

KEI YOSHIMURA

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RESEARCH INTERESTS

- Study of stable water isotope (HDO and H₂¹⁸O) circulation
- Data assimilation, particularly for stable water isotopes with the ensemble Kalman filter
- Reconstruction of past climate using isotopic proxies
- Dynamical downscaling and development of a Regional Earth System Model
- Study on terrestrial hydrologic cycles and development of river and land surface models

REMARKS ON RESEARCH

My current research is focused on various interdisciplinary areas including global and regional meteorology, land surface and atmospheric hydrology, and paleoclimatology, all of which are bridged by natural isotopic tracers. The main thrust of my work is toward better understanding of the Earth climate system, and this is explored both by utilizing additional information obtained from isotopic records and by developing models that simulate the observed processes. Moreover, I would emphasize that, by being an intensive climate system modeler with great knowledge of isotopic tracers myself, I am fully capable of bridging the divide between retrospective and forward modeling efforts in paleo- and current/future climate studies.

EDUCATION

February 2006 Ph.D. Civil Engineering from The University of Tokyo, Tokyo, Japan
September 2002 M.S. Civil Engineering from The University of Tokyo, Tokyo, Japan
March 2000 B.S. Civil Engineering from The University of Tokyo, Tokyo, Japan

PROFESSIONAL EXPERIENCE

June 2019 to present *Professor* at Institute of Industrial Science, The University of Tokyo, Japan
April 2016 to May 2019 *Associate Professor* at Institute of Industrial Science, The University of Tokyo, Japan
March 2010 to March 2016 *Associate Professor* at Atmosphere and Ocean Research Institute, The University of Tokyo, Kashiwa, Japan
August 2008 to March 2010 *Project Scientist* at Scripps Institution of Oceanography, UCSD, La Jolla, CA, USA
(*Visiting Scholar* during June 2006 to May 2008)
October 2002 to July 2008 *Assistant Professor* at Institute of Industrial Science, The University of Tokyo, Tokyo, Japan (*Research Associate* during May 2004 to March 2007)

TEACHING (main contribution only)

2010 to present *Advanced Hydrology* in Dep. of Civil Engineering, Graduate level.
2017 to present *Hydrosphere Science Project* in Dep. of Civil Engineering, Graduate level.
2010 to 2017 *Global Water Cycles and Society* in Dep. of Civil Engineering, Undergraduate level.
2018 to present *Hydrology in Progress* in Dep. of Civil Engineering, Undergraduate level.
2012 to present *Environmental Modeling* in Dep. of Natural Environmental Studies, Graduate level.

HONORS AND AWARDS

October 2018 *Horiuchi Award* from Meteorological Society of Japan
August 2016 *Outstanding Discussion Award* from Japan Society of Civil Engineering
March 2014 *Thesis Award* from Japan Society of Civil Engineering
April 2012 *The Young Scientists' Prize, The Commendation for Science and Technology* from the Minister of Education, Culture, Sports, Science and Technology
October 2011 *Innovation Award for ACRS2011* from AARS Foundation

KEI YOSHIMURA

- August 2008 *Thesis Award for Young Scientists* from Japan Society of Hydrology and Water Resources Engineering
- June 2006 *Postdoctoral Fellowships for Research Abroad* from Japan Society for the Promotion of Science
- March 2004 *Thesis Award for Young Scientists* from Japan Society of Civil Engineering
- September 2002 *Furuichi Award* (upper 10% of master course graduates) from Civil Engineering Department, The University of Tokyo Graduate School

GRANTS (PI only; selected)

- 2019-2022 *PI*: Testing isotopologues as diabatic heating proxy for atmospheric data analyses, JRPs-LEAD with DFG, \$300K
- 2018-2020 *PI*: Development of innovative data assimilation method for reconstruction of climate and weather reconstruction before 19th Century, JSPS, \$450K.
- 2017-2021 *PI*: Greater sophistication of land surface models, MEXT Integrated Research Program for Advancing Climate Models, \$1,000K
- 2016-2018 *PI*: Detailed investigation on hydrologic cycles in atmosphere and land surface using isotope data assimilation system, JSPS, \$100K.
- 2015-2016 *PI*: Development of weather data assimilation system, JSPS, \$50K.
- 2014-2016 *PI*: Detailed investigation on hydrologic cycles in atmosphere and land surface using isotope data assimilation system, JSPS, \$200K.
- 2012-2016 *PI*: Improvement in Cost-Efficiency of Dynamical downscaling for Ensemble data, Program for Risk Information on Climate Change, MEXT, \$1,000K
- 2011-2016 *PI*: A tracer simulator of fallout radionuclides for safe and sustainable water use, CREST on "Innovative Technology and System for Sustainable Water Use", JST, \$500K
- 2011-2013 *PI*: "Development of isotope-CGCM for comprehensive understanding of climate proxy data", JSPS, \$300K.
- 2010-2011 *PI*: "20th century Reanalysis with stable water isotope information," Japan Society for the Promotion of Science, \$30,000.
- 2010-2013 *Co-PI*: "Is the current drought affecting the Western US unique from earlier droughts of the 20th Century and therefore attributable to anthropogenic climate change?" NOAA/CPO, \$544,022.
- 2006-2008 *PI*: "Study on processes of Earth hydrological cycle with stable water isotopes," Japan Society for the Promotion of Science, \$88,000.
- 2005-2006 *PI*: "Development of a stable water isotope circulation model with land surface process," Japan Society for the Promotion of Science, \$30,000.

EDITORIAL SERVICE

- 2018 to present *Editor* for Hydrological Research Letters
- 2017 to present *Associate Editor* for The Journal of Advances in Modeling Earth Systems
- 2013 to present *Associate Editor* for Progress in Earth and Planetary Science
- 2010 to present *Associate Editor* for Asia-Pacific Journal of Atmospheric Sciences
- 2008 to 2018 *Associate Editor* for Hydrological Research Letters

INTERNATIONAL COLLABORATIVE RESEARCH ACTIVITIES

- 2018 to present *Member*: The US CLIVAR Working Group on Observations and Modeling of Water Isotopes in the Climate System
- 2018 to present *Member*: Isotope-enabled Models for Improved Estimates of Water Balance in Catchments, CRP F31005, IAEA
- 2013 to 2016 *Member*: GEWEX Hydrological Panel, WCRP
- 2008 to 2012 *Co-chair*: The second phase of the Stable Water Isotope Intercomparison Group (SWING2)

KEI YOSHIMURA

- 2007 to 2010 *Project Planning Committee Member*: Coordinated Energy and Water Cycle Observations Project (CEOP)
- 2004 to 2007 *Core Member*: Stable Water Isotope Intercomparison Group (SWING)
- 2004 to 2006 *Core Member*: Isotopes in Project for Intercomparison of Land-surface Parameterization Schemes (iPILPS)

SELECTED PUBLICATIONS

1. Miura, Y. and K. Yoshimura, 2020: Development and verification of a three-dimensional variably saturated flow model for assessment of future global water resources, submitted to JAMES.
2. Nitta, T., T. Arakawa, M. Hatono, A. Takeshima, K. Yoshimura, 2020: Development of Integrated Land Simulator, submitted to PEPS.
3. Hatono, M. and K. Yoshimura, 2020: Development of a global sediment dynamics model, submitted to PEPS.
4. Jones, M.C., M. Berkelhammer, K. J. Keller, M. J. Wooller, K. Yoshimura, 2020: High sensitivity of Bering Sea winter sea ice to winter insolation and carbon dioxide over the last 5,500 years, *Sci. Adv.*
5. Chiang, J.C.H., M. J. Herman, K. Yoshimura, and I. Y. Fung, 2020: Enriched East Asian oxygen isotope of precipitation indicate reduced summer seasonality in regional climate and westerlies, *PNAS*.
6. Okazaki, A. and K. Yoshimura, 2019: Global evaluation of proxy models for stable water isotopes with realistic atmospheric forcing, *JGR-Atmos.*, <https://doi.org/10.1029/2018JD029463>.
7. Tatebe, H., K. Yoshimura, et al., 2019: Description and basic evaluation of simulated mean state, internal variability, and climate sensitivity in MIROC6, *Geosci. Model Dev.*, 12, 2727-2765, <https://doi.org/10.5194/gmd-12-2727-2019>.
8. Wei, Z., K. Yoshimura, et al., 2019: A global database on high-frequency isotopic compositions of water vapour measured with infrared isotopic spectroscopy near the Earth surface, *Scientific Data*, <https://doi.org/10.1038/sdata.2018.302>.
9. Yoshikane, T., K. Yoshimura, 2018: Dispersion characteristics of radioactive materials predicted using wind patterns, *Scientific Reports*, 8, 9926.
10. Rahul P, K. Prasanna, P. Ghosh, Anilkumar N, K. Yoshimura, 2018: Stable isotopes in water vapor and rainwater over Indian sector of Southern Ocean and estimation of fraction of recycled moisture, *Scientific Reports*, 8, 7552.
11. Nitta, T., K. Yoshimura, A. Abe-Ouchi, 2017: Impact of arctic wetlands on the climate system: Model sensitivity simulations with the MIROC5 AGCM and a wetland scheme, *J. Hydrometeor.*, doi:10.1175/JHM-D-16-0105.1.
12. Toride, K., P. Neluwala, H.J. Kim, and K. Yoshimura, 2017: Feasibility Study of the Reconstruction of Historical Weather with Data Assimilation, *Mon. Wea. Rev.*, doi:10.1175/MWR-D-16-0288.1.
13. Park, K.J., K. Yoshimura, H. Kim, and T. Oki, 2017: Family tree of the global mean estimates of precipitation over land, *Bull. Amer. Meteorol. Soc.*
14. Okazaki, A. and K. Yoshimura, 2017: Development and evaluation of a system of proxy data assimilation for paleoclimate reconstruction, *Clim. Past*, doi:10.5194/cp-2016-12.
15. Wei, Z., K. Yoshimura, L. Wang, D. Miralles, S. Jasechko, X. Lee, 2017: Revisiting the contribution of transpiration to global terrestrial evapotranspiration, *Geophys. Res. Lett.*, doi:10.1002/2016GL072235.
16. Yoshikane, T., K. Yoshimura, E.-C. Chang, A. Saya, and T. Oki, 2016: Long-distance transport of radioactive plume by nocturnal local winds, *Scientific Reports*, 6, doi:10.1038/srep36584.
17. Ham, S., K. Yoshimura, H. Li, 2016: Historical dynamical downscaling for East Asia with the atmosphere and ocean coupled regional model, *J. Meteor. Soc. Japan*, 94, doi:10.2151/jmsj.2015-046.
18. Chang, E.-C. and K. Yoshimura, 2015: A semi-Lagrangian advection scheme for radioactive tracers in the NCEP Regional Spectral Model (RSM), *Geosci. Model Dev.*, 8, 3247-3255, doi:10.5194/gmd-8-3247-2015.
19. Yoshimura, K., 2015: Stable water isotopes in climatology, meteorology, and hydrology: A

KEI YOSHIMURA

- review. *J. Meteor. Soc. Japan*, **93**, doi:10.2151/jmsj.2015-036.
20. Wei, Z., K. Yoshimura, A. Okazaki, W. Kim, Z. Liu, M. Yokoi, 2015: Partitioning of evapotranspiration using high frequency water vapor isotopic measurement over a rice paddy field, *Water Resour. Res.*, **51**, doi:10.1002/2014WR016737.
 21. Yoshimura, K., T. Miyoshi, M. Kanamitsu, 2014: Observation System Simulation Experiments using Water Vapor Isotope Information, *J. Geophys. Res. Atmos.*, **119**, doi:10.1002/2014JD021662.
 22. Berkelhammer, M., A. Sinha, M. Mudelsee, H. Cheng, K. Yoshimura, and J. Biswas, 2014: On the low-frequency component of the ENSO–Indian monsoon relationship: a paired proxy perspective, *Clim. Past*, **10**, 733-744, doi:10.5194/cp-10-733-2014.
 23. Liu, Z., K. Yoshimura, G. J. Bowen, N. H. Buenning, C. Risi, J. M. Welker, F. Yuan, 2014: Paired oxygen isotope records reveal modern North American atmospheric dynamics during the Holocene, *Nature Communications*, doi:10.1038/ncomms4701.
 24. Liu, G., K. Kojima, K. Yoshimura, T. Okai, A. Suzuki, T. Oki, F. Siringan, M. Yoneda, H. Kawahata, 2013: A model-based test of accuracy of seawater oxygen isotope ratio record derived from a coral dual proxy method at southeastern Luzon Island, the Philippines, *J. Geophys. Res. Biogeo.*, **118**, 2012JG002266.
 25. Yoshimura, K. and M. Kanamitsu, 2013: Incremental correction for the dynamical downscaling of ensemble mean atmospheric fields, *Mon. Wea. Rev.*, **141**, 3087-3101.
 26. Li, H., M. Kanamitsu, S.-Y. Hong, K. Yoshimura, D.R. Cayan, and V. Misra, 2013: A High-Resolution Ocean-Atmosphere coupled downscaling of a present climate over California, *Clim. Dyn.*, DOI 10.1007/s00382-013-1670-7.
 27. Gimeno, L., A. Stohl, R. M. Trigo, F. Dominguez, K. Yoshimura, L. Yu, A. R. de M. Drumond, A. M. Duran-Quesada, and R. Nieto, 2012: Oceanic and Terrestrial Sources of Continental Precipitation, *Rev. Geophys.*, doi:10.1029/2012RG000389.
 28. Welp, L., R.F. Keeling, H.A.J. Meijer, A.F. Bollenbacher, S.C. Piper, K. Yoshimura, R.J. Francey, C.E. Allison, and M. Wahlen, 2011: El Nino effects on the isotopic composition of oxygen in atmospheric CO₂, *Nature*, **477**, 579–582, doi:10.1038/nature10421.
 29. Yoshimura, K., C. Frankenberg, 2011: J. Lee, M. Kanamitsu, J. Worden, T. Röckmann, Comparison of an isotopic AGCM with new quasi global satellite measurements of water vapor isotopologues, *J. Geophys. Res.*, **116**, D19118, doi:10.1029/2011JD016035.
 30. Yoshimura, K., M. Kanamitsu, and M. Dettinger, 2010: Regional downscaling for stable water isotopes: A case study of an Atmospheric River event, *J. Geophys. Res.*, **115**, doi:10.1029/2010JD014032.
 31. Frankenberg, C., K. Yoshimura, I. Aben, A. Butz, N. Deutscher, D. Griffith, F. Hase, J. Notholt, M. Schneider, H. Schrijver, T. Warneke, T. Röckmann, 2009: Dynamic processes governing lower-tropospheric HDO/H₂O ratios as observed from space and ground, *Science*, **325**, 1374-1377.
 32. Yoshimura, K., M. Kanamitsu, D. Noone, and T. Oki, 2008: Historical isotope simulation using reanalysis atmospheric data, *J. Geophys. Res.*, **113**, doi:1029.10/2008JD010074.
 33. Yoshimura, K., T. Sakimura, T. Oki, S. Kanae, and S. Seto, 2008: Toward flood risk prediction: a statistical approach using a 29-year river discharge simulation over Japan, *Hydrol. Res. Let.*, **2**, 22-26.
 34. Yoshimura, K. and M. Kanamitsu, 2008: Dynamical global downscaling of global reanalysis, *Mon. Wea. Rev.*, **136**, 8, 2983-2998.
 35. Yoshimura, K., S. Miyazaki, S. Kanae, and T. Oki, 2006: Iso-MATSIRO, a land surface model that incorporates stable water isotopes, *Glob. Planet. Change*, **51**, 90-107.
 36. Yoshimura, K., T. Oki, and K. Ichiyanagi, 2004: Evaluation of two-dimensional atmospheric water circulation fields in reanalyses by using precipitation isotopes databases. *J. Geophys. Res.*, **109**(D20), D20109, doi:10.1029/2004JD004764.
 37. Yoshimura, K., T. Oki, N. Ohte, and S. Kanae, 2003: A quantitative analysis of short-term 18O variability with a Rayleigh-type isotope circulation model. *J. Geophys. Res.*, **108**(D20), 4647, doi:10.1029/2003JD003477.
- (82 others)