List of BLUEGEM scientific production
Since June 2021 to July 2024

Session "Groundwater and Climate Change" at IAH/UNESCO international conference « Groundwater, key to the sustainable development goals », 18-20 May 2022 in Paris. https://www.gw-sdg2022.fr/index.php/en

Advances in Transdisciplinary Research on Land-Water-Carbon-Society Interactions Using Modeling and Field-Based Approaches Yadu Pokhrel, Timothy S. White, Hwa-Lung Yu, Jr-Chuan Huang and Amar Deep Tiwari. AGU 2023, Sessions GC52B & & GC53A

1. Papers in scientific journals (published, submitted, or in prep)

2021 - 4

Gleeson T, Wagener T, Döll P, Zipper SC, West C, Wada Y, Taylor R, Scanlon B, Rosolem R, Rahman S, Oshinlaja N, Lo MH, Kim H, Hill M, Hartmann A, Fogg G, Famiglietti JS, Ducharne A, de Graaf I, Cuthbert M, Condon L, Bresciani E, Bierkens MFP (2021). The quest to improve the evaluation of groundwater representation in continental to global scale models. GMD, 14, 7545–7571. GMD link

Kim, H. and D. Tokuda (2021). River Discharge and Runoff [in "State of the Climate in 2020", R. J. H. Dunn, F. Aldred, N. Gobron, J. B Miller, and K. M. Willett, Eds., doi.org/10.1175/BAMS-D-21-0098.1

Pokhrel, Y., F. Felfelani, Y. Satoh, J. Boulange, P. Burek, A. Gädeke, D. Gerten, S. N. Gosling, M. Grillakis, L. Gudmundsson, N. Hanasaki, H. Kim, A. Koutroulis, J. Liu, L. Papadimitriou, J. Schewe, H. Müller Schmied, T. Stacke, C. E. Telteu, W. Thiery, T. Veldkamp, F. Zhao, and Y. Wada, 2021. Global terrestrial water storage and drought severity under climate change. Nature Climate Change, 11(3), pp.226-233. https://doi.org/10.1038/s41558-020-00972-w

Wu, R., Lo, M., & Scanlon, B. R. (2021). The Annual Cycle of Terrestrial Water Storage Anomalies in CMIP6 Models Evaluated against GRACE Data, Journal of Climate, 34(20), 8205-8217. Retrieved Jun 15, 2022, from https://journals.ametsoc.org/view/journals/clim/34/20/JCLI-D-21-0021.1.xml

2022 - 5

Al-Yaari, A., Ducharne, A., Thiery, W., Cheruy, F., & Lawrence, D. (2022). The role of irrigation expansion on historical climate change: Insights from CMIP6. *Earth's Future*, 10, e2022EF002859. https://doi.org/10.1029/2022EF002859

Arboleda Obando, P. F., Ducharne, A., Cheruy, F., Jost, A., Ghattas, J., Colin, J., & Nous, C. (2022). Influence of hillslope flow on hydroclimatic evolution under climate change. *Earth's Future*, 10, e2021EF002613. https://doi.org/10.1029/2021EF002613

Lan CW, YT Hwang, RY Chien, A Ducharne, MH Lo (2022) Responses of Global Atmospheric Energy Transport to Idealized Groundwater Conditions in a General Circulation Model, Journal of Climate, 35 (21), 3297-3309, https://doi.org/10.1175/JCLI-D-20-0753.1

Pokhrel, Y., & Tiwari, A. D. (2022). Re-operating dams in the Mekong. *Nature Sustainability*, 5, 1005-1006.

Kim, H. and D. Tokuda (2022) [Global Climate] River Discharge and Runoff [in "State of the Climate in 2021"], Bull. Amer. Meteor., 103, 8, S61-S63, doi:10.1175/BAMS-D-22-0092.1

2023 - 3

Kabir. T, Pokhrel, Y., Felfelani, F., (2023). "Climatic and Anthropogenic Controls on Groundwater Dynamics of Mekong River Basin". *Journal of Hydrology* [DOI: 10.1016/j.jhydrol.2023.129761]. With related datasets on https://doi.org/10.5281/zenodo.7968319 and https://doi.org/10.6084/m9.figshare.23154878.

Tiwari, A.D., Pokhrel, Y., Kramer, D., Akhter, T., Tang, Q., Liu, J., Qi, J., Loc, H.H. and Lakshmi, V. (2023). A synthesis of hydroclimatic, ecological, and socioeconomic data for transdisciplinary research in the Mekong. *Scientific Data*, 10(1), 283.

McDermid S, Nocco M, Lawston-Parker P, Keune J, Pokhrel Y, Jain M, Jägermeyr J, Brocca L, Massari C, Jones A D, Vahmani P, Thiery W, Yao Y, Bell A, Chen L, Dorigo W, Hanasaki N, Jasechko S, Lo M H, Mahmood R, Mishra V, Mueller N D, Niyogi D, Rabin S S, Sloat L, Wada Y, Zappa L, Chen F, Cook B I, Kim H, Lombardozzi D, Polcher J, Ryu D, Santanello J, Satoh Y, Seneviratne S, Singh D and Yokohata T 2023 Irrigation in the Earth system Nat. Rev. Earth Environ. 4 435–53. https://doi.org/10.1038/s43017-023-00438-5

2024 - 2

Arboleda-Obando P.F., Ducharne A., Yin Z. , and Ciais P (2024). Validation of a new global irrigation scheme in the land surface model ORCHIDEE v2.2. GMD, 17, 2141–2164, https://doi.org/10.5194/gmd-17-2141-2024.

Stelly, J., Pokhrel, Y., Tiwari, A. D., Dang, H., Lo, M., Yamazaki, D., & Lee, T. (2024). Reconstruction of long-term hydrologic change and typhoon-induced flood events over the entire island of Taiwan. Journal of Hydrology: Regional Studies, 53, 101806. https://doi.org/10.1016/j.ejrh.2024.101806.

Submitted - 3

Tiwari, A. D., Pokhrel, Y., Boulange, J., Burek, P., Guillaumot, L., Gosling, S. N., Grillakis, M., Hanasaki, N., Koutroulis, A., Otta, K., Müller Schmied, H., Satoh, Y., Scanlon, B., Sebastian, O., Stacke, T., Yokohata, T. (2024). Similarities and divergent patterns in hydrologic fluxes and storages simulated by global water models, Nature Water (Under review: NATWATER-24-0744).

Huang P, Ducharne A, Rinchiuso L, Polcher J, Baratgin L, Bastrikov V, Sauquet E (2024). Multi-objective calibration and evaluation of the ORCHIDEE land surface model over France at

high-resolution. Submitted to HESS in February 2024.EGUsphere [preprint], https://doi.org/10.5194/egusphere-2024-445

Julie Reineix and Pierre-Alain Jayet, Multi-scale analysis of water sharing based on bio-economic modeling, submitted

In prep - 7

Salmon, E., Guenet B. Representing the effect of soil moisture on soil organic carbon decomposition and land-atmosphere carbon fluxes.

Wu RJ, MH Lo, Y Pokhrel, A Ducharne, Effects of Irrigation on the Local and Regional Climate with a New Groundwater Scheme Using Coupled Model Simulations.

Tanjila Akhter, Yadu Pokhrel, Farshid Felfelani, Agnès Ducharne, Min-Hui Lo, and Robert Reinecke . Implications of lateral groundwater flow and pumping across varying spatial resolutions in Global Land Surface Modeling.

Tiwari, A. D., Pokhrel, Y. . Improving irrigation and groundwater representations in the Community Land Model (CLM)

Yao, Y., and 19 co-authors including 5 BLUEGEM members (Ducharne, A., Lo, M.H., Arboleda-Obando, P., Pokhrel, Y., Satoh, Y). Impacts of irrigation expansion on moist-heat stress: first results from IRRMIP

Huang, P., Ducharne, A. The impact of rising CO2 on future water resources depends on soil moisture

Arboleda-Obando, P., Ducharne, A., Cheruy, F., Ghattas, J. Joint evolution of irrigation, water cycle and water resources under a strong climate change scenario along 1950-2100

2. International conferences

2021 - 2

Al-Yaari A, Ducharne A, Wim T, Cheruy F, Lawrence D (2021). The role of irrigation expansion on historical climate change during the last 115 years: insights from CMIP6. OZCAR-TERENO First International Conference, October 5-7 2021, Strasbourg, France. Oral.

Arboleda P, Ducharne A, Yin Z, Ciais P (2021). Exploring the effects of an improved irrigation scheme in ORCHIDEE land surface model on Europe's land surface hydrology and energy budget. OZCAR-TERENO First International Conference, October 5-7 2021, Strasbourg, France. Poster.

2022 -12

Akhter, T., & Pokhrel, Y. (2022, December). Scale-dependency of Lateral Groundwater Flow in Land Surface Models. In AGU Fall Meeting Abstracts (Vol. 2022, pp. H22Q-1075). [poster presentation]

Akhter, T., Tiwari, A.D., and Pokhrel, Y. (2022, September). Synthesis of multi-source dataset for transdisciplinary research in the Lower Mekong River basin. In Vietnam Int. Water Conf. 2022, 19-21 September online everywhere and 9-11 November onsite @SECC, Hochiminh, Vietnam. Oral presentation in OS11: Groundwater, Soil and Surface Water Exchange (virtual; oral).

Arboleda Obando PF, Ducharne A, Cheruy F, Jost A, Ghattas J, Colin, J (2022). Influence of groundwater on hydroclimatic evolution under climate change. International Conference "Groundwater, key to the sustainable development goals", 18-20 May, 2022, Paris (France)

Arboleda P, Ducharne A, Yin Z, Ciais P (2022). Tuning an improved irrigation scheme inside ORCHIDEE land surface model and assessing its sensitivity over land surface hydrology and energy budget. EGU General Assembly 2022, 3-8 April, Vienna (Austria). HS2.5.1.

Ducharne A (2022). Feedback of terrestrial hydrology on climate change. Webinar Series on Global Sustainability, Future Earth Taipei, 28 September 2022. PDF (invited)

Guenet B, Le Noé J, Bruni E, Abiven S, Barré P, Cécillon L (2022). Do we necessarily need to increase model complexity to forecast soil carbon dynamics? EGU General Assembly 2022, 3-8 April, Vienna (Austria).

Kabir. T, Pokhrel, Y., Felfelani, F., (2022). “Climatic and Anthropogenic Controls on Groundwater Dynamics of Mekong River Basin”. AGU Fall Meeting 2022. Poster Presentation.

Lee Ting-Hui and Min-Hui Lo (2022), The role of maritime continent land use changes in moderating the evapotranspiration’s variability, AGU 2022 Fall meeting (online).

Lo Min-Hui (2022). Anthropogenic Climate Changes Impact on the Terrestrial Water Cycle and Water Resources, Future Earth Taipei, 28 September 2022 (invited)

Rinchiuso L, Ducharne A, Polcher J, Peylin P, Arboleda P, Schrapffer A, Sauquet E (2022). Improving land surface hydrological simulations over France using a high resolution river network and a description of anthropocentric pressures. EGU General Assembly 2022, 3-8 April, Vienna (Austria). HS2.5.2.

Ting-Hui Lee and Min-Hui Lo (2022), The role of maritime continent land use changes in moderating the evapotranspiration’s variability, AGU 2022 Fall meeting (online).

Tiwari, A. D., Pokhrel, Y., Kramer, D., & Akhter, T. (2022). A synthesis of climate, water, food, energy, and ecosystem datasets to advance transdisciplinary research and collaboration in the Mekong River basin. In AGU Fall Meeting Abstracts (Vol. 2022, pp. H45Q-1598) [poster presentation].

2023 - 11

Arboleda-Obando PF, Ducharne A, Vargas L, Yin Z, Ciais P (2023). Validation of an irrigation scheme inside ORCHIDEE land surface model at global scale. EGU General Assembly 2023, 23-18 April, Vienna (Austria). HS 2.2.1.

Arboleda-Obando PF, Ducharne A, Cheruy F, Tiengou P. Exploring the Joint Evolution of Irrigation Activities, Hydrology and Climate under Future Climate Change in the IPSL Climate Model. AGU Fall meeting 2023, 11-15 December 2023, San Francisco, CA & Online. Session GC010.

Ducharne A, Al-Yaari A, Mizuochi H, Arboleda-Obando PF (2023). Insights on irrigation uncertainties from offline and online modeling. AGCI Workshop on Irrigation in the Earth System, June 5-9, 2023, Aspen (USA). https://www.agci.org/workshops/irrigation

Kim H (2023). Tools and approaches for studying irrigation in the Earth system from GEWEX. AGCI Workshop on Irrigation in the Earth System, June 5-9, 2023, Aspen (USA). https://www.agci.org/workshops/irrigation

Lo MH (2023). Interactions between irrigation and precipitation: local vs remote. AGCI Workshop on Irrigation in the Earth System, June 5-9, 2023, Aspen (USA). https://www.agci.org/workshops/irrigation

Pokhrel Y (2023). Coupling irrigation and groundwater in land surface models. AGCI Workshop on Irrigation in the Earth System, June 5-9, 2023, Aspen (USA). https://www.agci.org/workshops/irrigation

Reineix J, Jayet PA (2023). Multi-scale Analysis of Water Sharing Based on Bio-economic Modeling. EAAE 2023, August 29th - September 1st 2023, Rennes (France). ORAL presentation (contributed paper).

Yao Y, ..., Thiery W (2023). Irrigation-expansion-induced impacts model-intercomparison project (IRRMIP). EGU General Assembly 2023, 23-18 April, Vienna (Austria).

Wu Ren-Jie, Min-Hui Lo, Yadu Pokhrel, Agnès Ducharne (2023) Effects of Irrigation on the Local and Regional Climate with a New Groundwater Scheme Using Couple Model Simulations, 2023 July 31-Aug 4 Singapore, AOGS meeting.

Tiwari, A. D., & Pokhrel, Y. (2023). Improving irrigation and groundwater representations in the Community Land Model. In AGU Fall Meeting Abstracts (Vol. 2023, pp. GC53G-0883) [poster presentation].

Pokhrel, Y., White, T. S., Yu, H. L., & Tiwari, A. D. (2023). Advances in Transdisciplinary Research on Land-Water-Carbon-Society Interactions Using Modeling and Field-Based Approaches, Oral sessions. In AGU23. AGU.

2024 - 5

Huang P, Ducharne A (2024). The impact of increasing atmosphere CO2 concentration on hydrological trends in France over the 21st century. EGU General Assembly 2024, 14–19 April, Vienna (Austria). HS1.1.2

Arboleda-Obando P, Ducharne A, Tiengou P, Cheruy F (2024). Effect of irrigation on joint evolution of water resources and hydroclimate variables under climate change. EGU General Assembly 2024, 14–19 April, Vienna (Austria). HS1.1.2

Salmon E, Guenet B, Ducharne A (2024). Modelling soil moisture control on soil organic carbon decomposition and land-atmosphere carbon fluxes in a global scale ecosystem model. Soil Carbon in the Ecological Transition, 24-26 January 2024, Rueil-Malmaison, France.

Tiengou P, Ducharne A, Cheruy F, Meurdesoif Y, and Arboleda-Obando P (2024). Regional impacts of simulated irrigation in the IPSL climate model. EGU General Assembly 2024, 14–19 April, Vienna (Austria). HS7.9.

3. National conferences

Ducharne A, Arboleda P, Rinchiuso P, Vargas L, Baro A, Al Yaari A, Cheruy F, Sauquet E (2022). Influence historique de l'irrigation sur l'hydrologie du bassin de la Seine. Colloque PIREN-Seine 2022, 6-7 octobre 2022, Paris, France. ORAL.

Pokhrel, Yadu (2022), A Transdisciplinary Integration of Climate, Hydrologic, and Social Sciences to Address Food-Energy-Water Issues in a Changing Environment, *International Degree Program in Climate Change and Sustainable Development, National Taiwan University*, Sept. 16, 2022 (Lecture for Interdisciplinary Graduate Students).

Pokhrel, Yadu, Farshid Felfelani, Tamanna Kabir, and Tanjila Akhter (2022), Representing Irrigation and Groundwater Processes in Earth System Models, *10th Summer Meeting of the International Association of Chinese Youth in Water Sciences (CYWater)*, August 28 (Invited; Virtual).

Jezequel A, Ducharne A, Magand C (2023). Les conditions hydroclimatiques de 2022 au regard des réanalyses SAFRAN depuis 1959. Conférence SHF « Sécheresse & Étiages 2022 – Avancées, valorisation et perspectives », 8-9 mars 2022, Paris. POSTER

Pokhrel, Yadu (2023), Opportunities for and Challenges in Developing Transdisciplinary Research Projects, *7th Annual Symposium on Future Earth Taipei*, Academia Sinica, Taiwan (Jan 7, 2023).

Reineix J, Jayet PA, Ducharne A, Rinchiuso L, Arboleda P (2022). Couplage simple de modèles agro-économique et de surface en vue d'une analyse de l'adaptation de l'irrigation au changement climatique en France. JMSC 2022, 6-7 octobre 2022, Grenoble, France. POSTER.

Ducharne A, Arboleda-Obando P, Huang P, Chéruy F, Ghattas J, Tiengou P (2024) Influence de l'irrigation dans les modèles de l'IPSL de 1950 à 2100. Ateliers de Modélisation de l'Atmosphère 2024, 15-17 janvier 2024, Toulouse. ORAL.

Ducharne A (2024). Le secteur de l'eau face au changement climatique en France. Colloque "L'urgence climatique : un tournant décisif", Académie des sciences, 8-9 mars 2024, Paris.

Ducharne A, Huang P, Arboleda P, Bastrikov V. Irrigation et effet physiologique du CO2 : quelle influence sur les impacts hydrologiques du changement climatique simulés en France ? 5èmes Journées de Modélisation des Surfaces Continentales, 19-20 juin 2024, Strasbourg. ORAL.

Tiengou P, Cheruy F, Ducharne A. Etude régionale des impacts simulés de l'irrigation sur les interactions surface-atmosphère. 5èmes Journées de Modélisation des Surfaces Continentales, 19-20 juin 2024, Strasbourg. ORAL.

Huang P, Ducharne A, Rinchiuso L, Polcher J, Baratgin L, Bastrikov V, Sauquet. Calibration et évaluation multi-objectifs du modèle ORCHIDEE sur la France à haute résolution. 5èmes Journées de Modélisation des Surfaces Continentales, 19-20 juin 2024, Strasbourg. POSTER.

4. PhD theses

Arbolada-Obando, P.F. (2023). Feedback from groundwater and irrigation on past and future climate simulated by the IPSL climate model, Sorbonne Université, defense on March 22, 2023

Kabir, Tamanna (2023), Improving Regional Hydrological Simulations by Accounting for Climate Forcing Uncertainty and Human Impacts, PhD Dissertation, Michigan State University, April 20, 2023.

In progress

Julie Reineix (2021-): Influence croisée du climat et des politiques environnementales sur le développement de l'irrigation en France : vers une modélisation à l'échelle régionale par couplages des contraintes agro-économiques, biophysiques et hydrogéologiques (Université Paris-Saclay, INRAE).

Tanjila Akhter (2021-) : Irrigation and Irrigation in Earth System Models (MSU)

Pierre Tiengou (2023-): Modeling and study of land surface-atmosphere coupling in irrigated areas using the IPSL Climate Model (Sorbonne Université, IPSL)

5. Post-docs

Amar Deep Tiwari (MSU, Spring 2022-): Climate-hydrology modeling with irrigation and groundwater.

Pedro Arboleda (IPSL): Impact de l'irrigation sur les simulatiosn du climat passé et futur avec le modèle climatique IPSL-CM6 (18 months, 2023-2024, ANR BLUEGEM)

Peng Huang (IPSL): Construction et analyse des projections hydrologiques Explore2 avec le modèle ORCHIDEE (21 months, 2022-2024, financement Explore2, EUR IPSL et ANR BLUEGEM)

Koichi Toyoshima (U Tokyo)

Elodie Salmon (IPSL, LG-ENS, 6 months)

6. Master students

Matthieu Belin (2024, IPSL/LMD): Des sécheresses météorologiques aux sécheresses hydrologiques et agronomiques en France, Stage du M2 WAPE, Institut Polytechnique de Paris, Année 2023-2024 (encadrement principal par Aglaé Jezequel, LMD)

Nathan Humbert (2023, IPSL/LMD):

Luiza Vargas (2022,IPSL/METIS): Irrigation in the ORCHIDEE model: Evaluating inputs and results in metropolitan France, Stage du M2 Géosciences STEPE, ENS, Année 2021-2022 (co-encadrement avec Pedro Arboleda). PDF

Charlotte Jeuilly, M1, 2024 (METIS-IPSL)