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To the members of the selection committee for the ESiWACE2 Summer School on Effective HPC

Letter of motivation

Dear Sir or Madam,

I am writing you to attend this year's Summer School on Effective HPC in Reading.

As a physics Master's student I am currently involved in a climate modelling project of paleoclimate dynamics in the Last Glacial period. Therefore, I seek to increase model performance with regard to efficient simulations of the paleoclimate over ten thousands of years. Furthermore, I am curious to effectively handle large amounts of climate model data.

Branching off my personal research interests, I suggest experiments with and analyses of the simplified general circulation model PlaSim as tentative ideas for possible group projects during the Summer School. The model does not necessarily require a HP cluster but could easily be used by participants on their local machines making it ideal for testing and teaching. I would be happy to provide model support and longer simulation runs to try out efficient data processing workflows.

Possible group activities with regard to data analysis could be to quantify cloud feedbacks and climate sensitivity of the model or to examine the newly-integrated dynamic sea-ice component in idealised set-ups like an aqua-planet. In addition to efficient data analysis, I am very interested to discuss means to further accelerate PlaSim. As a result, I could imagine another group project identifying bottlenecks and developing a concept for speeding the model up.

There will be numerous ways for me to serve as a multiplier of gathered knowledge on HPC. I am involved in a junior research group with only modest knowledge on how to effectively use their computational resources. It would be of great benefit to group members including doctoral and graduate students if they could parallelise their code more efficiently and adapt their analyses to be run on the local HP cluster bwHPC in order to increase productivity.

Applications for HPC within the group include paleoclimate simulations, development work on different levels of the climate model hierarchy, proxy-based climate reconstructions using Bayesian and machine learning techniques, Monte Carlo-based methods to generate chronologies for paleoclimate records, and more.

Besides, I contribute to research-based teaching projects on climate modelling and the physics of climate. In this context I share my knowledge with interested doctoral and graduate students not only from the Institute of Environmental Physics but from the Physics Department of the University of Heidelberg as well.

I am very much looking forward to hearing from you.

Yours sincerely,

Moritz F. Adam