ▪ Closing Remarks: MODFLOW 6 Beyond 2026, by Eric D. Morway, U.S. Geological Survey	**Contaminants and Water Quality** Session chairs: **Nick Engdahl**, **Reed Maxwell**	
08:30 – 08:45		Shubham Goswami, Abia Katimbo, Sahila Beegum, Sorab Panday, Daniel Snow, Arindam Malakar, Alakananda Mitra, Chittaranjan Ray	MODFLOW-Based Unified Modelling Framework for Water and Nutrient Transport in Agro-Hydrological Systems
08:45 – 09:00		Cathy Wang, Mario Soriano, Danyka Byrnes, Reed Maxwell	Quantifying legacy nitrogen transport from agricultural lands to streams and groundwater using integrated hydrologic and particle tracking models
09:00 – 09:15		Wyatt Tatge, Samuel Shaheen, Fengchao Sun, Rob Rioux, William Miller-Brown, Quinn Zacharias, James Saiers	Hydrologic Controls on Chemical Weathering in a Headwater New England Catchment
09:15 – 09:30		Andrew Ashton	Modeled PFAS Signatures in Groundwater Considering Vadose Zone Leaching, Air-Water Interface Adsorption, and Soil Heterogeneity Across Various Soil Types
09:30 – 09:45		Liangchao Zou, Georgia Destouni *WITHDRAWN*	Semi-analytical modeling of PFAS transport from the unsaturated zone to groundwater
09:45 – 10:00		*Session discussion.*	
10:00 – 10:15	Coffee Break		

TUESDAY, JUNE 9

TIME	Friend 101		COS 104	
10:20 – 10:40	*Featured Presentation:* **Not your average Ghyben-Herzberg interface: How fresh groundwater gets offshore and why it matters**, by Holly Michael		*Featured Presentation in Friend 101*	
10:45 – 12:00	**Machine Learning and Next-Generation Computing** (1 of 2) Session chairs: **Jeremy White**, **Lauren Foster**		**Coastal Hydrology: Groundwater and Saltwater Intrusion** Session chairs: **Laura Condon**, **Holly Michael**	
10:45 – 11:00	Aman Singh, Sorab Panday, Jamie Kim	Regression-Enhanced Random Forest Model Application for Groundwater Level Predictions in Long Beach, California	Christian Langevin, Mark Bakker, Sorab Panday, Ron Falta, Alan Lemon, Chris Patterson, Alex Defalco	Implementation of a New Seawater Intrusion Package for MODFLOW 6
11:00 – 11:15	Robert Wienroeder, Charuleka Varadharajan, Stefan Broda, Felix Biessmann	Hybrid Spatiotemporal Modeling for Forecast-Anywhere Groundwater Level Prediction	Anner Paldor, Yipeng Zhang	Alongshore topography is a dominating factor in modeling Offshore Freshened Groundwater systems
11:15 – 11:30	Joshua Larsen	Public and self-supplied domestic water use modeling for the conterminous United States	Hugo Loaiciga	Coupled groundwater flow, salt transport, and heat transport simulation in layered coastal aquifers to prevent seawater intrusion
11:30 – 11:45	Xiao Xia Liang, Erwan Gloaguen, Reed Maxwell	Temporal Sensitivity in Data-Driven Hydrology: Linking Water Dynamics and Deep Learning Model Performance	Yu Zhang, Daniil Svyatsky, J. David Moulton, Joel Rowland	Integrating Hydrology and Eco-Geomorphology to Advance Coastal Groundwater and Saltwater Intrusion Prediction
11:45 – 12:00	Michael Morphew, Travis Smiley, Lauren Foster, Leslie Gains-Germain	Groundwater Surrogate Models with Uncertain Source Conditions	Yuqi Song, Frank Tsai, Michael Attia, Jian Luo	Modeling Seawater Intrusion under Climate Stress in the Mississippi River Delta Using a Hydrogeological Digital Twin
12:00 – 13:10	Lunch		*Commons D301*	
13:15 – 13:45	*Keynote Presentation:* **Evolution of Global Hydrology in the Anthropocene**, by Dr. Taikan Oki, Professor at The University of Tokyo, Meguro-ku, Tokyo, Japan		*Featured Presentations in Friend 101*	
13:50 – 14:10	*Featured Presentation:* **Conceptual Modeling in the Age of AI**, by Dr. Lauren Foster, Neptune and Company			
14:15 – 14:35	*Featured Presentation:* **Groundwater Models Supporting Consumptive Use Permit Decisions in Florida**, by James Rumbaugh, Environmental Simulations, Inc.			
14:35 – 15:00	Coffee Break			

TUESDAY, JUNE 9

TIME	Friend 101		COS 104	
15:05 – 15:25	*Featured Presentation:* **Challenges and opportunities in reactive transport at regional scales**, by Dr. Christopher Green, U.S. Geological Survey		*Featured Presentation in Friend 101*	
15:30 – 16:45	**Machine Learning and Next-Generation Computing** (2 of 2) Session chairs: **Jim Rumbaugh**, **Lauren Foster**		**Hydrogeology, Vadose Zone, Case Studies, and Reactive Transport** Session chairs: **Christopher Green**, **Nick Engdahl**	
15:30 – 15:45	Tyler Kamp, Skyler Sorsby, Roselyne Laboso, William Gottobrio, Cliff Baines	Comparison of Explainable AI and PEST-HP for Evaluating Model Sensitivity	Raghu Suribhatla, Murray Einarson, Charles Payne	Development and Calibration of Numerical Models from Environmental Sequence Stratigraphy-based Geologic Models - Evaluation of Prior Geologic Information
15:45 – 16:00	Roselyne Laboso, Skyler Sorsby, William Gottobrio	Applying Machine Learning to Hydrographs to Identify Different Types of Hydraulic Stresses in a Coastal Groundwater System	Deviyani Gurung, Ali Meyal, Dimitri Vlassopoulos, Olivier Atteia	In Situ Groundwater Remediation with Layered Double Hydroxides: Injection Strategies for Bimolecular Reactions
16:00 – 16:15	Daniel Burnell, JIe Xu, Justin Cooper, James Ross	Quantum Computing and Machine Learning for Groundwater Flow and Solute Transport Modeling	Philipp Huttner, Steve Blake, Maximilian Winderl, Douglas Graham	High resolution modelling of groundwater recharge for MODFLOW with MIKE SHE
16:15 – 16:30	Jevon Harding, Shirley Wade	Transitioning a Statewide Groundwater Modeling Program to MODFLOW 6: Lessons Learned from the Southern Trinity Aquifer Model (Texas)	Hiroko Hort, Richard Niswonger, Sorab Panday	Ecohydrology and West Nile Virus Risk: Advancing a Coupled Water-Disease Modeling Framework
16:30 – 16:45	William Gottobrio, Brent Waters, Skyler Sorsby, William Grimes	Groundwater Modeling Process Overview for Small Modular Reactor Nuclear Power Plant Licensing	Jennifer Sano	Integrated Geological and Numerical Modeling to Support a Technical Impracticability Evaluation at a Former Coal Tar Processing Facility
17:00 – 19:00	**POSTER RECEPTION**			
	Poster presentations are listed by topic on program pages 18–19. Carl A. Fields Center.			
19:30 – 21:30	*Conference Party:* Live music, appetizers, and refreshments		*Graduate Hotel, Princeton*	

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Poster Reception – Tuesday, June 9, 2026

POSTER PRESENTATIONS

Coastal Hydrology: Groundwater and Saltwater Intrusion	
Siska de Vreeze, Holly Michael, Omowumi Erukubami, Carolyn B. Voter	Modeling and mapping groundwater flooding and salinization in the East-Dover (DE) area
Dannielle Pratt, Anner Paldor, Ryan Frederiks, Holly Michael	Antecedent hydrological conditions and site characteristics as the primary control on surge salinization
Jia Zhang, Yao Hu	Propagation of tidal stage and salinity signals into an adjacent aquifer: calibration and forcing sensitivity in a wetland reserve
Hanni Blair, Derrik Williams	Groundwater Modeling to Inform Regulatory Agency and Stakeholder Discussions of Seawater Intrusion Mitigation Strategies in the Salinas Valley, California
Chieh-Ying Chen, Dannielle Pratt, Keryn Gedan, Matthew Kirwan, Tahmidur Rahman Junayed, Riley Leff, Holly Michael	A coupled modeling framework to study the impacts of hydrologic stressors on ecosystem response in the coastal critical zone
Tahmidur Rahman Junayed, Holly A. Michael, Dannielle Pratt, Sasha Sehgal	Mechanistic Modeling of Evapoconcentration and Root Water Uptake Inhibition in Salinizing Coastal Transition Zones
Contaminants and Water Quality	
Brian Mailloux, Laurina Xie, Heidi O'Neill, Nicholas Procopio, Steven Chillrud, Mark Bakker	Possible trends of PFAS and Uranium in New Jersey Private Wells: New data from when a home sells twice.
Jake Smith, Jacob Chu, Raghu Suribhatla	Estimating Field-scale Air-Water Interfacial Area for PFAS Fate and Transport Evaluation
Himmat Basnet, Eunsang Cho, Seonggyu Park, Sangchul Hwang	Hydrologic Simulation and PFOS Transport in the San Antonio River Watershed: SWAT+ Insights for Coupling with MODFLOW
Eric Morway, Ayman Alzraiee, Timothy Gates, Richard Niswonger, Martijn Russcher, Christian Langevin	Dynamic Simulation of Salinity-Dependent Evapotranspiration Using the MODFLOW 6 API
Hydrogeology, Vadose Zone, Case Studies, and Reactive Transport	
Trevor Budge, Will Nichols, Sean Sexton	Remedial Process Optimization Approach and Application on the Central Plateau at the Hanford Site
Alberto Casillas-Trasvina, Tiantian Zhou, Menberu Meles, Scott Bradford	Modeling Recharge and Travel Times Across a Thick Vadose Zone in California's Central Valley
Sebastián Vázquez-Gasty, Sorab Panday, James McCord	A Physically Based MODFLOW Framework for Modelling Variably Saturated Flow in Heap Leaching Systems
Benjamin West, Laura Condon	Using Integrated Hydrologic Modeling to Investigate the Spatiotemporal Characteristics of Droughts in Catchments with Human Water Management
Machine Learning and Next Generation Computing	
Rodrigo Herrera	Breaking the Windows Shell and Biting the Apple: A Performance Benchmark of ARM Silicon for Groundwater Modeling
Maria Pereira Fleury, Reed Maxwell, Yueling Ma	Mapping Water Table Depth Across Brazil Using a Random Forest Model
Schuyler Robinson, Poonam Kulkarni, Emily Stockwell, Katlyn Schmeltzer, Jordan White, Joseph Scalia, Charles Newell	Optimizing PFAS Plume Remediation with Groundwater Modeling and Machine Learning
Michael Ou	Space-Time Kriging for Reconstructing Contaminant Plume Evolution from Irregular Monitoring Data
Tom Glose, Scott Stokes, Jacob Bauer	Benchmarking MODFLOW API for Re-Run and Time-Parallelization in USGS Large Test Models
Wes Bonelli, Michael Reno, Marnix Kraus	Next generation Python tools for MODFLOW
Zhaoyu Zhang, Akiyuki Kawasaki, Qing He, Abdul Moiz	Model-consistent EA-LSTM explanations for diagnosing runoff controls across Japanese basins
Mehdi Ghasemizade	Comparative Evaluation of Data-Driven and Physics-Based Approaches for Modeling Groundwater-Induced Land Subsidence
Adam Janzen	Comparison of Methods for Estimating Time-Varying Recharge for MODFLOW Model Input

POSTER PRESENTATIONS, CONTINUED

Making Models Better: Calibration, Inference, and Uncertainty	
Trent Farnum, Andrew Leaf, Michael Fienen	PEST++IES How Many Iterations and Realizations, Finding the Point of Diminishing Returns
Yun Huang	On the Usefulness of Groundwater Models
Jonathan Quiroz, Steve Young, Shuo Yang	Reducing Groundwater Model Nonuniqueness through Parameter Bounding and Multi-type Calibration Data
Lauren Sather, Eric Chiang, Garrett Rapp	From Calibration to Decision Making: Using Ensemble Methods and Uncertainty Analysis to Estimate the Chino Basin Safe Yield
Marie Joe Sawma, Amanda Triplett, Andrew Bennett, Peter Melchior, Laura Condon, Reed Maxwell	Simulation-Based Inference for Spatially Distributed Parameter Estimation in Integrated Hydrologic Models
Amandeep Singh, Sorab Panday, Brian Partington, Thomas Henderson	Advancing Groundwater Management Under Uncertainty: Ensemble Modeling in Southern California
Prashanth Khambhammettu, Scott Potter, Michael Kladias, Marc Killingstad	Next-Generation Parameterization Methods for Subsurface Heterogeneity: Enhancing Groundwater Models and Remedial Strategies
Prashanth Khambhammettu, Scott Potter, Michael Kladias	Unpopular Opinion: The Ensemble Delusion and Why Automated Uncertainty is No Substitute for Expert-Guided “Subsurface Weather” Forecasting
Daniel Burnell, Mahade IbnSalam, Jie Xu	Modeling Tool for Simulating Advective Transport and Back-diffusion in Highly Heterogeneous Media
Mining and Energy	
Alan Jang, Steve Meyerhoff	Climate-Driven Controls on Groundwater Recovery and Pit-Lake Evolution at a Post-Mining Site in the Western United States
Aya Mohamed, Assaf Wunsch, Philine Tullius, Kyle Williams	Turning Monitoring Data into Insights: Understanding Shallow Subsurface Dynamics in Closed Tailing Facilities Through Data-Driven Infiltration Modeling
Aya Mohamed, Carolyn Lambert, Vladimir Ugorets, Assaf Wunsch	Evaluating the Impact of Land Subsidence Induced by Pumping Activities on Mine Water Management and Regulatory Permitting
Rodolfo Ordoñez, Mauricio Muñoz, Cristian Ortiz	Coupled Simulation of Unsaturated Flow and Consolidation in Tailings Deposits Using MODFLOW-USG Transport
German Ibarra, Jeff Randall	Evaluating the impact of overbreak zone representation on pore pressure distributions
Sustainable Water Management: The Role of Safe vs Sustainable Yield in Groundwater Systems	
Pranta Bhowmik, Md. Aminul Haque Laskor, Md. Mohaimenul Islam	Assessing Groundwater Sustainability in Intensive Agricultural Zones: A GIS-AHP Approach in Kishoreganj District, Bangladesh
Laura Rodriguez, Hongbin Zhan, Peter Knappett, Sonia Lopez	On the Inland Saltwater and Freshwater Interaction and its Impact on Water Resource Management
Saif Haider, Muhammad Rashid	Quantifying Climate and Land Use Change Impacts on Aquifer Behavior Through Numerical Simulation

WEDNESDAY, JUNE 10

TIME	Friend 101		COS 104	
08:00 – 08:25	Opening and Featured Presentation *Featured Presentation:* **Four Decades of Research at the MADE Site and Beyond: Advancing Understanding Through Modeling**, by Dr. Chunmiao Zheng, Eastern Institute of Technology, Ningbo, China, and Southern University of Science and Technology, Shenzhen, China		*Opening and Featured Presentation in Friend 101*	
08:30 – 09:45	**Making Models Better: Calibration, Inference, and Uncertainty** (1 of 2) Session chairs: **Jeremy White**, **Sorab Panday**		**Sustainable Water Management: The Role of Safe vs. Sustainable Yield in Groundwater Systems** Session chairs: **Matt Tonkin**, **Jim Rumbaugh**	
08:30 – 08:45	Mohammad Afzal Shadab, Nicholas Jadallah, Reed Maxwell	Scale-Dependent Role of Soil Capillarity in Integrated Surface-Subsurface Hydrologic Simulations	Katherine H. Markovich, Michael N. Fienen, Nicholas Corson-Dosch, Cecile Coulon, Jeremy T. White, Stephen B. Gingerich	Balancing environment and economy in an agricultural basin: Moving beyond scenarios with multi-objective optimization
08:45 – 09:00	David Brakenhoff, Mattijs Borst, Mark Bakker	Cross-sectional analytic element modeling - estimation of aquifer parameters and dike stability with timflow	Prathiksha Raghava, Prakash kumar Jha, Drew Gholson	A benchmark study for Mississippi delta region food-water nexus; An Integrated Modeling approach
09:00 – 09:15	Leonardo Sandoval, Reed Maxwell, Amy Defnet, Laura Condon	Operationalizing Continental-Scale Integrated Hydrologic Modeling with ParFlow-CLM	Merhawi GebreEgziabher, Scott Jasechko, Debra Perrone	National-Scale Lithologic Controls on Drainable Porosity and Managed Aquifer Recharge Potential
09:15 – 09:30	Vivek Bedekar	Uncertainty in Groundwater Modeling: Between Acknowledgment and Illusion	Danael Aceves Pafilla, Rogelio Ledesma Ruiz, Laura Rodríguez Lozada, Daisy Nuñez Flores, Margarito Vázquez del Carmen, Rosario Sánchez, Jurgen Mahlknecht	Groundwater recharge in crisis: Analyzing the impact of urban growth on Monterrey's aquifer health in the face of the Rio Grande current conditions
09:30 – 09:45	Mark Bakker, Davíd Brakenhoff	What is difficult to do in MODFLOW but easy in analytic elements?	Sharlet Alice Ndede, Valmy Awuor Otieno, Patrick Murung *WITHDRAWN*	From Safe Yield to Sustainable Yield in the Baricho/Sabaki Wellfield (Coastal Kenya): Scenario-Based Groundwater Modeling for Expansion Planning
09:45 – 10:00	Coffee Break			

WEDNESDAY, JUNE 10

TIME	Friend 101		COS 104	
10:05 – 11:35	**Making Models Better: Calibration, Inference, and Uncertainty** (2 of 2) Session chairs: **Christopher Green**, **Holly Michael**		**Water Management in Mining and Energy** Session chairs: **Jim Rumbaugh**, **Nick Engdahl**	
10:05 – 10:20	Louisa Pawusch, Andrew Bennett, Peter Melchior, Laura Condon, Danielle Tijerina-Kreuzer, Reed Maxwell	Quantifying Hydraulic Conductivity Sensitivity in Continental-Scale Steady-State Groundwater Simulations	Yinuo Wang, Hongbin Zhan, Junyuan Zhang, Zehao Chen, Laura Rodriguez Lozada	Aquifer Thermal Energy Storage: Implications for Integrated Water and Energy Management
10:20 – 10:35	Farshid Felfelani, Tanjila Akhtar, Aubrey Dugger, Yadu Pokhrel, Wesley Zell	Advancing Groundwater Representation in Land Surface Modeling: Case Studies in Incorporating Lateral Subsurface Flow and Pumping, Model Coupling, and Cross-Scale Dynamics	Mickey Rush, Daniel Birdsell, Renee Reichenbacher, Parker Rehmus	Evaluating the Hydrothermal Footprint of Geothermal Energy Development in Complex Rift Settings using MODFLOW 6 GWE
10:35 – 10:50	Erik Toller, Victor Blomqvist, Andrea Marinelli, Moa Berg	Using discrete fracture networks to improve continuum models	Julianna Huba, David Boutt, Danielle Hare, Brendan Moran	Shifts in Aquifer Mechanics from Climate and Geochemical Impacts in the Salar de Atacama, Chile
10:50 – 11:05	Dave Estrella, Bianca Mintz	When Water Levels Aren't Enough: Incorporating Water Budget Uncertainty into Groundwater Flow Model Calibration	Michael Sweetenham	Evaluating the Impacts of Raw Water Withdrawals on Surface Water and Groundwater at a Lithium Mine
11:05 – 11:20	Nico Higgs, Youssef Loukili, Allan MacGregor, Steven Siciliano	Sequential Assimilation of Concentration Data into Groundwater Transport Models: Solving the Zero-Variance Problem	Roseanna Neupauer, Maya Leizerovich, Shemin Ge	Impact of Geothermal Energy Production on Hot Springs
11:20 – 11:35			Bruno Lapi, Benjamin Rizzardini, Maximiliano Hebel, Jose Yañez	ENSI-Based Calibration of a Lithium Brine Reserve Model in the Salar de Atacama, Chile
11:40 – 12:10	Awards and Closing			
12:15 – 13:15	*Keynote Closing Presentation:* **Groundwater Recharge Regimes are in Flux**, by Steven Loheide, Professor, Department of Civil & Environmental Engineering, University of Wisconsin-Madison		*Featured Presentation in Friend 101*	
13:15 – 14:30	Lunch		*Friend Center, Convocation Room*	

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