Project: **1345**
Project title: **Modelling dust emissions from agricultural sources**
Principal investigator: **Matthias Faust**
Report period: **2023-11-01 to 2024-10-31**

Project Overview and Objectives

This project aimed to enhance the modelling of dust emissions from agricultural sources, which are significant contributors to the global dust budget yet underrepresented in current models. By focusing on soil moisture's effect on agricultural dust emissions, we refined the emission parameterisation within COSMO-MUSCAT and transitioned to ICON-MUSCAT for future projects.

Progress and Achievements

1. **Advancement with ICON-MUSCAT**
   We tested and demonstrated that ICON-MUSCAT performs efficiently on the HLRE-4 (Levante) platform. It will serve as our standard model in future projects. This transition will enable more refined simulations, which is especially beneficial for high-resolution applications.

2. **COSMO-MUSCAT Simulations and Ongoing Analysis**
   Using COSMO-MUSCAT, we successfully conducted all planned simulations at a resolution of 0.0625°, covering the period 2019-2023. These simulations examined dust emissions from agricultural regions across years with varying moisture conditions, providing insights into how wet and dry years impact emissions. While we completed the simulations, data analysis is still ongoing.

3. **Future Publication Plans**
   A publication is planned. It will present our findings on agricultural dust emissions and outline our advancements in dust emission modelling. This upcoming work will highlight the critical role of agricultural sources in regional dust loads and will emphasise the integration of these sources in broader climate models.

Conclusion and Future Directions

This project provided essential groundwork for improving the representation of agricultural dust emissions in climate models. The insights gained from this project will play a significant role in enhancing the representation of agricultural dust emissions in future modelling efforts.