

# KEI YOSHIMURA

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*As of June 26, 2013*

## EDUCATION

- February 2006 University of Tokyo, Tokyo, Japan  
Ph.D. Civil Engineering  
Thesis: *A Study on Systems of the Global Hydrologic Cycles with Stable Water Isotopic Information.*  
Committee: Professors Taikan Oki (chair), Naohiro Yoshida, Toshio Koike, Takeshi Ishihara, Kung Yang, Toshiharu Kishi, and Masaki Sato
- September 2002 M.S. Civil Engineering  
March 2000 B.S. Civil Engineering  
University of Durham Business School, Durham, UK
- September 2001 to March 2002 Attended all M.A. Management classes as an exchange student

## RESEARCH INTERESTS

- Study of stable water isotope (HDO and H<sub>2</sub><sup>18</sup>O) 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.

## PROFESSIONAL EXPERIENCE

- March 2010 to present Atmosphere and Ocean Research Institute, University of Tokyo, Tokyo, Japan  
*Associate Professor*: research on climate sciences and stable water isotope circulation  
(Also at Institute of Industrial Science, University of Tokyo)  
Scripps Institution of Oceanography, UCSD, La Jolla, CA, USA
- August 2008 to March 2010 *Project Scientist*: research on stable water isotope circulation, global and regional atmospheric modeling, data assimilation, carbon cycle modeling, dynamical downscaling, past and future changes in meso-scale climate and extremes.  
(*Visiting Scholar* during June 2006 to May 2008)  
Institution of Industrial Science, University of Tokyo, Tokyo, Japan

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- October 2002 to July 2008 *Assistant Professor*: research on stable water isotope circulation, modeling and impact assessment of terrestrial and hydrological processes, flood risk analysis and early warning. (*Research Associate* during May 2004 to March 2007)  
(*Technical Research Fellow* during October 2002 to April 2004)  
Japan Agency for Marine-Earth Science and Technology, Yokohama, Japan
- October 2006 to present *Invited Researcher*: research on relationship between water isotopes and Asian Monsoon, typhoon mechanism, tropical convective precipitation.

### TEACHING EXPERIENCE

- Graduate School Level Advanced Hydrology / Environmental Restoration, Rehabilitation and Mitigation / Environmental Simulations
- Undergraduate Level Earth Hydrologic Cycle and Society

### SERVICE

- 2008 to present *Associate Editor* for Hydrological Research Letters.
- 2010 to present *Associate Editor* for Asia-Pacific Journal of Atmospheric Sciences
- 2005 *Session Convener* on Isotope Hydrology, 2005 Asia Oceania Geosciences Society annual meeting, Singapore.
- 2011, 2012 *Session Convener* on Dataset Exhibition in Japan Geoscience Union
- 2003-2006 *Open House Coordinator* for Hydrology and Water Resources Lab. in IIS/UT.
- Reviewer for *Journal of Geophysical Research, Geophysical Research Letters, Journal of Climate, Climate of the Past, Atmospheric Chemistry and Physics, Journal of Meteorological Society of Japan, Hydrological Processes, Global and Climate Change, Water Resources Research, Advances in Atmospheric Sciences, Advances in Geosciences, Terrestrial, Atmospheric and Oceanic Sciences*, etc.

### INTERNATIONAL COLLABORATIVE RESEARCH ACTIVITIES

- 2008 to present *Co-chair*: The second phase of the Stable Water Isotope Intercomparison Group (SWING2)
- 2007 to present *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)

### HONORS AND AWARDS

- April 2012 *The Young Scientists' Prize, The Commendation for Science and Technology* by the Minister of Education, Culture, Sports, Science and Technology
- October 2011 *Innovation Award for ACRS2011* from AARS Foundation
- August 2008 *Thesis Award for Young Scientists* from Japan Society of Hydrology and Water Resources Engineering.
- April 2007 Invited for ICSU 75<sup>th</sup> anniversary conference "Global Scientific Challenges: Perspectives from Young Scientists" as one of 142 young scientists, from 71 countries.
- June 2006 *Postdoctoral Fellowships for Research Abroad* from Japan Society for the Promotion of Science.

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- 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, University of Tokyo Graduate School.  
August 2001 *Excellent Poster Presentation Award* from Japan Society of Hydrology and Water Resources.

### GRANTS

- 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*: "20<sup>th</sup> 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.

### PUBLICATIONS

#### *Published work:*

1. Liu, Z., K. Yoshimura, C. D. Kennedy, X. Wang, S. Pang, Water vapor  $\delta D$  over eastern Asia derived from SCIAMACHY satellite measurements, *Science China Earth Sciences*, in print.
2. Liu, G., K. Kojima, K. Yoshimura(cor.), T. Okai, A. Suzuki, T. Oki, F. Siringan, M. Yoneda, H. Kawahata, 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, *JGR-Biogeophys*, 2012JG002266, 2013.
3. Farlin, J., C.-T. Lai, K. Yoshimura, Influence of synoptic weather events on the isotopic composition of atmospheric moisture in a coastal city of the western United States, *Water Resour. Res.*, in press.
4. Suwarman R, K. Ichianagi, M. Tanoue, K. Yoshimura, S. Mori, M. D. Yamanaka, N. Kurita and F. Syamsudin. The Variability of Stable Isotopes and Water Origin of Precipitation over the Maritime Continent, *SOLA*, **9**, 74-78, doi:10.2151/ sola.2013-01, 2013.
5. Yoshimura, K. and M. Kanamitsu, Incremental correction for the dynamical downscaling of ensemble mean atmospheric fields, *Mon. Wea. Rev.*, in press.
6. Pierce, D., D. Cayan, T. Das, E. Maurer, N. Miller, Y. Bao, M. Kanamitsu, K. Yoshimura, M. Snyder, L. Sloan, G. Franco, and M. Tyree, The key role of heavy precipitation events in climate model disagreements of future annual precipitation changes in California, *J. Clim.*, doi:10.1175/JCLI-D-12-00766.1, 2013.
7. Li, H., M. Kanamitsu, S.-Y. Hong, K. Yoshimura, D.R. Cayan, and V. Misra, A High-Resolution Ocean-Atmosphere coupled downscaling of a present climate over California, *Clim. Dyn.*, DOI 10.1007/s00382-013-1670-7, 2013.
8. Berkelhammer, M., A. Sinha, L. Stott, H. Cheng, F. S. R. Pausata, and K. Yoshimura, An abrupt shift in the Indian monsoon 4000 years ago, in *Climates, Landscapes, and Civilizations*, *Geophys. Monogr. Ser.*, **198**, edited by L. Giosan et al., 75-87, AGU, Washington, D. C., doi:10.1029/2012GM001207,

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- 2012.
9. Schneider, M., Barthlott, S., Hase, F., González, Y., Yoshimura, K., García, O. E., Sepúlveda, E., Gomez-Pelaez, A., Gisi, M., Kohlhepp, R., Dohe, S., Blumenstock, T., Wiegele, A., Christner, E., Strong, K., Weaver, D., Palm, M., Deutscher, N. M., Warneke, T., Notholt, J., Lejeune, B., Demoulin, P., Jones, N., Griffith, D. W. T., Smale, D., and Robinson, J., Ground-based remote sensing of tropospheric water vapour isotopologues within the project MUSICA, *Atmos. Meas. Tech.*, **5**, 3007-3027, doi:10.5194/amt-5-3007-2012, 2012.
  10. Lee, J.-H., J. Worden, D.-C. Koh, K. Yoshimura, and J.-E. Lee, A seasonality of  $\delta D$  of water vapor (850-500 hPa) observed from space over Jeju island, Korea, *Geosciences J.*, **17**, 87-95, DOI 10.1007/s12303-013-0003-5, 2013.
  11. Uemura, R., N. Yonezawa, K. Yoshimura, R. Asami, H. Kadena, K. Yamada, N. Yoshida, Factors controlling isotopic composition of precipitation on Okinawa Island, Japan: Implications for paleoclimate reconstruction in the East Asian Monsoon region, *J. Hydrol.*, **475**, 314-322, 2012.
  12. Liu, Z., G.J. Bowen, J.M. Welker, and K. Yoshimura, Winter precipitation isotope ( $\delta^{18}O$ ) slopes of the contiguous USA and their relationship to the Pacific/North American (PNA) pattern, *Climate Dynamics*, 10.1007/s00382-012-1548-0, 2012.
  13. 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, Oceanic and Terrestrial Sources of Continental Precipitation, *Rev. Geophys.*, doi:10.1029/2012RG000389, 2012.
  14. Buening, N. H., L. Stott, K. Yoshimura, and M. Berkelhammer, The cause of the seasonal variation in the oxygen isotopic composition of precipitation along the western U.S. coast, *J. Geophys. Res.*, **117**, D18114, doi:10.1029/2012JD018050, 2012.
  15. Ishizaki, Y., K. Yoshimura, S. Kanae, M. Kimoto, N. Kurita, and T. Oki, Interannual variability of H218O in precipitation over the Asian monsoon region, *J. Geophys. Res.*, **117**, D16308, doi:10.1029/2011JD015890, 2012.
  16. Okazaki, A. P.J.-F. Yeh, K. Yoshimura, M. Watanabe, M. Kimoto, T. Oki, Changes in flood risk under global warming estimated using MIROC5 and the discharge probability index, *J. Meteorol. Soc. Japan*, **90**, 509-524, doi:10.2151/jmsj.2012-405, 2012.
  17. Zhu, M., L.D. Stott, B. Buckley, K. Yoshimura, K. Ra, Indo-Pacific Warm Pool convection and ENSO since 1867 AD derived from Cambodian pine tree cellulose oxygen isotopes, *J. Geophys. Res.*, **117**, D11307, doi:10.1029/2011JD017198, 2012.
  18. Pierce, D., T. Das, D. Cayan, E. Maurer, N. Miller, Y. Bao, M. Kanamitsu, K. Yoshimura, M. Snyder, L. Sloan, G. Franco, and M. Tyree, Probabilistic estimates of future changes in California temperature and precipitation using statistical and dynamical downscaling, *Climate Dynamics*, 10.1007/s00382-012-1337-9, 2012.
  19. Zhu, M., L. Stott, B. Buckley, and K. Yoshimura, 20th century seasonal moisture balance in Southeast Asian montane forests from tree cellulose  $\delta^{18}O$ , *Climatic Change*, **115**, 505-517, 2012.
  20. Sunmonu, N., K. Muramoto, N. Kurita, K. Yoshimura, and Y. Fujiyoshi, Characteristics of Seasonal Variation of Near-surface Water Vapor D/H Isotope Ratio Revealed by Continuous in situ Measurement in Sapporo, Japan, *SOLA*, **8**, 5-8, 2012.
  21. Pfahl, S., H. Wernli, and K. Yoshimura, The isotopic composition of precipitation from a winter storm – a case study with the limited-area model COSMOiso, *Atmos. Chem. Phys.*, **12**, 1629-1648, 2012.
  22. Jiang, C.-L., S.T. Gille, J. Sprintall, K. Yoshimura and M. Kanamitsu, Spatial variation in turbulent heat fluxes in Drake Passage, *J. Clim.*, doi:10.1175/2011JCLI4071.1, 2011.
  23. Hiraoka, A., R. Kawamura, K. Ichiyanaagi, M. Tanoue, and K. Yoshimura, Water origins over central and southern Japan during the early summer rainy season as simulated with an isotope circulation model, *SOLA*, **7**, 141-144, 2011.
  24. 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, El Nino effects on the isotopic composition of oxygen in atmospheric CO<sub>2</sub>, *Nature*, **477**, 579–582, doi:10.1038/nature10421, 2011.

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25. Yoshimura, K., C. Frankenberg, J. Lee, M. Kanamitsu, J. Worden, T. Röckmann, Comparison of an isotopic AGCM with new quasi global satellite measurements of water vapor isotopologues, *JGR*, in print.
26. Berkelhammer, M., L. Stott, K. Yoshimura, K. Johnson, and A. Sinha, Synoptic and mesoscale controls on the isotopic composition of precipitation in the southwestern US, *Clim.Dyn.*, in print.
27. Fudeyasu, H., K. Ichiyangi, K. Yoshimura, S. Mori, N. Sakurai, J.-I. Hamada, M.D. Yamanaka, J. Matsumoto, and F. Syamsudin, 2011: Effects of large-scale moisture transport and mesoscale processes on precipitation isotope ratios observed at Sumatera, Indonesia, *J. Meteor. Soc. Japan*, in print.
28. 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.
29. Kanamitsu, M., K. Yoshimura, Y-B Yhang and S-Y Hong, 2010: Errors of interannual variability and trend in dynamical downscaling of Reanalysis, *J. Geophys. Res.*, **115**, doi:10.1029/2009JD013511.
30. Schneider, M., K. Yoshimura, F. Hase, and T. Blumenstock, 2009: The ground-based FTIR network's potential for investigating the atmospheric water cycle, *Atmos. Chem. Phys. Discuss.*, **9**, 26199-26235.
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/H<sub>2</sub>O ratios as observed from space and ground, *Science*, **325**, 1374-1377.
32. Miller, N.L., P. Duffy, D. Cayan, H. Hidalgo, J. Jin, H. Kanamaru, M. Kanamitsu, T. O'Brien, N. Schlegel, L. Sloan, M. Snyder, K. Yoshimura, An evaluation of simulated California climate using multiple dynamical and statistical downscaling techniques, *CEC Report*, CEC-500-2009-017-F.
33. Abe, O., S. Agata, M. Morimoto, M. Abe, K. Yoshimura, T. Hiyama, and N. Yoshida, 2009: A 6.5-year continuous record of sea surface salinity and seawater isotopic composition at Harbor of Ishigaki Island, southwest Japan, *Isotopes in Environmental and Health Studies*, **45**, 247-258.
34. Yoshimura, K. and M. Kanamitsu, 2009: Specification of external forcing for regional model integrations, *Mon. Wea. Rev.*, **137**, 1409–1421.
35. Yoshimura, K. and M. Kanamitsu, 2008: Dynamical global downscaling of global reanalysis, *Mon. Wea. Rev.*, **136**, 8, 2983-2998.
36. Yoshimura, K., M. Kanamitsu, D. Noone, and T. Oki, 2008a: Historical isotope simulation using reanalysis atmospheric data, *J. Geophys. Res.*, **113**, doi:1029.10/2008JD010074.
37. Uemura, R., Y. Matsui, K. Yoshimura, H. Motoyama, N. Yoshida, 2008: Evidence of deuterium excess in water vapour as an indicator of ocean surface conditions, *J. Geophys. Res.*, **113**, doi:1029.10/2008JD010209.
38. Fudeyasu, H., K. Ichiyangi, A. Sugimoto, K. Yoshimura, A. Ueta, M.D. Yamanaka, K. Ozawa, 2008: Isotope ratios of precipitation and water vapor observed in Typhoon Shanshan, *J. Geophys. Res.*, **113**, D12113, doi:10.1029/2007JD009313.
39. Yoshimura, K., T. Sakimura, T. Oki, S. Kanae, and S. Seto, 2008b: Toward flood risk prediction: a statistical approach using a 29-year river discharge simulation over Japan, *Hydrol. Res. Let.*, **2**, 22-26.
40. Islam, M.S., T. Oki, S. Kanae, N. Hanasaki, Y. Agata, K. Yoshimura, 2007: A grid-based assessment of global water scarcity including virtual water trading, *Water Resour. Manag.*, **21**(1), 19-33.
41. 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.
42. Henderson-Sellers, A., M. Fischer, I. Aleinov, K. McGuffie, W.J. Riley, G. Schmidt, K. Sturm, and K. Yoshimura, 2006: Stable water isotope simulation by current land surface schemes: Results of iPILPS phase 1, *Glob. Planet. Change*, **51**, 34-54.
43. Ichiyangi, K., K. Yoshimura, and M.D. Yamanaka, 2005: Validation of changing water origins over Indochina during the withdrawal of the Asian monsoon using stable isotopes, *Sci. Onl. Let. Atmos.*, **1**, 113-116.
44. Shinoda, T., H. Uyeda, and K. Yoshimura, 2005: Structure of moist layer and sources of water over the southern region far from the Meiyu/Baiyu front, *J. Meteor. Soc. Japan*, **83**, 137-152.
45. Yoshimura, K., T. Oki, and K. Ichiyangi, 2004: Evaluation of two-dimensional atmospheric water

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- circulation fields in reanalyses by using precipitation isotopes databases. *J. Geophys. Res.*, **109**(D20), D20109, doi:10.1029/2004JD004764.
46. Yoshimura, K., T. Oki, N. Ohte, and S. Kanae, 2004: Colored moisture analysis estimates of variations in 1998 Asian monsoon water sources, *J. Meteor. Soc. Japan*, **82**, 1315-1329.
  47. Yoshimura, K., T. Oki, N. Ohte, and M. Koike, 2003: Development and verification of a vertical integrated two dimensional water isotope circulation model, *J. Hydrosci. Hydraul. Eng.*, **21**, 25-35.
  48. Yoshimura, K., T. Oki, N. Ohte, and S. Kanae, 2003: A quantitative analysis of short-term <sup>18</sup>O variability with a Rayleigh-type isotope circulation model. *J. Geophys. Res.*, **108**(D20), 4647, doi:10.1029/2003JD003477.

### RECENT CONFERENCE PRESENTATIONS

- 2013 May, Water isotope modeling and observations toward reconstruction for Asian hydroclimatology, 2013JpGU, Makuhari.
- 2012 Dec., Idealized Experiments for Data Assimilation of Vapor Isotopes with Isotopic AGCM and Ensemble Kalman Filter, AGU Fall Meeting 2012, San Francisco.
- 2012 May, Reproduction of isotopic signals in climate proxies with Isotope Reanalysis for 20th century, JpGU2012, Makuhari.
- 2012 May, 20th Century Isotope Reanalysis, 4th WCRP International Conference on Reanalyses, Silver Spring.

### NEWS ARTICLES, ETC.

- "Not so much the heat, but the humidity" in *Explorations*, SIO e-magazine, Nov/Dec 2009.  
[http://explorations.ucsd.edu/Research\\_Highlights/2009/Nov\\_Dec/Water\\_Vapor/](http://explorations.ucsd.edu/Research_Highlights/2009/Nov_Dec/Water_Vapor/)
- Report on ICSU Young Scientist Conference, *WCRP News*, 8/28/2007.  
[http://www.icsu.org/1\\_icsuinscience/ARCHIVE/10\\_icsu75/PDF/Kei\\_Yoshimura\\_WCRP.pdf](http://www.icsu.org/1_icsuinscience/ARCHIVE/10_icsu75/PDF/Kei_Yoshimura_WCRP.pdf)