UFZ HELMHOLTZ
Centre for Environmental Research

M. Kaluza, L. Samaniego, S. Thober, R. Schweppe, R. Kumar, O. Rakovec

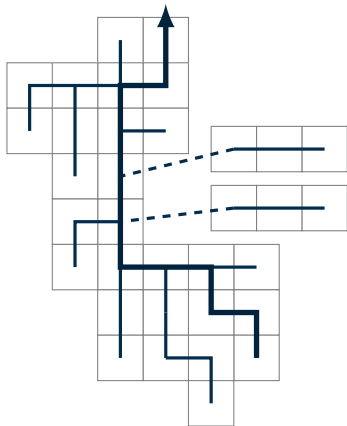# Massive Parallelization of the Global Hydrological Model mHM

May 2020

Universität Potsdam

ESM
Advanced
Earth System Modell
Capacity

JÜLICH
FORSCHUNGSZENTRUM

Parallelization of a river network (tree data structure)

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- run sub-domains in parallel

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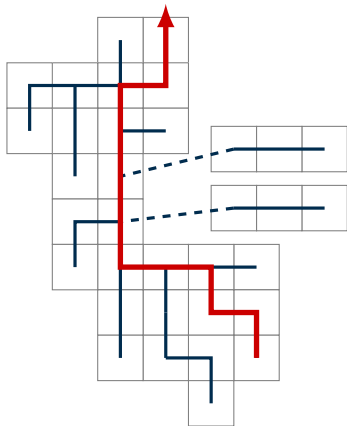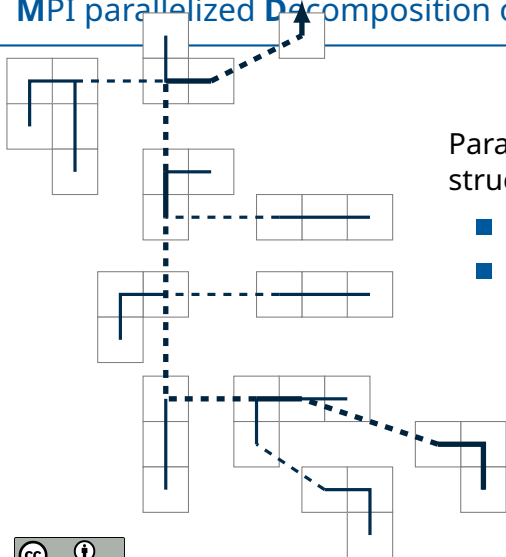- Bottleneck: the longest subriver (*tree depth*)

Parallelizing river networks with MDF:
MPI parallelized **D**ecomposition of **F**orests

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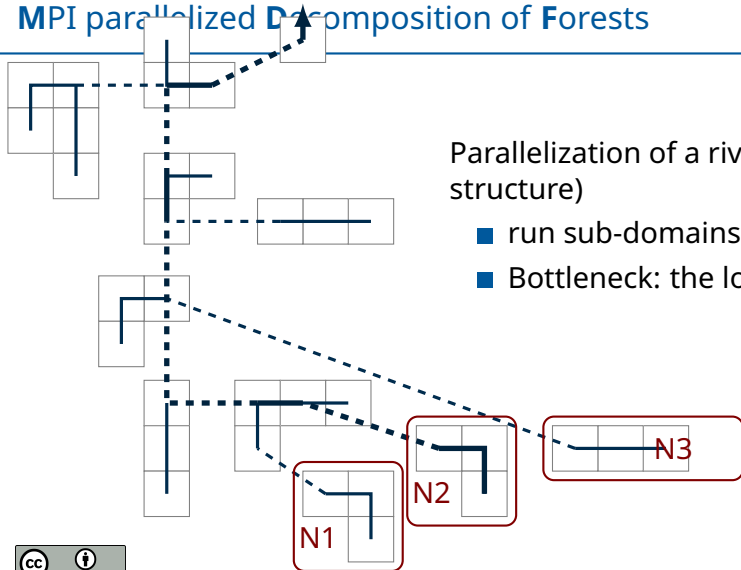- Bottleneck: the longest subriver (*tree depth*)

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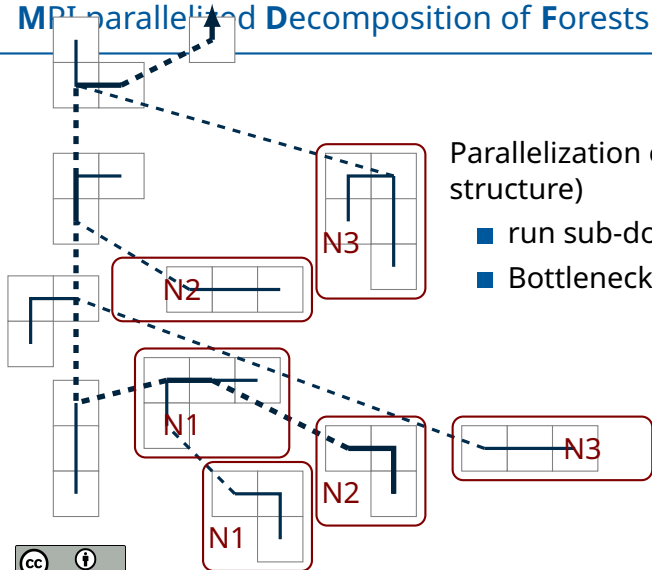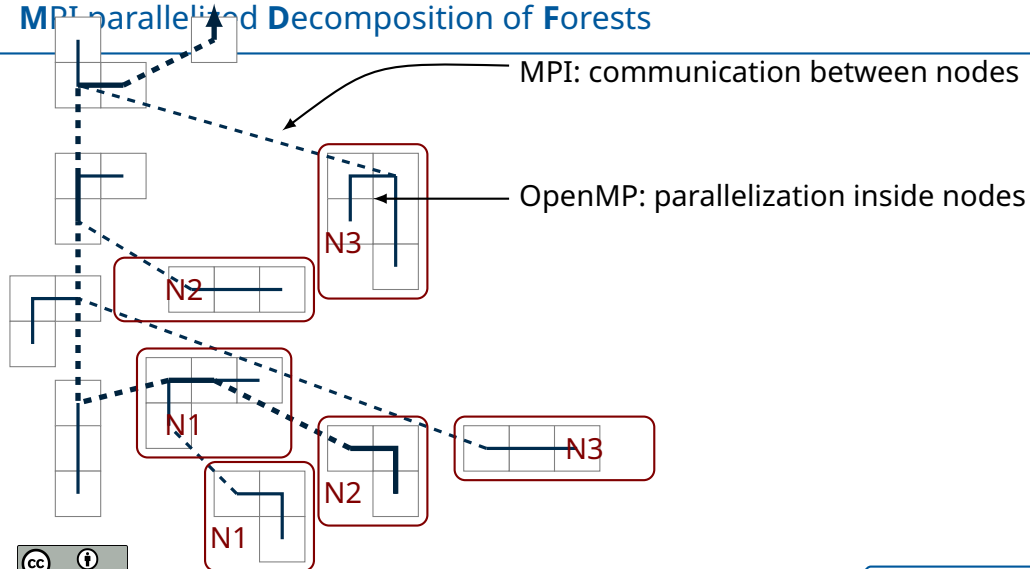- Bottleneck: the longest subriver (*tree depth*)

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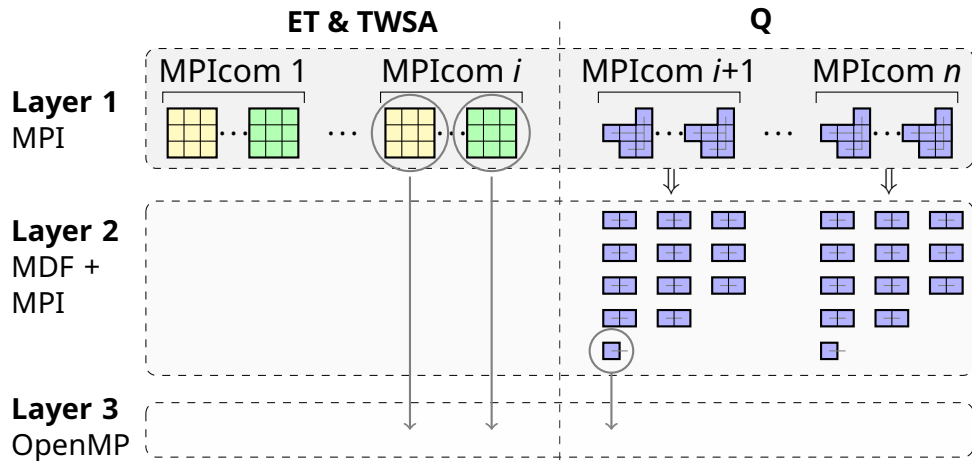## **M**PI parallelized **D**ecomposition of **F**orests

MPI: communication between nodes

OpenMP: parallelization inside nodes

N3

N2

N1

N3

N2

N1

Parallelizing global setups
parallelization scheme

Parallelizing river networks
example: Danube