Motivation Letter

Please accept this motivation letter as part of my application to attend the Summer School on Effective HPC for Climate and Weather, 23-28 August 2020 at University of Reading.

I was first introduced to the exciting world of atmospheric, oceanography and solid earth sciences when I joined Earth System Physics program as a Postgraduate Diploma student at ICTP, Italy. My thesis work: Meridional Heat Transport in Present and Future Climate, focused on Meridional Overturning Circulation, atmospheric oceanic heat transport and the coupling between them and how they interact with each other. I continued with my scientific endeavor and obtained my M.Sc. degree in Atmospheric Science, Oceanography and climate from Stockholm University, Meteorology department, Sweden. There, I extended my atmospheric-oceanic heat transport knowledge during Global Climate System course at Stockholm University, by conducting a one month project under title: The Ocean Heat Transport Effect on the Atmospheric Circulation in an Aquaplanet Environment. In this project, I set up an aqua planet in Planet Simulator model. I applied different shapes and sizes of Ocean Heat Transport to study the atmospheric response. My master thesis at Stockholm University focused on studying climate variability of the Sahel region and its link to large scale flow. After finishing my master degree, I joined the junior research group of Dr. Aiko Voigt "Clouds and Storm Tracks" in the institute of Meteorology and Climate Research- Department of Troposphere Research (IMK-TRO), KIT. Now I am working on the role of atmospheric vertical structure in determining the future changes of tropical rain belts using energetic framework. I am currently testing the deep and shallow vertical modes assumption by means of Moist Static Energy budget analysis using the existing simulations from the Tropical Rain belts with an Annual cycle and a Continent Model Intercomparison Project (TRACMIP). TRACMIP compares a set of five simulations with 14 state-of-the art global climate models run in idealized aquaplanet and land setups. The simulations explore the dynamics of tropical rainfall, the interactions between the ocean's ITCZ and the land monsoons, and the link between processes acting on timescales from hours to decades. The TRACMIP introduction paper is available here: TRACMIP Introduction Paper.

Following TRACMIP energetic-framework analysis, I will be performing simulations with the ICOsahedral Non-hydrostatic global climate model (ICON), which has been developed in cooperation between Max-Planck Institute for Meteorology (MPI-M) and the Deutscher Wetterdienst (DWD). I believe that this topic is of great scientific and socioeconomic importance and it builds upon my past research work.

I would be privileged if I were presented the chance to attend the Summer School on Effective HPC for Climate and Weather, as it is a valuable addition to my current PhD studies. I believe that taking part in this summer school would allow me to develop and evolve an interdisciplinary knowledge through attending and participating in its various sessions. The summer school theoretical and practical sessions on the and its different components will prepare me for the next steps of my current research, which involve enormous amount of my own simulation runs on ICON model using HPC and Mistral computing powers, this followed by data processing, visualising, analysing and storing. This summer school will also help me to optimally prepare for my further career in Earth science.

I would like to be engaged within a predefined project or group in a topic related to big data analytics, code development, post-processing and visualisation. During the first year of my PhD, I acquired some experience in these topics. I would be delighted to share my methods and experience with my assigned team and others. Not to mention that working in a team, networking with others, learn about others research, presenting scientific results and getting feedbacks will strengthen my skills and will help me to conduct my doctoral thesis successfully. I am sure that taking part in this summer school will be of great value to my current research and enable me to participate in the cutting edge research work, gain detailed knowledge, improve my understanding and interpretation of my own results, and help my current project to succeed. The possibility of doing all of this is the main reason for applying for this summer school.

With sincere regards,
Elzina Bala