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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)
 - 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 Sisyphé)
- **2000-2013** : Research scientist at CNRS, Laboratory Sisyphé, Paris
- **1999-2000** : Visiting research scientist, Laboratory Sisyphé, Paris
- **1997-1999** : Visiting research scientist, NASA/GSFC, Hydrological Sciences Branch (Maryland, USA)
- **1994-1997** : Teaching assistant, UPMC
- **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
- 1990-1994 Fellowship of the Ecole Normale Supérieure, Paris

Research interests

My work focuses on the water cycle and its relationship 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 hydrology in this model, and I have devoted a lot of efforts to improve the representation of groundwater. I also work on processes that are tightly linked to hydrology, and contribute to the definition of water quality, namely water temperature, and river and wetland biogeochemistry. 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. The last axis of my research concerns the evaluation of the hydrological impact of global changes (land use changes and climate change) owing to the various models that I have developed and validated.

Publications in peer-reviewed journals

ISI Web of Knowledge synthesis: h-factor = 40

with 99 referenced articles, average number of ISI citations per article = 51 (without self-citations)

Full list of publications on www.metis.upmc.fr/~ducharne/publis.html

Recent selected publications (supervised young scientists are underlined):

- 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>
- Arboleda Obando PF, **Ducharne A**, Cheruy F, Jost A, Ghattas J, Colin J (2022). Influence of hillslope flow on hydroclimatic evolution under climate change. *Earth's Future*, 10, e2021EF002613. <https://doi.org/10.1029/2021EF002613>
- 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>
- Padrón RS, Gudmundsson L, **Ducharne A**, Lawrence DM, Mao J, Peano D, Krinner G, Kim H, Seneviratne SI (2020). Observed changes in dry season water availability attributed to human-induced climate change. *Nature Geoscience*, 13, 477–481. <https://doi.org/10.1038/s41561-020-0594-1>
- 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.

Supervision

- 11 young PhD scientists
- 15 PhD candidates
- 26 Master students

Selected research projects

| Project | Coordinator | Funding | Period |
|--|--------------------------------------|----------------|---------------|
| BLUEGEM - Biosphere and Land Use Exchanges with Groundwater and soils in Earth system Models | A. Ducharne | Belmont Forum | 2021-2024 |
| I-GEM - Impact of Groundwater in Earth system Models | A. Ducharne M.H. Lo | ANR-MoST | 2014-2019 |
| EMBRACE : Earth system Model Bias Reduction and assessing Abrupt Climate change | C. Jones | FP7 | 2011-2015 |
| AMAZALERT : Raising the alert about critical feedbacks between climate and long-term land use change in the Amazon | B. Kruijt | FP7 | 2011-2015 |

Service (main tasks)

- Sorbonne Université, Board of trustees (Conseil d'Administration), 2022-
- Jury of the French PhD thesis prize Henri Milon in hydrology, 2022-
- Project evaluation committee for the national research programme HYBIGE/EC2CO, 2021-
- Scientific Council of the BRGM (French USGS), 2021-
- CNAP, evaluation section SCOA "surfaces continentales océan atmosphère", 2020-
- Deputy-head of laboratory METIS, 2018-
- CNES (French Space Agency), evaluation committee TOSCA (Earth observation) : head of the land surface group, 2014-2018
- Scientific Council of the Comité de Bassin Seine-Normandie, 2010-2016
- Scientific Council of the ONEMA (National Office for Aquatic Environment, 2008-2012
- Project evaluation committee for the national research programme CYTRIX/EC2CO, 2006-2010
- Steering committee of PIREN-Seine regional research programme, 2000-2006

Done in Paris on January 9, 2023.