Model Entry form

General Information	
Acronym of the model:	FABM-PCLake
Full name of the model:	FABM-PCLake
Type of model:	☐Hydrodynamic XWhole Ecosystem ☐Subpart of Ecosystem
Supported platforms:	Windows X Mac X Linux X
Programming languages:	
Still maintained:	X Yes, by Aarhus University ☐ No
Most recent version	https://gitlab.com/FABM-PCLake/pclake
Model structure	
X Needs compilation(linux, macosx) X Executables are available(for windows)	
☐ 0D ☐ 1D ☐ 2D (horizontal) ☐ 2D (vertical) ☐ 3D	
☐ Lagrangian X Eulerian Other:	
☐ Mass balance included	
Model description	
Model Objective:	Simulated complicated ecosystem model under multiple water domains(0D, 1D, 2D and 3D)
Specific application: (Please include example(s))	Not available yet, but several manuscript on the way
Background knowledge needed to run model:	Understanding of lake hydrodynamics and ecosystem
Basic procedures: (Describe the procedure step-by-step)	1. Choose a hydrodynamic model to run, e.g GOTM 2. calibrate temperature and light in hydrodyanmic model 3. turned on gotm_fabm=true, and then attach fabm-pclake.yaml 4. sensitivity analysis 5. calibration
FABM-PCLake describes interactions between multiple trophic levels, including piscivorous, zooplanktivorous and benthivorous fish, zooplankton, zoobenthos, three groups of phytoplankton and rooted macrophytes. The model also accounts for oxygen dynamics and nutrient cycling for nitrogen, phosphorus and silicon, both within the pelagic and benthic domains.	

Link to website(s) and/or manual:	https://gitlab.com/FABM-PCLake/pclake
Model characteristics	
Input variables:	*Obligatory*:
	Optional:
Input file format:	ASCII ☐ .netcdf ☐ .csv ☐ .xls ☐ Other, namely: namlist(*.nml) yaml(*.yaml)
Output variables:	Hydrodynamic variables 57 state variables Diagnostic variables
Output file format	ASCII ☐ .netcdf X .csv ☐ .xls ☐ Other, namely:
Biogeochemical model components: (*Which nutrients, phytoplankton, zooplankton, etc., including number of different groups*)	FABM-PCLake describes interactions between multiple trophic levels, including piscivorous, zooplanktivorous and benthivorous fish, zooplankton, zoobenthos, three groups of phytoplankton and rooted macrophytes. The model also accounts for oxygen dynamics and nutrient cycling for nitrogen, phosphorus and silicon, both within the pelagic and benthic domains.
Model structure/mathematical framework (e.g., ODE, PDE, empirical model,...)	ODE
Temporal resolution: (*minimal and maximal)*	ranging from 60s--day)
Minimal spatial resolution:	depending on the chosen hydrodyanmic model
Variables needing calibration:	Decide after sensitivity analysis
Has successfully been used in: (*e.g. Climate change scenarios, lake management support, etc. Please provide a reference*)	
X Climate Change Scenario	
XShallow Lake/Reservoir	

X Deep Lake/Reservoir	
X Oligotrophic Water	
☐ Mesotrophic Water	
X Eutrophic Water	
☐ Ocean	
X Management Support	
☐ Theoretical testing of hydrodynamic and biogeochemical parameter settings	
Countries in which the model has been applied	Denmark, China Has been successfully used, but publications are not made
Which Institutes have applied the model	Aarhus University, Hohai University Sino-Danish University Institute of Hydrobiology,the Chinese Academy of Sciences Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences (NIGLAS)

Has coding for:	
☐ Ice dynamics X Sediment heat flux X Sediment dynamics ☐ ... ☐ Internal waves ☐ ...	

Accessibility		
X Open-Source ☐ Open-to-Use ☐ Licensed		
☐ Prompt-based ☐ GUI		
X Test cases available		

Available tools for pre- and post-processing:	
Support: (*Community forum, mailing list, "help"-manual, contact, etc.*)	https://gitlab.com/FABM-PCLake/pclake
Can be coupled to the following models:	To group of hydrodyanmic models ranging from 0D to 3D and the bigeochemical models under FABM Full list can be view on fabm.net
How can someone get access to this model: (*Please provide a URL or contact person*)	https://gitlab.com/FABM-PCLake/pclake

Miscellaneous
Comments (things not covered by the form): *There's a graphic user interface of GOTM-FABM-PCLake available, called Water Ecosystem Tool(WET, will be covered in another model entry form), this is a 1D version of this model.*
Useful tricks and hints for other users (on handling input files, running the model, numerics,...):

Links (*Please add links to the model's developer's website and the model's resources, like forums, manuals, support, contact,...*):

https://gitlab.com/FABM-PCLake/pclake

Reference list (Please add several references in which the model has been applied):

Hu, F., Bolding, K., Bruggeman, J., Jeppesen, E., Flindt, M. R., van Gerven, L., Janse, J. H., Janssen, A. B. G., Kuiper, J. J., Mooij, W. M., and Trolle, D.: FABM-PCLake – linking aquatic ecology with hydrodynamics, Geosci. Model Dev., 9, 2271-2278, https://doi.org/10.5194/gmd-9-2271-2016, 2016.

Nielsen, A., Bolding, K., Hu, F. and Trolle, D. 2017. An open source QGIS-based workflow for model application and experimentation with aquatic ecosystems. Environmental Modelling and Software 95: 358-364.

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