ESiWACE2: Work Packages and Deliverables

WP1: Cutting Edge Resolution in Earth system modelling

WP1 will develop coupled weather and climate models in unprecedented technical quality and performance as well as the organisational framework to assess their scientific performance. (Peter Dueben ECMWF; Joachim Biercamp, DKRZ)

Deliverables

- **D1.1** Simulations of global high-resolution climate and weather models in production mode
- **D1.2** Model inter-comparison for global high-resolution simulations
- **D1.3** Scalability on preexascale EuroHPC systems

WP2: Establish and watch new technologies for the community

WP2 will establish, evaluate and watch new technologies to prepare climate and weather simulation for the exascale era. (Rupert Ford, UKRI; Carlos Osuna, MeteoSwiss)

Deliverables

- **D2.1** Report summarising the adaptation of the proposed DSLs and the evaluation of the benchmarks and models proposed in this project.
- **D2.2** Demonstration of the DSLs in the proposed models.
- **D2.3** Demonstration of PSyclone-CLAW using the GridTools toolchain with the proposed benchmarks, making use of the HIR. D2.4 Report on the performance of DSL compilers with the proposed models.
- **D2.5** Report and demonstration of the concurrency of model components, evaluating the impact in performance and comparison of technologies employed.
- **D2.6** First white paper on community guidelines on the use, value and applicability of emerging technologies in climate and weather applications.
- **D2.7** Second white paper on community guidelines on the use, value and applicability of emerging technologies in climate and weather applications.
- **D2.8** Material and summary of the hackathon experiences (derived from individual reports by each of the attending partners).
- **D2.9** Report summarising porting the different models to containers, including evaluation of the performance on the supercomputer where the containers are deployed.
- **D2.10** Machine learning workshop.

WP3: HPC services to prepare the weather and climate community for the pre-exascale

WP3 will develop and provide services to improve performance and portability of climate codes with respect to existing and upcoming tier1 and tier0 computers. (Ben van Werhoven, NLeSC; Erwan Raffin, Bull)

Deliverables

- **D3.1** Mid-term assessment of the services
- **D3.2** Report on services in portability and refactoring
- **D3.3** Report on services offered on IO, coupling and workflow
- **D3.4** Report on services offered on weather and climate benchmarks
- **D3.5** To make Europe's Earth system models fit for the exascale

WP4: Data Handling at Scale

WP4 will provide the necessary toolchain to handle data at pre-exa-scale and exa-scale, for single simulations, and ensembles. (Bryan Lawrence, UREAD; Julian Kunkel, UREAD)

Deliverables

- **D4.1** Advanced software stack for Earth system data
- **D4.2** Report on appliances available for testing
- **D4.3** Software documentation and roadmap
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WP5: Data post-processing, analytics and visualisation

WP5 will enhance the tools to analyse and visualise these data (Sandro Fiore, CMCC; Niklas Roeber, DKRZ)

Deliverables

- **D5.1** Report on the ESDM runtime extensions for parallel in-flight analytics
- **D5.2** Report on the implementation of the ESDM PAV analytical kernels for post-processing, analysis and visualisation
- **D5.3** Report on the final implementation of key selected post-processing, analytics and visualisation applications and main outcomes

WP6: Community engagement and Training

WP6 will link ESiWACE2 to the weather and climate community it serves on the one hand and to the European HPC ecosystem on the other hand (Sylvie Joussaume, CNRS-IPSL; Sophie Valcke, CERFACS)

Deliverables

- **D6.1** Report on summer school and its material
- **D6.2** Report on the different trainings
- **D6.3** 6th ENES HPC-workshop in Hamburg
- **D6.4** Training OER material made available under a permissive CC-by licence

WP7 Coordination, Management and Dissemination

WP7 ensures an effective and smooth high-quality implementation of the project and puts strong emphasis on dissemination of ESiWACE2 achievements (Joachim Biercamp, DKRZ; Peter Bauer, ECMWF)

Deliverables

- **D7.1** Design and implementation of the intranet
- **D7.2** Project Public website
- **D7.3** Dissemination, Engagement and Communication
- **D7.4** Data Management Plan (DMP)
- **D7.5** Exploitation Plan
- **D7.6** Strategy for the Intellectual Property Exploitation
- **D7.7** Refined set of KPIs
- **D7.8** Sustainability Plan