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The EuroHPC Center of Excellence for Exascale in Solid Earth

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The second phase (2023-2026) of the Center of Excellence for Exascale in Solid Earth (ChEESE-2P), funded by HORIZON-EUROHPC-JU-2021-COE-01 under the Grant Agreement No 101093038, will prepare 11 European flagship codes from different geoscience domains (computational seismology, magnetohydrodynamics, physical volcanology, tsunamis, geodynamics, and glacier hazards). Codes will be optimised in terms of performance on different types of accelerators, scalability, containerisation, and continuous deployment and portability across tier-0/tier-1 European systems as well as on novel hardware architectures emerging from the EuroHPC Pilots (EuPEX/OpenSequana and EuPilot/RISC-V) by co-designing with mini-apps. Flagship codes and workflows will be combined to farm a new generation of 9 Pilot Demonstrators (PDs) and 15 related Simulation Cases (SCs) representing capability and capacity computational challenges selected based on their scientific importance, social relevance, or urgency. The SCs will produce relevant EOSC-enabled datasets and enable services on aspects of geohazards like urgent computing, early warning forecast, hazard assessment, or fostering an emergency access mode in EuroHPC systems for geohazardous events including access policy recommendations. Finally, ChEESE-2P will liaise, align, and synergise with other domain-specific European projects on digital

twins and longer-term mission-like initiatives like Destination Earth.