Project:	bb1224
Project title:	Applied Atmospheric Modelling Course at University Leipzig
Project lead:	Ina Tegen (TROPOS), administrated by Fabian Senf (TROPOS)
Allocation period:	1.1.2021 - 31.12.2022

Overview

This project is dedicated to educate students from the University of Leipzig in the field of applied atmospheric modelling held during summer terms. The condcuted activities are part of the Master education in Meteorology at the Leipzig Institute for Meteorology, which are hold as seminars - called **ComputerLab** - with active hands-on training by TROPOS as a partner institute. The course is part of the master module 'Atmospheric Modeling - Scales and Parameterizations', and took place in the previous summer semesters on one day a week over the course of six weeks in June and July.

A variety of learning objectives have been taught. Students were familiarized with HPC platforms in general, and the HLRE computing resources in particular. Further learning objectives were:

- (i) to explore the content of netcdf data,
- (ii) to use post-processing platforms like jupyterhub for exploratory data analysis,
- (iii) to perform numerical experiments with state-of-the-art atmospheric models like ICON and ECHAM, and
- (iv) to get an conceptual understanding of computational workflows in atmospheric modelling.

Project Management

The project is composed of a set of permanent users that prepare and test tasks in advance of the seminars. The other component are temporary accounts for the student for which the application is done year by year considering the actual number of subscribed students.

The ComputerLab course can be done either purely online or in an on-site seminar format. The course material is reached via a prepared website ¹ which holds the up-to-date instructions. The main component of student work is the DKRZ jupyterhub service. The course material was also published under https://doi.org/10.5281/zenodo.5533794.

So far, we were able to carry out every single course instance without problems, e.g. no interruption of the HLRE infra-structures happened.

¹https://tropos.gitlab-pages.dkrz.de/uni-master-module-t2/

ComputerLab 2021

During spring 2021, we experienced severe restrictions due to the COVID19 pandemic. To bridge the situation, it was decided to build up course material from scratch and to hold the course purely online. This implementation task was an endeavor for us, but we finally succeeded to jointly collected material (as collection of markdown files ²) which are rendered via sphinx into a static HTML website hosted as gitlab pages. This workflow has the advantage to allow for collaborative writing during preparations using the capabilities of the distributed git version control system and also allows for fast bug fixes in the material during the ComputerLab course itself.

In the 2021-course, 12 master student were attending which were guided by 3 supervising persons. A plenary zoom session was used to transmit general instructions to the students and breakout rooms were provided to allow to students to discuss problems and solutions in small teams. Finally, all students were able successfully complete the course.

ComputerLab 2022

The ComputerLab course in 2022 could be realized as in-person seminar hosted at TROPOS. The preparations for the 2022-course were demanding as well because the DKRZ compute infrastructure changed just one month before the start of the course. We were successful to migrate all ICON-related tasks to the new Levante machine using the v2.6.5-rc Version. All ECHAM-related task needed to be canceled for the 2022-ComputerLab.

In the 2022-course, 8 master student were attending which were guided by 3 supervising persons. All students could gather in one seminar room and solved the tasks for themselves, but of course with the support of the other fellow students and the supervisors. Finally, all students were able successfully complete the course.

²hosted at https://gitlab.dkrz.de/tropos/uni-master-module-t2