

Seokhyeon Kim

Assistant Professor, Ph.D., M.Eng.



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Education

- **Ph.D.** (Water Resources Engineering and Remote Sensing) || Jul 2013 – Nov 2017 || School of Civil and Environmental Engineering, UNSW Sydney, NSW, Australia
 - Thesis: [Improvements and applications of satellite-derived soil moisture for flood forecasting](#)
 - Supervisors: [Ashish Sharma](#), [Fiona Johnson](#) (joint), [Yi Liu](#) (co)
- **M.Eng.** (Water Resources Engineering) || Mar 2006 – Feb 2008 || School of Civil and Environmental Engineering, Korea University, Seoul, Republic of Korea
 - Thesis: *Study for Improving Water Distribution System Reliability*
 - Supervisor: [Joong Hoon Kim](#)
- **B.Eng.** (Civil and Environmental Engineering) || Mar 1997 – Feb 2001 || School of Civil and Environmental Engineering, Korea University, Seoul, Republic of Korea

Experiences

- **Assistant Professor** || Department of Civil Engineering, Kyung Hee University, Republic of Korea || Mar 2022 –
- **Research associate** || Water research centre at UNSW Sydney, Australia || Apr 2017 – Feb 2022
- **Associate manager** || Water resources engineering in HDEC, Seoul, Republic of Korea || Jan 2008 – Jul 2013
- **Compulsory military service (1st lieutenant)** || Republic of Korea Army || Jul 2001 – Sept 2004

Publication



1. Han, K., **Kim, S.**, Mehrotra, R., & Sharma, A. (2024). Enhanced water level monitoring for small and complex inland water bodies using multi-satellite remote sensing. *Environ. Modell. Softw.*, 180, 106169.
2. **Kim, S.**, Wasko, C., Sharma, A., & Nathan, R. (2024). The role of regional water vapor dynamics in creating precipitation extremes. *J. Hydrol. X*, 24, 100181.
3. Sinha, J., Sharma, A., Marshall, L., & **Kim, S.** (2024). Characterizing Satellite Soil Moisture Drydown: A Bivariate Filtering Approach. *Water Resour. Res.*, 60(7), e2022WR034019.
4. Yoo, S., **Kim, S.**, & Paik, K. (2024). Optimal combinations of global evapotranspiration and terrestrial water storage products for catchment water balance. *Int. J. Remote Sens.*, 45(9), 2865-2892.
5. Liu, S., **Kim, S.**, Glamore, W., Tamburic, B., & Johnson, F. (2024). Remote sensing of water colour in small southeastern Australian waterbodies. *J. Environ. Manage.*, 352, 120096.
6. Zhang, R., **Kim, S.**, Kim, H., Fang, B., Sharma, A., & Lakshmi, V. (2023). Temporal Gap-Filling of 12-Hourly SMAP Soil Moisture Over the CONUS Using Water Balance Budgeting. *Water Resour. Res.*, 59(12), e2023WR034457.
7. Tie, J., **Kim, S.**, & Sharma, A. (2023). How does increasing temperature affect the sub-annual distribution of monthly rainfall? *Environmental Research: Climate*, 2(1), 015004.
8. Visser J., **Kim S.**, Wasko C., Nathan R., Sharma A. (2022) The impact of climate change on operational estimates of Probable Maximum Precipitation, *Water Resour. Res.*, 58(11), e2022WR032247.
9. He W., **Kim S.**, Wasko C., Sharma A. (2022) A global assessment of change in flood volume with surface air temperature, *Advances in Water Resources*, 165, 104241.
10. **Kim S.**, Sharma A., Wasko C., Nathan R. (2022) Linking total precipitable water to precipitation extremes globally, *Earth's Future*, 10(2), e2021EF002473.
11. Yoon H.N., Marshall L., Sharma A., **Kim S.** (2022) Bayesian model calibration using surrogate streamflow in ungauged catchments, *Water Resour. Res.*, 58, e2021WR031287.
12. Lee S., **Kim S.**, and Moon S. (2022) Development of Car-free Street Mapping (CfSM) Model using an Integrated System with Unmanned Aerial Vehicle, Aerial Mapping Camera and Deep Learning Algorithm, *J. Comput. Civ. Eng.*, 36(3), 04022003.

13. **Kim S.**, Sharma, A., Liu, Y., Young, S. I. (2022) Rethinking Satellite Data Merging: From Averaging to SNR Optimization, *IEEE Trans. Geosci. Remote Sens.*, 60, 1–15.
14. **Kim S.**, Dong J., Sharma A. (2021) A triple collocation-based comparison of three L-band soil moisture datasets, SMAP, SMOS-IC, and SMOS, over varied climates and land covers, *Front. Water.*, 3, 64.
15. Kim S., Mehrotra R., **Kim S.**, Sharma A. (2021) Assessing countermeasure effectiveness in controlling cyanobacterial exceedance in riverine systems using probabilistic forecasting alternatives, *J. Water Resour. Plan. Manag.*, 147(10), 04021062.
16. Kim S., Mehrotra R., **Kim S.**, Sharma A. (2021) Probabilistic forecasting of Cyanobacterial concentration in riverine systems using environmental drivers, *J. Hydrol.*, 593, 125626.
17. Zhang R., **Kim S.**, Sharma A., Lakshmi V. (2021). Identifying relative strengths of SMAP, SMOS-IC, and ASCAT to capture temporal variability using a model combination approach, *Remote Sens. Environ.*, 252, 112126.
18. **Kim S.**, Anabalón A., Sharma A. (2021) An Assessment of Concurrency in Evapotranspiration Trends Across Multiple Global Datasets, *J. Hydrometeorol.*, 22(1), 231–244.
19. **Kim S.**, Pham H., Liu Y., Marshall L., Sharma A. (2020). Improving the combination of satellite soil moisture datasets by considering error cross-correlation: A comparison between triple collocation (TC) and extended double instrumental variable (EIVD) alternatives, *IEEE Trans. Geosci. Remote Sens.*, 59(9), 7285–7295.
20. Magan B., **Kim S.**, Wasko C., Barbero R., Moron V., Nathan R., Sharma A. (2020). Impact of atmospheric circulation on the rainfall-temperature relationship in Australia, *Environ. Res. Lett.*, 15(9), 094098.
21. Kim S., **Kim S.**, Mehrotra R., Sharma A. (2020). Predicting cyanobacteria occurrence using climatological and environmental controls, *Water Res.*, 175, 115639.
22. Kim T., Ley T., Kang S., Davis J., **Kim S.**, Amrollahi P. (2020). Using Particle Composition of Fly Ash to Predict Strength and Resistivity of Concrete, *Cem. Concr. Compos.*, 107, 103493.
23. **Kim S.**, Ajami H., Sharma A. (2020). Using remotely sensed information to improve vegetation parameterization in a semi-distributed hydrological model (SMART) for upland catchments in Australia, *Remote Sens.*, 12(18), 3501.
24. Moradi S., Agostino A., Gandomkar Z., **Kim S.**, Hamilton L., Sharma A., Henderson R., and Leslie G. (2020). Quantifying natural organic matter concentration in water from climatological parameters using different machine learning algorithms, *H2Open Journal*, 3(1), 328–343.
25. **Kim S.**, Eghdamirad S., Sharma A., Kim J. H. (2020). Quantification of uncertainty in projections of extreme daily precipitation, *Earth and Space Sci.*, 2020, e2019EA001052-T.
26. Hagan D., Wang G., **Kim S.**, Parinussa R., Liu Y., Ullah W., Bhatti S., Ma X., Jiang T., Su B. (2020). Maximizing Temporal Correlations in Long-Term Global Satellite Soil Moisture Data Merging, *Remote Sens.*, 12 (13), 2164.
27. **Kim S.**, Zhang R., Pham H., Sharma A. (2019). A review of satellite-derived soil moisture and its usage for flood estimation, *Remote Sens. Earth Syst. Sci.*, 2, 225–246.
28. Pham H., **Kim S.**, Johnson F., Marshall L. (2019). Using 3D robust smoothing to fill land surface temperature gaps at the continental scale, *Int. J. Appl. Earth Obs. Geoinf.*, 82, 10879.
29. **Kim S.**, Jun H. D., Yoo D. G., Kim J. H. (2019). A framework for improving reliability of water distribution systems based on a segment-based minimum cut-set approach, *Water*, 11(7), 1524.
30. Zhang R., **Kim S.**, Sharma A. (2019). A comprehensive validation of the SMAP Enhanced Level-3 Soil Moisture product using ground measurements over varied climates and landscapes, *Remote Sens. Environ.*, 223, 82–94.
31. **Kim S.**, Sharma A. (2019). The role of floodplain topography in deriving basin discharge using passive microwave remote sensing, *Water Resour. Res.*, 55(2), 1707–1716.
32. Khan U., Ajami H., Tuteja N., Sharma A., **Kim S.** (2018). Catchment Scale Simulations of Soil Moisture Dynamics Using an Equivalent Cross-Section based Hydrological Modelling Approach, *J. Hydrol.*, 564, 944–966.
33. **Kim S.**, Paik K., Johnson F., Sharma A. (2018). Building a flood warning framework for ungauged locations using low resolution, open access remotely sensed surface soil moisture, precipitation, soil and topographic information, *IEEE J. Sel. Top. Appl. Earth Obs. Remote Sens.*, 11(2), 375–387.
34. **Kim S.**, Balakrishnan K., Liu Y., Johnson F., Sharma A. (2017). Spatial Disaggregation of Coarse Soil Moisture Data by Using High Resolution Remotely Sensed Vegetation Products, *IEEE Geosci. Remote. Sens. Lett.*, 14(9), 1604–1608.
35. **Kim S.**, Parinussa R., Liu Y., Johnson F., Sharma A. (2016). Merging Alternate Remotely-Sensed Soil Moisture Retrievals Using a Non-Static Model Combination Approach, *Remote Sens.*, 8 (6), 518.

36. Silva A., Subasinghe K., Rajapaksha C., Raveenthiran K., **Kim S.**, Young M., Perera H. N. R., Araki S. (2016). Assessment of Design Alternation via 2D Physical Modelling in the Main Breakwater of Colombo Port Expansion Project. *J. Jpn. Soc. Civ. Eng., Ser. B2 (Coastal Engineering)*, 72(2), I_1129-I_1134.
37. **Kim S.**, Parinussa R., Liu Y., Johnson F., Sharma A. (2015). A framework for combining multiple soil moisture retrievals based on maximizing temporal correlation, *Geophys. Res. Lett.*, 42 (16), 2015GL064981.
38. **Kim S.**, Liu Y., Johnson F., Parinussa R., Sharma A. (2015). A global comparison of alternate AMSR2 soil moisture products: Why do they differ? *Remote Sens. Environ.*, 161 (0), 43-62.
39. Jun H. D., **Kim S.**, Yoo D. G., Kim J. H. (2009). Evaluation of the reliability improvement of a water distribution system by changing pipe, *J. Korea Water Resour. Assoc.*, 42 (6), 505-511.

❖ **Conference proceedings**

1. Young M., Hayman-Joyce J., **Kim S.** (2012). Use of Single Layer Concrete Armour Units as Toe Reinforcement, *Coast. Eng. Proc.*, 1 (33), 48.

Presentations (selected)

1. **Kim, S.**, Lee, G. & Sharma, A. Evaluating the impact of rainfall duration on the relationship between atmospheric moisture and extreme precipitation, *MODSIM 2023*, Darwin, Australia
2. **Kim S.**, Sharma A., Wasko C., Nathan R. How does total precipitable water link to precipitation extremes?, *MODSIM 2021*, Sydney, Australia
3. **Kim S.**, Zhang R., Sharma A., Lakshmi V. Improvements of satellite observations through data merging: status and challenges, *AGU fall meeting 2020*, San Francisco, CA, USA
4. **Kim S.**, Pham H., Liu Y., Sharma A., Marshall L. Combining geophysical variables for maximizing temporal correlation without reference data, *MODSIM 2019*, Canberra, Australia
5. **Kim S. [Invited]**, Guo Y., Wasko C., Sharma A. On soil moisture, rain and flood extremes in a warming climate – using satellite remote sensing to define future antecedent conditions, *KSCC 2018*, Jeju, Republic of Korea
6. **Kim S.**, Ajami H., Sharma A. Incorporating an operational satellite-derived leaf area index into a computationally efficient semi-distributed hydrologic modelling application (SMART), *MODSIM 2017*, Hobart, Australia
7. **Kim S.**, Liu Y., Johnson F., Sharma A. A temporal correlation-based approach for spatial disaggregation of remotely sensed soil moisture, *AGU fall meeting 2016*, San Francisco, CA, USA
8. **Kim S.**, Liu Y., Johnson F., Parinussa R., Sharma A. Reducing Structural Uncertainty in AMSR2 Soil Moisture Using a Model Combination Approach, *AGU fall meeting 2014*, San Francisco, CA, USA
9. **Kim S.**, Liu Y., Johnson F., Parinussa R., Sharma A. Improvement of Soil Moisture Dataset Combining AMSR2 Soil Moisture Products, *OzEWEX 2014*, Canberra, ACT, Australia

Awards & Grants

- **Early Career Research Excellence (ECRE) Award** || Modelling and Simulation Society of Australia and New Zealand Inc. (MSSANZ) || [Dec 2021](#)
- **Tuition Fee, Stipend and Top-up Scholarship etc.** || UNSW Sydney || 2013 – 2021

Certifications

- **Professional Engineer – Skill Level 1 Civil Engineer** || Engineers Australia || Apr 2018
- **Engineer Civil Engineering** || Human Resources Development Service of Korea || Oct 2000

Languages

Korean (mother tongue), English

Skills & Expertise

Hydrology, Remote Sensing, MATLAB, Python, ArcGIS/QGIS

Research Experiences

- **Ph.D. Student & Research Associate** || UNSW Sydney || Apr 2017 – Feb 2022 || Hydrological applications of remote sensing data
- **Master Student** || Korea University || Mar 2006 – Feb 2008 || Improving the reliability of water distribution system

Teaching Experiences

- **Assistant Professor** || Kyung Hee University || Mar 2022 –
 - UG: Introduction to Engineering Computer Programming, Numerical Analysis and Practice, Design for Civil Engineering 1 & 2, Hydraulics, Big Data Analysis and Practice
 - PG: Climate Change and Adaptation (PG), Remote sensing of water resources and environment (PG), Catchment and Water Resources Modelling (PG)
- **Teaching Assistant and Post-Doctoral Teaching Assistant** || UNSW Sydney || Jul 2017 – Mar 2020
 - Teaching, coordinating and consulting for *Catchment and Water Resources Modelling* (PG), *Water Resources Engineering* (UG)
 - Academic supervision: paper ##7, 9, 15, 16, 20, 21, and 30
- **Teaching Assistant** || Korea University || Mar 2006 – Dec 2007

Professional activities

- **Reviewer for Scholarly Journal:** *Int. J. Appl. Earth Obs. Geoinf.*; *J. Hydrol.*; *Remote Sens. Environ.*; *Stoch Environ Res Risk Assess*; *PLOS ONE*; *KSCE J. Civ. Eng.*; *ISPRS J. Photogramm. Remote Sens.*; *Environ. Res. Lett.*; *ISPRS Int. J. Geo-Inf.*
- **Conference session convener:** AOGS 2024; MODSIM 2021, 2023
- **Editorial board:** MDPI Remote Sensing (topic editor and volunteer reviewer); Frontiers in Water (associate editor)
- **Professional membership:** Korea Water Resources Association (KWRA), Korean Society of Civil Engineers (KSCE), Korean Society of Remote Sensing (KSRS), Engineers Australia (EA), Australian Water Association (AWA)

Projects

- **Participating Researcher** || Apr 2024–Dec 2028 || *Development of AI-based water resources big data quality management technology*, supported by Korea Environmental Industry & Technology Institute
- **Participating Researcher** || Apr 2023–Dec 2026 || *Developing a Severity-Based Emergency Response Protocol for Water Shortage Using Linked Operations of Water Supply Facilities*, supported by Korea Environmental Industry & Technology Institute
- **Co-Investigator** || July 2022–Mar 2027 || *Multidisciplinary graduate school for carbon neutrality consulting and conflict management*, supported by Ministry of Trade, Industry & Energy, Republic of Korea
- Completed
 - **Co-Investigator** for *Graduate School Specialized in Climate change*, supported by Ministry of Environment, Republic of Korea
 - **Principle Investigator** for *Atmospheric Moisture Increases Due to Global Warming and Prediction of Consequent Changes in Extreme Precipitation (focused on the Korean Peninsula)*, supported by Kyung Hee University
 - *Assessing Water Supply Security in a Nonstationary Environment* ([DP200101326](#)), funded by Australian Research Council (ARC)
 - *A Fourier approach to address low-frequency variability bias in hydrology* ([DP180102737](#)), funded by ARC
 - *Adapting catchment monitoring and portable water treatment to climate change* ([LP160100620](#)), funded by ARC, WaterNSW and Sydney Water
 - *Soil Moisture Active Passive Experiment – the 4th campaign* ([SMAPEX-4](#))
 - *Reducing Flood Loss –Data Assimilation Framework for Improving Forecasting Capability in Sparsely Gauged Regions* ([DP140102394](#)), funded by ARC