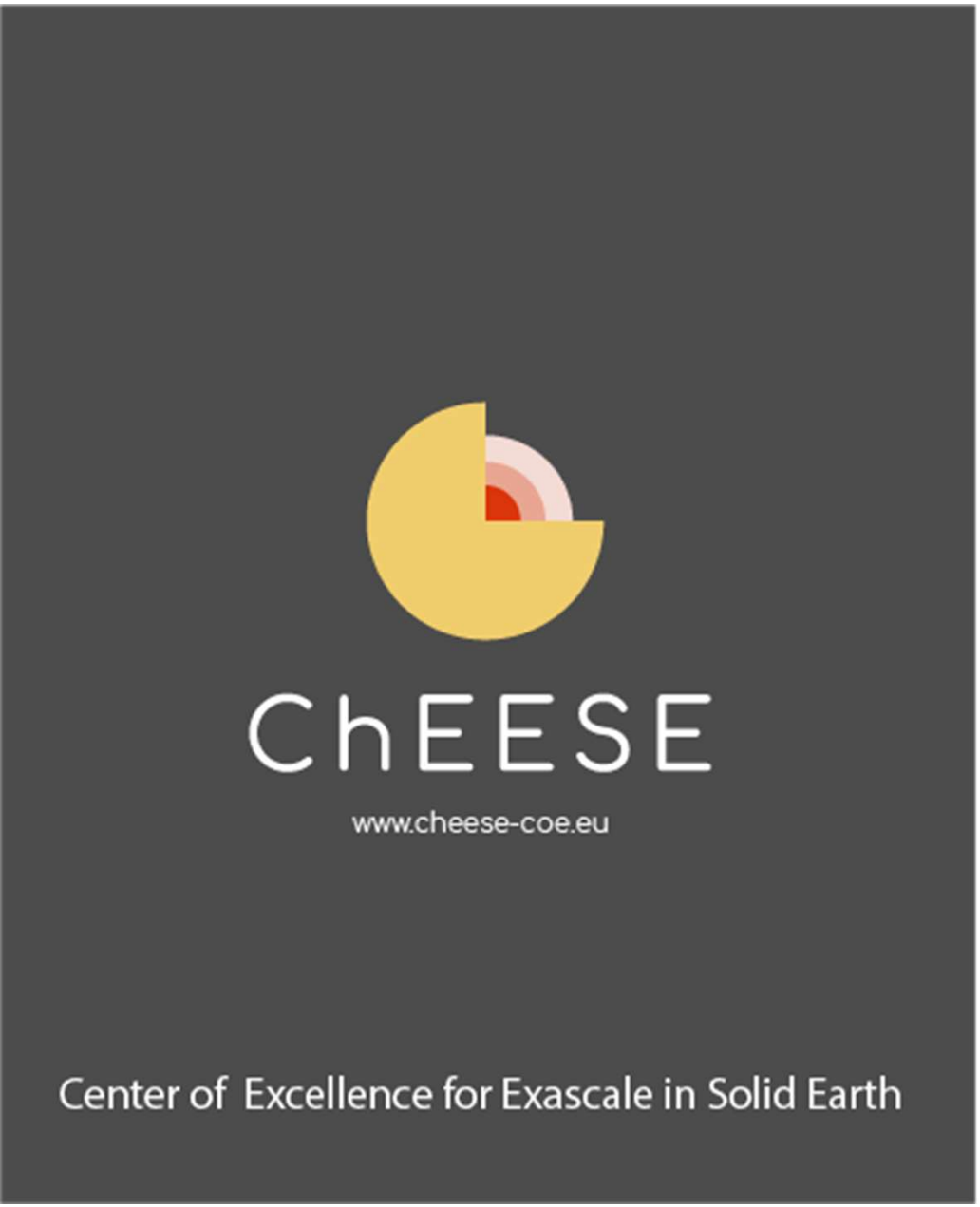


Experience from the ChEESE CoE

Finn Løvholt
NGI

Online RCN seminar on EuroHPC call for CoEs

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 823844

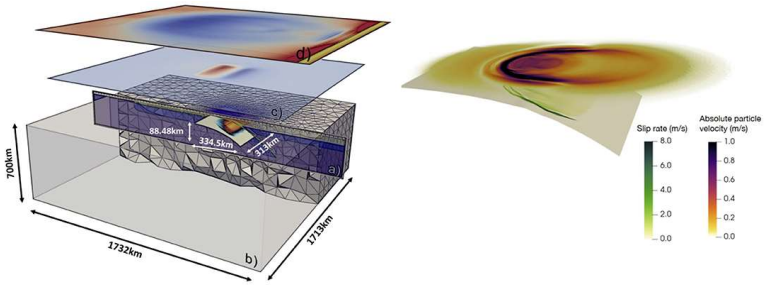
The ChEESE-CoE project

- Funded by H2020 – Pillar 1 – Excellent Science
- Coordinated by Barcelona Supercomputing Center (BSC)
- 13 European partners
  - 3 Supercomputing Centres (BSC, CINECA, HLRS)
  - 10 Research Institutes / Universities
- Organised in a matrix-like fashion through 6 WPs and 12 Pilot Demonstrators (Applications)
- Supercomputing resources through PRACE projects or national resources

ChEESE focus

- Targets HPC in the Solid Earth society (e.g. geophysics, geohazards)
- Application themes: supercomputing related to earthquakes, volcanoes, tsunamis, geomagnetics, geophysics
- 10 Flagship codes available up front (most CPU, some GPU)
- Mix between
  - Massive single pre-exascale codes
  - Parallelised codes for capacity modelling – in complex workflows
- Application driven – strong emphasis on *advancing science* through Pilot Demonstrators applications
- Strength – pushing *science advances* to new limits through supercomputing – increasing TRL

Complex earthquake rupture



High resolution tsunami inundation

NGIs – role and experience in ChEESE

- Role
  - Leading one Pilot Demonstrator (Probabilistic tsunami hazard analysis)
  - Probabilistic hazard analysis (capacity) – modelling and aggregating millions of 2D CFD simulations
  - Urgent computing – parallel simulations intended for early warning
  - Tsunami codes GPU based – tested on major European infrastructure (e.g. Marconi100 HPC5, Mare Nostrum, and PizDaint)
- Experience from project
  - Well driven – focus on keeping deliverables and timelines – strong dissemination component
  - Synthesis of advancing science through HPC necessary – doing one without the other will not work
  - Pushing science applications to new limits
  - Platform for both scientific scale-up and advancing capabilities for industrial and societal applications

What's next

- Several spin offs and downstream applications:
- eFlows4HPC (EuroHPC) – workflow software stack employment for urgent seismic and tsunami computing
- Several spin off projects related to Horizon Europe Pillar 1 within infrastructure
  - ChEESE hazard services in INFRA-SERV
  - ChEESE as building blocks for digital twin of the Earth via INFRA-TECH
- ChEESE will seek to continue through this EuroHPC call
- Strong link to excellent science while being user and HPC oriented