



## e-infrastructures and natural hazards. The Center of Excellence for Exascale in Solid Earth (ChEESSE)

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The Center of Excellence for Exascale in Solid Earth (ChEESSE; <https://cheese-coe.eu>) is promoting the use of upcoming Exascale and extreme performance computing capabilities in the area of Solid Earth by harnessing institutions in charge of operational monitoring networks, tier-0 supercomputing centers, academia, hardware developers and third parties from SMEs, Industry and public-governance. The scientific challenging ambition is to prepare 10 European open-source flagship codes to solve Exascale problems on computational seismology, magnetohydrodynamics, physical volcanology, tsunamis, and data analysis. Preparation to Exascale is considering code inter-kernel aspects of simulation workflows like data management and sharing following the FAIR principles, I/O, post-process and visualization. The project is articulated around 12 Pilot Demonstrators (PDs) in which flagship codes are used for near real-time seismic simulations and full-wave inversion, ensemble-based volcanic ash dispersal forecasts, faster than real-time tsunami simulations and physics-based hazard assessments for earthquakes, volcanoes and tsunamis. This is a first step towards enabling of operational e-services requiring of extreme HPC on urgent computing, early warning forecast of geohazards, hazard assessment and data analytics. Additionally, and in collaboration with the European Plate Observing System (EPOS), ChEESSE will promote and facilitate the integration of HPC services to widen the access to codes and fostering transfer of know-how to Solid Earth user communities. In this regard, the project aims at acting as a hub to foster HPC across the Solid Earth Community and related stakeholders

and to provide specialized training on services and capacity building measures.