

University of Dundee

A north-south divide in Europe

Wade, Andrew; Skeffington, Richard; Couture, Raoul; Erlandsson, Martin; Groot, Simon; Halliday, Sarah

Published in:
Geophysical Research Abstracts

Publication date:
2016

Licence:
CC BY

Document Version
Publisher's PDF, also known as Version of record

[Link to publication in Discovery Research Portal](#)

Citation for published version (APA):

Wade, A., Skeffington, R., Couture, R., Erlandsson, M., Groot, S., Halliday, S., Harezlak, V., Hejzlar, J., Jackson-Blake, L., Lepistö, A., Papastergiadou, E., Riera, J., Rankinen, K., Trolle, D., Whitehead, P., Dunn, S., & Bucak, T. (2016). A north-south divide in Europe: how projected changes in water quality differ depending on climate and land management. *Geophysical Research Abstracts*, 18, Article EGU2016-10047-2.

General rights

Copyright and moral rights for the publications made accessible in Discovery Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



A north-south divide in Europe: how projected changes in water quality differ depending on climate and land management

Andrew Wade (1), Richard Skeffington (1), Raoul Couture (2), Martin Erlandsson (3), Simon Groot (4), Sarah Halliday (1), Valesca Harezlak (4), Joseph Hejzlar (5), Leah Jackson-Blake (6), Ahti Lepistö (7), Eva Papastergiadou (8), Joan Riera (9), Katri Rankinen (7), Dennis Trolle (10), Paul Whitehead (11), Sarah Dunn (6), and Tuba Bucak (12)

(1) Dept. of Geography and Environmental Science, University of Reading, Reading, United Kingdom, (2) Norwegian Institute for Water Research, Oslo, Norway, (3) Department of Earth Sciences, Uppsala Universitet, Uppsala, Sweden, (4) Deltares, 2600 MH Delft, The Netherlands, (5) Biology Centre of the Academy of Sciences, Institute of Hydrobiology, 370 05 Ceske Budejovice, Czech Republic, (6) The James Hutton Institute, Aberdeen, Scotland, UK, (7) Finnish Environment Institute SYKE, Helsinki, Finland, (8) Department of Biology, University of Patras, GR26500 Patras, Greece, (9) Departament d'Ecologia, Universitat de Barcelona, Barcelona, Spain, (10) Department of Bioscience - Lake Ecology, 8600 Silkeborg, Denmark, (11) School of Geography and the Environment, University of Oxford, Oxford, UK, (12) Limnology Laboratory, Middle East Technical University, Ankara, Turkey

The key results from the application of catchment-scale biophysical models to eight river-systems across Europe to assess the effects of projected environmental change (change in climate, land use, nitrogen deposition and water use) on water quantity and quality will be presented. Together the eight sites represent a sample of key climate and land management types, and those aspects related to the Water Framework Directive were modelled: river flow, river and lake nitrogen and phosphorus concentrations, and lake chlorophyll-a. The baseline period was 1981-2010 and the scenario period, 2031-2060. The robustness and uncertainty of the models was assessed. Long-term trends and seasonal variations in all the major modelled variables were simulated well in the baseline period. Dynamic models however typically produced results with lower variance than the observations. The predicted effects on water flows differed between northern and southern sites. In the north and mid-latitudes, the increased evaporation was balanced to some extent by increased precipitation, leading to relatively small effects on flows, though seasonal effects may still be important. In the south the increased temperatures and lower precipitation act to reduce water flows considerably. In general, the projected effects of climate change on nutrient concentrations were rather small. The effects of credible land use changes on nutrient concentrations were larger. However, there were exceptions and there were considerable differences in the response between sites dependent on the mixture of nutrient sources (agriculture versus wastewater). Modelled ecological changes were not generally proportional to the changes in nutrients.