

A Lattice-Boltzmann model for simulating bedform-induced hyporheic exchange Supplementary material

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Within this Supplementary Material, the code used within the main article is described, and instructions as how to run it are provided. The code is based on OpenLB version 1.2r0 (<https://www.openlb.net/download/>).

Files provided

- **olb-1.2r0.tgz** Source code of OpenLB 1.2r0, as a tar archive.
- **debris.tar.gz** Source, as a tar archive (description below).

Description of the code

- **debris.cpp** Source code of the LB application, written in C++.
- **makefile** Makefile for **debris.cpp**.
- **module.mk** Auxiliary file to **makefile**.
- **definitions.mk** Auxiliary file to **makefile**.
- **athena-acoustic5dunes.sh**, **athena-test10.sh** Launching scripts for SLURM job scheduler. Defines the parametrization of the run as a set of bash environmental variables in **main()**. Then it calls **Oresources/run.sh**.

- 28 • **cirrus-acoustic5dunes.sh** Same as above, with the OpenPBS job scheduler.
- 29 • **Oresources/run.sh** Running script. Creates an xml file as an input to the LB
- 30 application from the environment variables defined in the launching script and us-
- 31 ing **Oresources/input.xml**; runs the LB application; and performs post-processing
- 32 by launching **plots.py**.
- 33 • **Oresources/processOnTheSpot.sh** Launcher for **plots.py** alternative to **Oresources/run.sh**.
- 34 • **Oresources/input.xml** Template file read by **Oresources/run.sh** to create LB
- 35 application's input xml file.
- 36 • **plots.py** Post-processing script, written in Python 3.

37 Usage

- 38 1. Prerequisites: **gcc**, **openmpi**
- 39 2. Untar **olb-1.2r0.tgz**. The folder **olb-1.2r0** is created
- 40 3. Configure **/olb-1.2r0/config.mk** according to hardware settings
- 41 4. Execute the commands **cd /olb-1.2r0; make**
- 42 5. Create the folder **/olb-1.2r0/apps/name**
- 43 6. Untar **debris.tar.gz** on **/olb-1.2r0/apps/name**
- 44 7. Run the commands **cd /olb-1.2r0/apps/name/debris; make** which creates the
- 45 executable **/olb-1.2r0/apps/name/debris/debris**
- 46 8. Write a custom launching script based on the examples provided, desired settings,
- 47 job scheduler and hardware
- 48 9. Launch the script through the available job scheduler