ChEESE: HPC Centre of Excellence in solid earth to mitigate impacts of geohazards

- ChEESE will prepare flagship simulation codes in the solid earth domain to run efficiently on future European Exascale high-performance computing (HPC) systems
- ChEESE will become a hub for HPC software within the solid earth community and will enable services such as urgent computing, hazard assessment, and early warning for European civil protection agencies and other stakeholders

On 19-20 November 2018, the HPC Centre of Excellence (CoE) ChEESE – Center of Excellence for Exascale in Solid Earth – kicks-off in Barcelona. Coordinated by Barcelona Supercomputing Center (BSC), this CoE will develop 10 flagship codes to address scientific Exascale computing challenges and to enable future operational services in the area of solid earth.

Many parts of Europe are exposed to geohazards such as earthquakes, landslides, tsunamis and volcanic eruptions. With civil protection as a primary objective, ChEESE has been awarded approximately €7.7 million in European Commission funding over three years.

The main objectives of ChEESE are:

- To prepare 10 community flagship European codes to run efficiently on upcoming pre-Exascale and Exascale supercomputers.
- To address 15 scientific, technical and socio-economic Exascale computational challenges in the domain of solid earth
- To develop 12 pilot demonstrators and enable services oriented towards society, on critical aspects of geohazards such as hazard assessment, urgent computing and early warning forecasting.

"ChEESE will boost the competitiveness of European solid earth science and aims to become a hub for HPC software in the community. Our results will enable services on urgent computing, early warning, assessment of geohazards, and data analytics that are relevant to European civil protection," says Arnau Folch, CHEESE coordinator and BSC environmental simulations group manager.

ChEESE will develop pilot demonstrators for scientific problems requiring Exascale computing on near real-time seismic simulations and full-wave inversion, ensemble-based volcanic ash dispersal, faster-than-real-time tsunami simulations, and physics-based hazard assessments for earthquakes, volcanoes and tsunamis. These demonstrators will serve as proofs of concept towards enabling services on urgent computing, early warning forecasts of geohazards, hazard assessment and data analytics.

In collaboration with the [European Plate Observatory System](#) (EPOS), the research infrastructure on solid earth, ChEESE will develop operational HPC-based services for hazard, early warning and earth sub-surface characterization, and widen the access to codes to the solid earth Community. Finally, this CoE aims to act as a hub to promote the use of HPC across the solid earth community and related stakeholders, and to provide specialist training on services and capacity building measures.

About ChEESE

ChEESE is the Centre of Excellence (CoE) in solid earth and aims to become a hub for HPC software within the solid earth community. Coordinated by Barcelona Supercomputing Center (BSC), this CoE has been awarded €7.7 million in funding from the European Commission. A range of world-class academic and industry partners from across Europe are participating in the CoE: the Instituto Nationale di Geofísica e Vulcanologia, Vedurstofa a Islands, Eidgenoessische Technische Hochschule Zürich, Unversität Stuttgart, CINECA, Technical University of Munich, Lundwig-Maximilians-Universität Münich, Universidad de Málaga, Stiftelsen Norges Geotekniske Institutt, Institut de Physique du Globe de Paris, Centre National de la Recherche Scientifique CNRS and Bull SAS. Further information: https://cheese-coe.eu/