

Senior Vice-Rector, United Nations University  
5-53-70 Jingumae, Shibuya-ku, Tokyo 150-8925, Japan  
Phone: +81 3 5467 1212, Fax: +81 3 3499 2828, Email: oki@unu.edu

Professor, The University of Tokyo  
Department of Civil Engineering, Graduate School of Engineering  
7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan  
Phone: 03-5841-0504, Fax: 03-5841-7496  
Email: oki@civil.t.u-tokyo.ac.jp



## Summary

Prof. Oki is the Senior Vice-Rector of the United Nations University and an Assistant Secretary-General of the United Nations since October 2016. He is also affiliated as a Special Adviser to the President and a professor at Department of Civil Engineering, Graduate School of Engineering, The University of Tokyo. Prof. Oki received his Ph.D in Civil Engineering at The University of Tokyo in 1993.

Prof. Oki has made important contributions across a number of scientific fields over the last two decades. These are detailed in the accompanying bibliography. His most important and wide-reaching work has been in demonstrating the connections between the hydrologic cycle, renewable water resources, the global economy, and sustainability culminating in his 2006 paper in *Science*. Prof. Oki has demonstrated the inequitable connections between local hydrologic sustainability, climate, and macroscale socioeconomic pressures. As a citizen of an island nation highly dependent on the import of natural resources and foodstuffs, he has demonstrated clearly how the international exchange of "virtual water", that needed to produce agricultural and other commodities traded on the global market, can exacerbate vulnerabilities in water-poor regions. Early in his career Prof. Oki developed a global river routing dataset for climate applications, Total Runoff Integrating Pathways (TRIP), which continues to be widely used around the world to study large-scale hydrology and the water cycle. It is a part of many climate models including those used in assessments by the Intergovernmental Panel of Climate Change (IPCC). Prof. Oki's work frequently bridges the gap between hydrology and climate research, including pioneering studies of the evaporative origins of rainwater around the globe based on stable water isotope tracing. As part of the Global Soil Wetness Project (GSWP), he demonstrated convincingly that our ability to simulate the surface hydrologic cycle with land surface models is more constrained by the quality of precipitation data than any other component of climate, establishing a critical threshold of raingauge density for model-based hydrologic monitoring.

Prof. Oki's lab at The University of Tokyo has grown to become world-renowned in the areas of Global Hydrology and Water Resources Engineering, drawing students from across Asia, and post-doctoral research fellows from around the world, including Europe and the United States. He and his students have made numerous advances in numerical model development in many aspects of the global and regional hydrologic cycles, as his publication list attests. Prof. Oki has also contributed innovative research in the assessment of risks and vulnerabilities in water resources at a range of scales from single basins to global, and his graduates are taking the methods and conscientiousness learned from their advisor into their own research and academic careers. He has contributed chapters to a dozen scientific books, and participates frequently in public outreach and education, also winning awards for science communication and promotion.

He was one of the coordinating lead authors for Chapter 3 "Freshwater Resources" of the IPCC WGII AR5, and a review editor for Chapter 8 "Poverty, Livelihoods and Sustainable Development" of IPCC WGII AR6. He has been the recipient of numerous awards such as the Biwako Prize for Ecology in 2011, and the Japan Academy Medal in 2008. He is the first Japanese AGU Fellow in its Hydrology Section with quotes "For interdisciplinary research and leadership bridging hydrology, climate, and sustainability through numerical modeling and scientific analysis."

## Education

**1993 Ph.D. (Engineering)**

The University of Tokyo, Japan

**1989 M.S. (Engineering)**

Department of Civil Engineering, Faculty of Engineering, The University of Tokyo, Japan

**1987 B.S. (Engineering)**

Department of Civil Engineering, Faculty of Engineering, The University of Tokyo, Japan

## Appointments

**2020 Professor (cross-appointment)**

Department of Civil Engineering, Graduate School of Engineering, The University of Tokyo

**2019 Professor (cross-appointment)**

Institute for Future Initiatives, The University of Tokyo

**2018 Professor (cross-appointment)**

The University of Tokyo Institutes for Advanced Study, Integrated Research System for Sustainability Science, Japan

**2016 Senior Vice-Rector of UNU and Assistant Secretary-General of UN (cross-appointment)**

United Nations University, Tokyo, Japan, and United Nations, NY, USA

**2006 Professor**

Institute of Industrial Science, The University of Tokyo, Tokyo, Japan

**2003 Associate Professor**

Institute of Industrial Science, The University of Tokyo, Tokyo, Japan

**2002 Associate Professor**

Research Institute for Humanity and Nature, Kyoto, Japan

**1997 Associate Professor**

Institute of Industrial Science, The University of Tokyo, Tokyo, Japan

**1995 Assistant Professor**

Institute of Industrial Science, The University of Tokyo, Tokyo, Japan

**1989 Research Associate**

Institute of Industrial Science, The University of Tokyo, Tokyo, Japan

## Major Concurrent positions

**2017- Special Advisor to the President**

The University of Tokyo, Tokyo, Japan

**2005-2006 Deputy Director for Environment and Energy**

Council for Science and Technology Policy, Cabinet Office, Japan

**1995-1997 Visiting Scientist**

Climate and Radiation Branch, Goddard Space Flight Center, NASA, USA

## Major International Contributions

- Coordinating Lead Author (CLA) for WGII Chapter 3 "Freshwater Resources" and Member of Core Writing Team of WGII SYR AR5, Lead Author (LA) for WGII Chapter 3 "Freshwater Resources" and contributing Author (CA) for WGI Chapter 3 "Observations: Atmospheric Surface and Climate Change", AR4, LA for IPCC Technical Paper on Water, and LA for Chapter 8 "Toward a Sustainable and Resilient Future", The Special Report of Extreme Events (SREX), Intergovernmental Panel on Climate Change (IPCC)
- Chief Advisor, Advancing Co-Design of Integrated Strategies with Adaptation to Climate Change in Thailand (ADAP-T), 2015-.
- Project Manager (2014-) of the Global Soil Wetness Project (GSWP) Phase 3 under GLASS/GEWEX as a liaison across broader science communities including ISI-MIP, Trendy, LUMIP, CLiC/WCRP, GDAP/GEWEX, and CMIP6.
- Co-chair (2014-) of Land Surface, Snow and Soil moisture Model Intercomparison Project (LS3MIP) as a CMIP6-endorsed-MIP.
- Science Team Member (2013-) of Precipitation Measurement Mission (PMM) – Validation team for Global Precipitation Measurement/Dual-frequency Precipitation Radar (GPM/DPR).
- Chair (2011-), JAXA GCOM-W1 Science Team.
- Chief Advisor, Integrated Study Project on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand (IMPAC-T), 2008-2014.
- Lead Author for Chapter 9 "Freshwater Resources", Millennium Ecosystem Assessment (MA).
- ESSP/ GWSP (Global Water System Project) Science Panel, Member, 2004-2008.
- GEWEX/GLASS (Global Land Atmosphere System Study) Science Panel, Member, 1999-2006.
- IAHS PUB (Prediction in Ungauged Basins) Scientific Steering Committee, Member, 2003-2005.

## Major Domestic Contributions as a Member of Councils and Boards

- Associate member, Science Council of Japan
- Member, National Land Council Committee, MLIT, Japan
- Member, Science and Technology Committee on Environment and Energy, Science, Research Plan and Evaluation Subcommittee, Technology, and Academic Council, MEXT, Japan
- Member of the board of directors, Japan Association for the United Nations Environment Programme
- Council Member, Sustainable Development Solutions Network Japan

## Memberships

- American Geophysical Union (Fellow, 2014)
- American Meteorological Society
- International Association of Hydrological Sciences
- Japanese Association of Hydrological Sciences
- Japan Society of Civil Engineers (Fellow)
- Japan Society of Hydrology & Water Resources
- Meteorological Society of Japan

## Recent Major Research Grants

- Project Leader, "New frontiers in global hydrology", JSPS/Grant-in-Aid for Scientific Research (16H06291) Grant-in-Aid for Specially Promoted Research, 2016-2020 (approximately 3 million USD in 5 years).
- Project Leader, "The Advancing Co-Design of Integrated Strategies with Adaptation to Climate Change in Thailand (ADAP-T)", Science and Technology Research Partnership for Sustainable Development, 2015-2021 (approximately 2 million USD in 5 years).

- Project Leader, “Development of an Emergency Groundwater Utilization System during a Disaster or Critical Drought”, Cross-ministerial Strategic Innovation Promotion Program (SIP) of Cabinet Office of Japan, 2018-2022 (up to 10 million USD in 5 years).

## Major Awards

- 2014 AGU Fellow, American Geophysical Union
- 2014 JICA President Award
- 2014 Cultural Publication Award, Japan Society of Civil Engineering
- 2013 Academic Publication Award, Japan Society of Hydrology and Water Resources
- 2011 Biwako Prize for Ecology, The Ecological Society of Japan
- 2009 JSHWR Paper Award, Japan Society of Hydrology and Water Resources
- 2009 Award for Persons of Distinguished Services to the Promotion of Science and Technology related to Ocean
- 2008 Nikkei Global Environmental Technology Awards
- 2008 Science and Technology Prize, Ministry of Education, Culture, Sports, Science, & Technology
- 2008 Japan Academy Medal, The Japan Academy
- 2008 JSPS PRIZE, Japan Society for the Promotion of Science
- 2005 Award in the field of Environment, JSCE
- 2004 Incentive Award, Japan Water Award
- 2003 IAHS Tison Award
- 1998 Scientific Award from Japan Society of Hydrology and Water Resources

## Major Publications

Publications in more than 60 books, 250 peer-reviewed journal articles, and 90 peer-reviewed proceedings both in English and Japanese.

Complete list of ISI journal articles can be found at: <https://publons.com/researcher/1366461/taikan-okii/>

- Yano, S., et al., including T. Oki, 2020: Using the sectoral and statistical demand to availability index to assess freshwater scarcity risk and effect of water resource management, *J. Hydrol. X*, **8**, 100058.
- Bayu, T., H. Kim, and T. Oki, 2020: Water Governance Contribution to Water and Sanitation Access Equality in Developing Countries, *Water Resources Research*, **36**:2-3, 416-428. DOI: 10.1080/07900627.2019.1698413
- Oki, T. and R.E. Quiocho, 2020: Economically challenged and water scarce: identification of global populations most vulnerable to water crises, *International Journal of Water Resources Development*, **36**:2-3, 416-428
- Gleeson et al., including T. Oki, 2020: Illuminating water cycle modifications and Earth System resilience in the Anthropocene, *Water Resources Research*, **56**(4). doi: 10.1029/2019WR024957
- Takakura et al., including T. Oki, 2019: Dependence of economic impacts of climate change on anthropogenically directed pathways, *Nature Climate Change*, **9**, 737-741.
- Cuthbert et al., including T. Oki, 2019: Observed controls on resilience of groundwater to climate variability in sub-Saharan Africa, *Nature*, **572**, 230-234.
- Fukuda, S., N. Keigo, and T. Oki, 2019: How global targets on drinking water were developed and achieved, *Nature Sustainability*, **2**, 429-434.
- Tokuda, D., H. Kim, D. Yamazaki, and T. Oki, 2019: Development of a global river water temperature model considering fluvial dynamics and seasonal freeze - thaw cycle, *Water Resources Research*, **55**, 1366-1383.
- Madakumbura, Gavin D. et al., including T. Oki, 2019: Event-to-event intensification of the hydrologic cycle from 1.5°C to a 2°C warmer world, *Scientific Reports*, **9**, 3483.
- Yokohata, T., and co-authors including Taikan Oki, 2019: Visualizing the interconnections among climate risks. *Earth's Future*, **7**, 85-100.

- Nakamura, S., and T. Oki, 2018: Paradigm Shifts on Flood Risk Management in Japan: Detecting Triggers of Design Flood Revisions in the Modern Era, *Water Resour. Res.*, **54**, 5504-5515.
- Zaherpour, J., et al., including T. Oki, 2018: Worldwide evaluation of mean and extreme runoff from six global-scale hydrological models that account for human impacts, *Environ. Res. Lett.* **13**, 065015.
- Boulay, A.-M. et al., including T. Oki, 2018: The WULCA consensus characterization model for water scarcity footprints: assessing impacts of water consumption based on available water remaining (AWARE), *Int J Life Cycle Assess*, **23**(2), 368-378.
- Park, K.J., K. Yoshimura, H. Kim, and T. Oki, 2017: Chronological development of terrestrial mean precipitation, *Bull. Amer. Meteorol. Soc.*, **98**(11), 2411-2427.
- Mateo, C.M.R., et al., including T. Oki, 2017: Impacts of spatial resolution and representation of flow connectivity on large-scale simulation of floods, *Hydrol. Earth Syst. Sci.*, **21**, 5143-5163.
- Wada, Y., and co-authors including Taikan Oki, 2017: Human-water interface in hydrological modeling: Current status and future directions, *Hydrol. Earth Syst. Sci.*, **21**, 4169-4193.
- Veldkamp, T.I.E. , and co-authors including T. Oki, 2017: Water scarcity hotspots travel downstream due to human interventions in the 20th and 21st century, *Nature Communications*, **8**, 15697.
- Oki, T., S. Yano, and N. Hanasaki, 2017: Economic aspects of virtual water trade, *Environ. Res. Lett.*, **12**(4), 044002.
- Utsumi, N., H. Kim, S. Kanae, and T. Oki, 2017: Relative contributions of weather systems to mean and extreme global precipitation, *J. Geophys. Res.-Atmospheres*, **122**(1), 152-167.
- Fukuda, S., M. Murakami, K. Noda, and T. Oki, 2016: How achieving the Millennium Development Goals increases subjective well-being in developing nations, *Sustainability*, **8**, 189.
- Utsumi, N., H. Kim, S. Kanae, and T. Oki, 2016: Which weather systems are projected to cause future changes in mean and extreme precipitation in CMIP5 simulations?, *J. Geophys. Res.-Atmospheres*, **121**(18), 10522-10537.
- Schmied, H.M. et al., including T. Oki, 2016: Variations of global and continental water balance components as impacted by climate forcing uncertainty and human water use, *Hydrol. Earth Syst. Sci.*, **20**, 2877-2898.
- Maeda, E.E., H. Kim, L.E.O.C. Aragao, J.S. Famiglietti, and T. Oki, 2015: Disruption of hydroecological equilibrium in southwest Amazon mediated by drought, *Geophys. Res. Lett.*, **42**.
- Döll, P., et al., including T. Oki, 2015: Integrating risks of climate change into water management, *Hydrol. Sci. J.*, **60**(1), 4-13.
- Utsumi, N., H. Kim, S. Seto, S. Kanae, and T. Oki, 2014: Climatological characteristics of fronts in the western North Pacific based on surface weather charts, *J. Geophys. Res.-Atmospheres*, **119**(15), 9400-9418.
- Pokhrel, Y., N. Hanasaki, P. J-F. Yeh, T. J. Yamada, S. Kanae, and T. Oki, 2012: Model estimates of sea-level change due to anthropogenic impacts on terrestrial water storage, *Nature Geosci*, **5**, 389-392.
- Utsumi, N., S. Seto, S. Kanae, E. Maeda, and T. Oki, 2011: Does higher surface air temperature intensify extreme precipitation?, *Geophys. Res. Lett.*, **38**, L16708.
- Yamazaki, D., S. Kanae, H. Kim, and T. Oki, 2011: A physically based description of floodplain inundation dynamics in a global river routing model, *Water Resour. Res.*, **47**(4), W04501.
- Yang, D., W. Shao, P. J. -F. Yeh, H. Yang, S. Kanae, and T. Oki, 2009: Impact of vegetation coverage on regional water balance in the nonhumid regions of China, *Water Resour. Res.*, **45**, W00A14.
- Oki, T., and S. Kanae, Global Hydrological Cycles and World Water Resources, 2006: *Science*, Vol. **313**. No. 5790, 1068-1072.
- Koster, R.D., and co-authors including T. Oki, 2004: Regions of strong coupling between soil moisture and precipitation, *Science*, **305**(5687), 1138-1140.
- Oki, T., and Y. C. Sud, 1998: Design of Total Runoff Integrating Pathways (TRIP) A global river channel network, *Earth Interactions*, **2**.
- Oki, T., K. Musiak, H. Matsuyama, and K. Masuda, 1995: Global atmospheric water balance and runoff from large river basins, *Hydrological Processes*, **9**, pp.655-678.