Agnès DUCHARNE
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Academic formation

2011 : Habilitation à Diriger des Recherches, Université Pierre et Marie Curie (UPMC)
1997 : UPMC Doctorate (PhD) in Atmospheric Sciences, summa cum laude
"The water cycle : modelling of continental hydrology and its interactions with the climate system"
1990-1994 : Ecole Normale Supérieure de Paris (top ranking "Grande Ecole" in France), with a major in Biology and Ecology (M.Sc. in Ecology and Plant Physiology; B.Sc. in Biology and Biochemistry)

Positions and professional experience

2013- : Senior research scientist at CNRS, Laboratory METIS (new name of laboratory Sisyphe)
2000-2013 : Research scientist at CNRS, Laboratory Sisyphe, Paris
1999-2000 : Visiting research scientist, Laboratory Sisyphe, Paris
1997-1999 : Visiting research scientist, NASA/GSFC, Hydrological Sciences Branch (Maryland, USA)
1994-1997 : Teaching assistant, UPMC, Paris
1990-1994 **:** Fellow student at École Normale Supérieure, Paris

Awards

2021: Franco-Taiwanese Scientific Grand Prize awarded by the French Académie des sciences and the Ministry of Science and Technology of Taiwan
2014: Member of the French Academy of Agriculture
2010, 2014, 2020: Premium for Scientific Excellence, CNRS
1999: Peer Award for Outstanding Post-Doc, Laboratory for Hydrospheric Processes, NASA/GSFC
1994: Best Poster Award, NATO Advanced Study Institute
1990-1994: Fellowship of the Ecole Normale Supérieure, Paris

Research interests

My work focuses on the water cycle and its relationships with climate, terrestrial ecology, and human impacts. My specialty is the modeling of land surface hydrology (watersheds, rivers, aquifers, and wetlands), mainly with the ORCHIDEE model of IPSL (Institut Pierre-Simon Laplace). Since 2010, I coordinate the developments on soil, hillslope and riverine hydrology in this model, with a lot of efforts to improve the representation of wetlands, groundwater and irrigation. Another focus of my activity concerns soil-atmosphere couplings and their modulations by soil moisture and groundwater, with important implications for Earth system modeling and climate projections. A third axis of my research addresses the impacts of global and regional changes (land use and climate change) on water resources (in terms of quantity and quality), owing to the various models I have developed and validated. A common thread to this work is what I call hydrogeography, i.e. the geographical analysis of the factors controlling hydrology, in order to improve the description of anthropized waterscapes, inform models, or evaluate them.

Scientific production

ISI Web of Knowledge synthesis: h-factor = 45
With 104 referenced articles, average number of ISI citations per article = 73 (without self-citations)
Full list of publications on www.metis.upmc.fr/~ducharne/publis.html
24 invited conferences

Selected peer-reviewed publications (supervised young scientists are underlined):

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. HESS, 28, 4455–4476, https://doi.org/10.5194/hess-28-4455-2024

Arboleda-Obando PF, **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.

Al-Yaari A, **Ducharne A**, Thiery W, Cheruy F, and Lawrence DM (2022). The Role of Irrigation Expansion on historical climate change: insights from CMIP6. Earth's Future, 10, e2022EF002859. https://doi.org/10.1029/2022EF002859

Belemtougri AP, **Ducharne A**, Fowé T, Oudin L, Karambiri H (2021). Understanding key factors controlling the duration of river flow intermittency: Case of Burkina Faso in West Africa. Journal of

Hydrology: Regional studies, 37, 100908. https://doi.org/10.1016/j.ejrh.2021.100908
Wu WY, Lo MH, Wada Y, Famiglietti JS, Reager JT, Yeh PJF, **Ducharne A**, Yang ZL (2020). Divergent effects of climate change on future groundwater availability in key mid-latitude aquifers. Nature Communications, 11, 3710. https://doi.org/10.1038/s41467-020-17581-y
Tootchi A, Jost A, **Ducharne A** (2019). Multi-source global wetland maps combining surface water imagery and groundwater constraints. ESSD, 11, 189-220, doi: 10.5194/essd-11-189-2019.
Sterling S, **Ducharne A**, Polcher J (2013). The impact of global land-cover change on the terrestrial water cycle. Nature Climate Change, 3, 385-390, doi:10.1038/nclimate1690.
Ducharne A, Baubion C, Beaudoin N, Benoit M, Billen G, Brisson N, Garnier J, Kieken H, Lebonvallet S, Ledoux E, Mary B, Mignolet C, Poux X, Sauboua E, Schott C, Théry S, Viennot P (2007). Long term prospective of the Seine river system: Confronting climatic and direct anthropogenic changes. Science of the Total Environment, 375, 292-311, doi:10.1016/j.scitotenv.2006.12.011

Supervision & Teaching

13 young PhD scientists, 1 ongoing; 16 PhD candidates, 2 ongoing; 31 Master students, 1 ongoing
20h/year on land hydrology and climate change (lectures)
10h/year on land hydrology modelling (lectures and practical training)

Recent research projects

Project	***Funding***	***Period***	***Role***
AquaThermie - Répondre aux enjeux socio-économiques et environnementaux liés à la température des eaux souterraines	CPIER	2024-2026	Participant
inteGREEN - Services urbains intégrés à partir de stratégies de végétalisation pour améliorer la résilience des villes	PEPR VDBI	2024-2029	WP leader
TRACCS - Transformer la modélisation du climat pour les services climatiques	PEPR	2023-2030	WP leader
Explore 2 - Elaboration de Projections hYdro-Climatiques en France pour le XXIe siècle	MTES	2021-2024	Task leader
BLUEGEM - Biosphere and Land Use Exchanges with Groundwater and soils in Earth system Models	Belmont Forum	2021-2024	Project PI
I-GEM - Impact of Groundwater in Earth system Models	ANR-MoST	2014-2019	Project PI with MH Lo

Service (main tasks)

- **Laboratory METIS: head, 2025-2029**; deputy-head, 2018-2024.
- Sorbonne Université, board of trustees (Conseil d'Administration), 2023-2025.
- CNES (French Space Agency), scientific council of the spatial programs (CPS), 2024-2028.
- CNES (French Space Agency), evaluation committee TOSCA (Earth observation), land surface group: head, 2014-2018; member, 2009-2014, 2001-2002.
- Project evaluation committee for the national research programme EC2CO: HYBIGE, 2021-2026; CYTRIX, 2006-2010.
- CNAP, evaluation section SCOA "surfaces continentales océan atmosphère", 2020-2023.
- Jury of the French PhD thesis prize Henri Milon in hydrology, 2022-
- Scientific council of research network OZCAR (French contribution to eLTER), 2021-
- Scientific Council of the BRGM (French USGS), 2021-2024.
- Scientific council of the Comité de Bassin Seine-Normandie, 2010-2016.
- Scientific council of the ONEMA (National Office for Aquatic Environment, 2008-2012.
- Steering committee of PIREN-Seine regional research programme, 2000-2006.

Editorial activities and conference organization

- Associate editor of Terrestrial, Atmospheric and Oceanic sciences journal, 2021-2028.
- Conference IAH/UNESCO "Groundwater, key to the Sustainable Development Goals" (May 2022, Paris, scientific committee & convener)
- OZCAR-TERENO international conference, session "Earth system models : water and carbon cycle" (October 2021 & September 2023, scientific committee & convener)
- Journées de Modélisation des Surfaces Continentales, Third edition (Nov 2019, Paris, organizer)
- International workshop IGEM (3-5 October 2016, Paris, organizer)
- Invited editor of HESS special issue "Man and River systems "Man and river systems: long-term interactions between societies and nature in regional scale watersheds", 2007-2008.

Done in Paris, July 2nd, 2025