



SPARC Training School on “Climate Data Analysis and Artificial Intelligence in the Global South”.

29th-31st October 2023

University of Rwanda - College of Science and Technology, Kigali, Rwanda.

Position on Google Map: [Here](#)

1. Introduction.

SPARC - Stratosphere-troposphere Processes And their Role in Climate - is a core project of the World Climate Research Programme (WCRP), which coordinates international efforts to harness knowledge of the atmosphere to address issues of climate variability and prediction.

WCRP SPARC is sponsoring a 3-day training school on "**Climate Data Science & Artificial Intelligence in the Global South**" from October 29 to 31. The training school is scheduled to follow the WCRP Open Science Conference in Kigali from October 22 to 28 (see <https://wcrp-osc2023.org/>), which will attract climate researchers from around the world.



2. Background.

Climate variability and change and their impact are already being felt in the Global South, with the recent recurrence of extreme precipitation, drought and heat waves, as well as food insecurity, urbanization and health problems, among others. There is a clear need to fill the gaps in climate services and in the training of future Climate Scientists in order to foster innovative solutions to better mitigate climate impacts and risks in developing countries, often referred to as the Global South.

Mitigating the effects of global warming and the associated climate risks is undeniably one of the greatest challenges facing humanity today. Climate change is a global phenomenon, but its impact is disproportionately felt in low-income countries. The main aim is to bridge the North-South gap in climate change mitigation and resilience by informing and training

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early-career scientists in climate data science and artificial intelligence to find innovative solutions, as well as engaging with the public and non-public sectors. The training school includes lectures on climate research and computational exercises on data science and artificial intelligence python tools.



3. Programme.

The mornings of the training school will be dedicated to presenting the topics, and the afternoons will be devoted to computational exercises on ML/AI python tools using observational, reanalysis and climate model data from the SPARC data center, as well as discussions between participants and mentors. The Climate Data Analysis and AI Training School is preliminarily structured as follows:

Day 1: 29 October 2023

Time	Description
08:30 - 09:40	General opening of the workshop Purpose, prospective outcomes of workshop & schedule
09:40 - 10:00	Introduction to the SPARC (Prof. Shepherd) & Jülich Research Center (Prof. Hegglin)
10:00 - 10:15	Introduction to the University of Rwanda-CST (Prof. Hanyrwimfura)
10:15 - 10:45	Short tea and coffee break
10:45 - 11:30	Overview lecture on Reanalysis products - SRIP (Prof. Manney)
11:30 - 12:15	African monsoon circulation: Processes and impacts on society (Prof. Gaye)
11:15 - 12:30	Introduction to ESMValTool (Dr. Hassler)
12:30 - 14:00	Lunch break
14:00 - 16:00	Hands-on Python on jupyter-notebook with a case study (Dr. Batamuliza)
16:00 - 16:30	Short tea and coffee break

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16:30 - 18:30	Hands-on ESMValTool on python (Dr. Hassler)
18:30 - onwards	Ice - Breaker Dinner

Day 2: 30 October 2023

Time	Description
09:00 - 09:45	Regional Climate Change Information for Africa from satellite observation and climate models (Dr. Sylla)
09:45 - 10:30	Convective Permitting modeling
10:30 - 11:00	Short tea and coffee break
11:00 - 11:45	Introduction to basics on Statistics and Probability (Prof. Hanyrwimfura/Prof. Ruranga)
11:45 - 12:30	Causal Inference in Climate and Weather Research (Dr. Saggioro)
12:30 - 14:00	Lunch break
14:00 - 16:00	Hands-on Python Statistics and Probability tools (Prof. Hanyrwimfura or Prof. Ruranga)
16:00 - 16:30	Short tea and coffee break
16:30 - 18:30	Hands-on Python Causal inference & MLRs (Dr. Saggioro)

Day 3: 31 October 2023

Time	Description
09:00 - 09:45	Demystifying AI in Climate and Weather Research (Spuler)
09:45 - 10:30	Variational autoencoders and clustering methods (Spuler)
10:30 - 11:00	Short tea and coffee break
11:00 - 11:45	Artificial Neural Network: from zero-to-hero (Dr. Diallo)
11:45 - 12:30	Explainability and interpretability AI (Dr. Diallo)
12:30 - 14:00	Lunch break
14:00 - 16:00	Hands-on Python dimensionality reduction and clustering methods (Spuller)
16:00 - 16:30	Short tea and coffee break
16:30 - 18:30	Hands-on Python Artificial NN kitchen (Dr. Diallo)

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4. **Participants.** The training school is open to BSc, MSc and PhD students, as well as postdoctoral fellows from all over the world who are attending the WCRP OSC in Kigali, as well as local students and researchers. Participation may be limited (30 places), and ECS applicants from the Global South are particularly encouraged.
5. **Venue and logistics.** The training school is hosted by the University of Rwanda - College of Science and Technology, Kigali, Rwanda. All participants could extend their existing accommodations and we could also suggest new hotels, which are conveniently located near to many services, including restaurants, transport to the city center and to the University of Rwanda.
6. **Financial support.** Participation in the training school is free of charge. Coffee breaks, lunches and accommodation are also included, as well as a social evening. Financial assistance will be available for those who need to cover the cost of flight changes for at least a limited number of ECSs.
7. **Registration.** The deadline for applications is October 15, 2023.
8. **Contact person.** Mohamadou A. Diallo, (m.diallo@fz-juelich.de) Forschungszentrum Jülich, Germany

9. **Organizing committee**

Dr. Mohamadou Diallo

Prof. Dr. Michaela I. Hegglin

Prof. Dr. Ted Shepherd

Prof. Dr. Amadou T. Gaye

10. **Local Organizing committee**

Prof. Dr. Damien Hanyurwimfura,

Dr. Jennifer Batamuliza,

Dr. Philibert Nsengiyumva,

Prof. Dr. Charles Ruranga,

Dr. Frédéric Nzanyingoma

11. **Sponsors**

The workshop is held under the auspices of WCRP (World Climate Research Programme), SPARC (Stratosphere-troposphere Processes And their Role in Climate).