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Federal Department of Home Affairs FDHA

**Federal Office of Meteorology and Climatology MeteoSwiss**  
International Affairs Division

CH-8058 Zurich Airport  
MeteoSwiss

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ECMWF  
Dr. Florence Rabier, Dr. Dieter Bauer  
Shinfield Park  
Shinfield Road  
Reading, RG2 9AX  
United Kingdom

Your reference:  
Our reference no./file no.:  
Our reference: kea  
Contact person: Manuel Keller  
**Zurich Airport, 10 September 2018**

**Subject: ExtremeEarth (preparatory action for new flagship - FETFLAG-01-2018); letter of support by MeteoSwiss**

Dear Dr. Rabier, dear Dr. Bauer

With this letter, the Federal Office of Meteorology and Climatology MeteoSwiss is pleased to express its strong support for the project ExtremeEarth, a candidate European Commission Future and Emerging Technology Flagship.

In general, the outcomes of the suggested project ExtremeEarth are of high relevance, not only from a societal perspective but also from a scientific and technological one. A quantum jump in innovation of weather and climate forecasting can be expected. The impacts of extreme meteo-hydrological events on our society have increased in recent years. Given the ongoing climate change, it is likely that we will need to tackle even more such extremes in the future. A next generation of advanced capabilities to predict the frequency and intensity of such extremes as well as the related impacts more reliably is, therefore, of high relevance.

From a MeteoSwiss perspective, ExtremeEarth is bringing the climate and weather modeling community a substantial step ahead in terms of both the way we formulate key physical processes in our numerical models and the way we use our modeling capability. In particular, it will enable to replace parameterizations of unresolved physical processes with first principle description closer to the underlying physical laws. The project will yield important benefits with respect to our capacity to model and predict weather and extreme events and thus improve our capability to fulfill our core duties, namely to properly inform the population and authorities in case of extreme weather.

MeteoSwiss is keen to become involved in the ExtremeEarth project and its preparatory action. Such involvement could consist of sharing technological and scientific knowledge as well as experience in

Federal Office of Meteorology and Climatology MeteoSwiss  
Manuel Keller  
Operation Center 1, P.O. Box 257, CH-8058 Zurich Airport  
Phone +41 58 460 97 42  
manuel.keller@meteoswiss.ch, www.meteoswiss.ch



weather, climate and impact based modeling, dialogue with users and stakeholders as well as in reviewing project related documentation. In recent years, MeteoSwiss has been engaged in the co-design of numerical tools and software frameworks tackling earth system modelling and the dedicated supercomputing system where the models can be run. Thanks to this, MeteoSwiss has been the first national weather service adopting Graphical Processing Units (GPU) technology for its operational numerical weather prediction, which considerably increased the computational efficiency of the workflow and reduced the energy consumption. Our development together with the Swiss Super Computing Centre CSCS has been awarded the Swiss ICT award in 2016.

The Swiss National Center for Climate Services (NCCS) has been established at MeteoSwiss, coordinating the elaboration and dissemination of climate scenarios and services in the spirit of the Global Framework for Climate Services (GFCS) of the World Meteorological Organization (WMO). In this context, substantially improved modelling capacities would allow to explore future extreme climate events in complex terrains such as the Alps.

MeteoSwiss and the Swiss Federal Institute of Technology ETH Zurich have established a joint Centre for Climate System Modelling (C2SM) to be prepared for future modelling challenges as addressed with ExtremeEarth. In addition, a chair for Weather and Climate Risks (WCR) as a joint professorship has been established. Combining numerical modelling of weather and climate risks with the engagement of decision makers and end-users, his research aims to explore ways to strengthen resilience based on a shared understanding of their weather and climate susceptibility.

MeteoSwiss is therefore interested to engage in the project and contribute in particular to the following two areas:

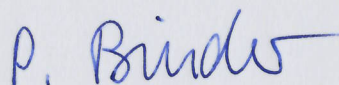
Key Technology 1 : Distributed extreme-scale computing. The ability to run extreme-scale computing for weather and climate systems is a great challenge for our community that will completely change the capabilities to do weather and climate forecasts at very high resolutions. We would like to engage to the software framework developments required within the co-design of the entire workflow. Our contribution would be based on our knowledge in porting workflows on various hardware architectures, including GPU based systems over the past years.

Demonstrators: MeteoSwiss delivers weather information through many channels to a diverse set of users and stakeholders both in the public and private domain. We will support co-development, testing and implementation of ExtremeEarth demonstrators, not least in the context of the recently established NCCS and WCR Group. This will allow us to pro-actively engage with stakeholders to help transform our ability to interact with models and a vast array of environmental data, using user friendly platforms to underpin an intense dialogue.

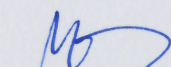
Please note that the present letter of support does not imply any legal or financial commitments by MeteoSwiss towards the ExtremeEarth project.

Yours sincerely,

Federal Office of Meteorology and Climatology MeteoSwiss



Dr. Peter Binder  
Director General



Manuel Keller  
Head of International Affairs Division



Copy to:

- Board of MeteoSwiss
- Prof. Dr. David N. Bresch; ETH Zurich