**Introduction**

This short course is about modelling with PCLake. After the introduction, we will introduce the PCLake model and demonstrate model runs for transient runs and bifucation analysis.

**Prepare for PCLake+ part (see folder PreparationDocuments\_PCLake):**

* Install PCLake+ and R-tools by following the instructions in the document called “Install\_PCLake\_and\_Rtools”.
* Read the following articles as preparation:
  + Janse, J.H., Scheffer, M., Lijklema, L., Van Liere, L., Sloot, J.S. and Mooij, W.M. (2010) Estimating the critical phosphorus loading of shallow lakes with the ecosystem model PCLake: Sensitivity, calibration and uncertainty. Ecological Modelling 221(4), 654-665.
  + Janse, J.H., De Senerpont Domis, L.N., Scheffer, M., Lijklema, L., Van Liere, L., Klinge, M. and Mooij, W.M. (2008) Critical phosphorus loading of different types of shallow lakes and the consequences for management estimated with the ecosystem model PCLake. Limnologica-Ecology and Management of Inland Waters 38(3), 203-219.
  + Ibelings, B.W., Portielje, R., Lammens, E.H.R.R., Noordhuis, R., Van den Berg, M.S., Joosse, W. and Meijer, M.L. (2007) Resilience of alternative stable states during the recovery of shallow lakes from eutrophication: Lake Veluwe as a case study. Ecosystems 10(1), 4-16.

**Aim**

After this course:

* you know how PCLake can be used in lake water quality management;
* you will know how to run PCLake for a case study;
* you know how to use PCLake in a bifurcation run.

**Planning**

15 minutes Introduction on PCLake

45 minutes Run PClake for a case study

15 minutes Break

45 minutes Run PClake in bifurcation