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Current research activities

Rainfall-runoff modelling of mountain catchments:

- Interpolation and reconstruction of precipitation and temperature fields in mountain regions
- Sub-grid parameterization of snow and ice processes in RR models

Quantitative geomorphology:

- Evaluation of geomorphological descriptors for the regionalization of hydrological parameters in ungaged basins
- Evaluation of geomorphological methods for the subgrid parameterization of ice processes in glacierized catchments (supervising Ph.D. thesis of P.-S.Gsell, 2011–2014)

Development of optimization and inversion methods for hydrological problems:

- Development of multi-objective evolutionary algorithms
- Test of multi-objective optimization procedures in hydrological applications: multi-response (temporal, frequential, etc.), multi-station, multi-variable (discharge, snow, ice, latent heat flux, soil moisture, etc.)

Teaching activities

Undergraduate courses:

- Free-Surface Hydraulics (RQEE Eau 4)
- Introduction to Hydrology (LT301)

Graduate courses (Master *Sciences of the Universe, Environment, Ecology*):

- Introduction to Hydrology and Hydrogeology (MU124, 1st year)
- Groundwater Hydrology for Geotechnics (NU657, 2nd year)
- Quantitative Hydrogeology (NU552, 2nd year)
- Operational Hydrology and Hydrogeology (NU556, 2nd year)

Professional experience

- Research engineer in the hydrology group at Électricité de France R&D, LNHE (National Laboratory in Hydraulics and Environment). Main research topics:
- Feb 2009 – • Rainfall-runoff modelling of mountain catchments
- Dec 2010 • Assessment of climate change impacts on hydrological and thermal regimes
- Modelling of the interactions between natural hydrology and anthropic activities (hydropower generation, nuclear power plants cooling, and irrigation)

Education

- 2008 Ph.D. thesis in Hydrology, University of Paris 6/CEMAGREF. Improvement of lumped rainfall-runoff models by taking into account groundwater–surface water interactions. Analysis based on a large dataset (over 1000 catchments) at various time resolutions (from annual to hourly).
- 2005 M.Sc. in Hydrology and Hydrogeology, University of Paris 6/ENGREF.
- 2003 Engineer degree, Ecole Centrale Paris (major in environmental engineering).

Publications

Le Moine, N., F. Hendrickx, and J. Gailhard (accepted), Rainfall-runoff modelling as a tool for constraining the reanalysis of daily precipitation and temperature fields in mountainous regions, IAHS Publ.

Rothfuss, Y., I. Braud, **N. Le Moine**, P. Biron, J.-L. Durand, M. Vauclin, and T. Bariac (2012), Factors controlling the isotopic partitioning between soil evaporation and plant transpiration: Assessment using a multi-objective calibration of SiSPAT-Isotope under controlled conditions, *J. Hydrol.*, *442*, 75–88, doi:10.1016/j.jhydrol.2012.03.041.

Pushpalatha, R., C. Perrin, **N. Le Moine**, and V. Andréassian (2012), A review of efficiency criteria suitable for evaluating low-flow simulations, *J. Hydrol.*, *420-421*, 171–182, doi:10.1016/j.jhydrol.2011.11.055.

Andréassian, V., J. Lerat, **N. Le Moine**, and C. Perrin (2012), Neighbors: Nature's own hydrological models, *J. Hydrol.*, *414-415*, 49–58, doi:10.1016/j.jhydrol.2011.10.007.

Pushpalatha, R., C. Perrin, **N. Le Moine**, T. Mathevet, and V. Andréassian (2011), A downward structural sensitivity analysis of hydrological models to improve low-flow simulation, *J. Hydrol.*, *411 (1-2)*, 66–76, doi:10.1016/j.jhydrol.2011.09.034.

Bourqui, M., F. Hendrickx, and **N. Le Moine** (2011), Long-term forecasting of flow and water temperature for cooling systems: case study of the Rhone River, France, in *Water Quality: Current Trends and Expected Climate Change Impacts (Proceedings of symposium H04 held during IUGG2011 in Melbourne, Australia, July 2011)*, pp. 135–142, IAHS Publ. 348.

Andréassian, V., C. Perrin, L. Berthet, **N. Le Moine**, J. Lerat, C. Loumagne, L. Oudin, T. Mathevet, M.-H. Ramos, and A. Valéry (2009), HESS Opinions: “Crash tests for a standardized evaluation of hydrological models”, *Hydrology and Earth System Sciences Discussions*, *6(3)*, 3669–3685, doi:10.5194/hessd-6-3669-2009.

Le Moine, N., V. Andréassian, and T. Mathevet (2008), Confronting surface- and groundwater balances on the La Rochefoucauld-Touvre karstic system (Charente, France), *Water Resour. Res.*, *44*, W03403, doi:10.1029/2007WR005984.

Perrin, C., V. Andréassian, C. Rojas Serna, T. Mathevet, and **N. Le Moine** (2008), Discrete parameterization of hydrological models: Evaluating the use of parameter sets libraries over 900 catchments, *Water Resour. Res.*, *44*, W08447, doi:10.1029/2007WR006579.

Oudin, L., V. Andréassian, C. Perrin, C. Michel, and **N. Le Moine** (2008), Spatial proximity, physical similarity, regression and ungaged catchments: a comparison of regionalization approaches based on 913 French catchments, *Water Resour. Res.*, *44*, W03413, doi:10.1029/2007WR006240.

Le Moine, N., V. Andréassian, C. Perrin, and C. Michel (2007), How can rainfall-runoff models handle inter-catchment groundwater flows? Theoretical study based on 1040 French catchments, *Water Resour. Res.*, *43(6)*, W06428, doi:10.1029/2006WR005608.

Le Moine, N., V. Andréassian, C. Perrin, and C. Michel (2007), “Outlier” catchments: what can we learn from them in terms of prediction uncertainty in rainfall-runoff modelling?, in *Quantification and Reduction of Predictive Uncertainty for Sustainable Water Resources Management (Proceedings of Symposium HS2004 at IUGG2007, Perugia, July 2007)*. IAHS Publ. n° 313, pp. 195–203, edited by E. Boegh, H. Kunstmann, T. Wagener, A. Hall, L. Bastidas, S. Franks, H. Gupta, D. Rosbjerg & J. Schaake.