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Endorsement letter to the Flagship candidate project ExtremeEarth (CSA proposal)

To Dr. Peter Bauer, ExtremeEarth CSA proposal coordinator

On behalf of the Institut de Physique du Globe de Paris, I am expressing our strongest support for the CSA proposal to develop a FET Flagship project ExtremeEarth.

The ExtremeEarth CSA proposal, bringing together Earth-system scientists (e.g. Climate, Ocean and atmosphere, solid Earth and environmental sciences), data and computing scientists, data and infrastructure providers, together with application communities, in a co-design and co-development framework is a timely and well-judged European collaborative initiative. It links research thinking and technology innovations to address a grand challenge in Earth Sciences: developing more effective and reliable ways to monitor, detect, characterise and predict extreme events of the Earth systems, together with quantifying their uncertainties and their impact on society.

ExtremeEarth embraces the opportunity brought by recent methodological and technological advances to blaze the path towards the science-driven vision of an ExtremeEarth science-cloud (EEsC) that will enable to easily and fluidly access and compose multi-source observational and simulated data, exploit extreme-scale computing and big data capabilities, and ultimately enhance our capacity and capability to monitor, detect, characterise, and predict extreme events in evolving Earth systems. As such, it will be a major contribution to the European Open Science Cloud (EOSC) initiative, and each step will deliver new capabilities, boosting research and informing actions.

ExtremeEarth will devote effort to the full-path of data-use to predict Earth-systems extreme events, rebalancing attention and investment to enable the development of new research and FAIR data practices, combining HPC and HDA applications and methods into large-scale workflows. These workflows orchestrate multi-scale and multi-physics simulations, and incorporate them into the stages of large-scale high-end analysis pipelines for multi-source data generated by simulations, experiments, observation and monitoring systems, together with the data logistics across the edge and centralised environments where they are produced.

The Institut de Physique du Globe de Paris (IPGP) is a world-leading higher education and research institution in Earth and Planetary Sciences and in added applications of societal and economical interest. IPGP has specific missions in hazard monitoring and assessment of extreme events of Earth systems (e.g. earthquakes, volcanic eruptions, landslides, environmental changes, and spatial meteorology) with the responsibility of national observatories (metropolitan and overseas) and worldwide geophysics and environmental networks.

IPGP is strongly involved in interdisciplinary research activities addressing innovative data-intensive methods and technologies for the detection, the prediction and the assessment of extreme transient events combining multi-source data (land, sea, space) logistics, multi-scale and multi-physics high-performance numerical simulation, high-end data analytics and assimilation methods, inference and imaging methods, together with recent machine learning and AI techniques. Researchers of IPGP are leading several ERC projects, and are involved in large-scale EU solid Earth initiatives such as the European Plate Observatory System (EPOS) and the recently funded Centre of Excellence (CoE) in solid Earth, ChEESE.

The Institute hosts and provides federated resources for multi-source FAIR data archiving and curation, high-performance computing and data analysis, together with next-generation experimental facilities. In collaboration with the Centre National d'Etudes Spatiales (CNES) and the European Space Agency (ESA), IPGP is also involved in the development and the scientific exploitation of space observation systems. A further activity building on strong partnership with industry (e.g. CGG Veritas, Schlumberger, Shell, Total) deals with new energy resource exploration and exploitation, and CO2 sequestration.

The importance of advancing our ability to reliably monitor, detect, characterise and predict the frequency of occurrence of extreme events, and the understanding of the underlying processes in the evolving Earth-systems cannot be overstated. Collating and distilling science-based evidence into forms that will be used in research and decision making is also of paramount importance to respond and to adapt to the impacts of global environmental changes and extreme events, manage natural resources responsibly, making society more resilient and economy more sustainable.

ExtremeEarth is a key European interdisciplinary initiative to get a leadership in extreme events research, to assembling and building skills, and to addressing technical and procedural barriers. Its objectives and strategy are well aligned with IPGP research expertise and specific missions. IPGP is therefore foreseeing strong synergies and links to the aims of the ExtremeEarth project, and strongly supports this proposal. IPGP is looking forward to collaborate with ExtremeEarth. IPGP will contribute to the project and promote synergies and alignment of objectives between IPGP and the ExtremeEarth initiative.

The ExtremeEarth CSA proposal aims to reflect the view and requirements of the scientific, technological and application communities that are included in the proposal for creating new research practice, methods and tools, and enabling new scales of computing and data services. ExtremeEarth will require the agility and energy of the next wave of research leaders of these communities, and a growing circle of users in the originating domains and then in new domains. Continuous investment of expert effort and increasing representation of the communities has to be developed throughout the collaborative evolution of ExtremeEarth, from preparatory action to Flagship project with endorsements, consultation and formal project partnership.

The IPGP endorsement of the ExtremeEarth Flagship candidate project implies that IPGP supports the scientific, technological and programmatic objectives of ExtremeEarth. This endorsement does not at this point include any legal or financial commitments towards the ExtremeEarth project, beyond its contribution to the CSA proposal. IPGP support will imply that statement and logo of IPGP may be shown on the ExtremeEarth website.

With best wishes,


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