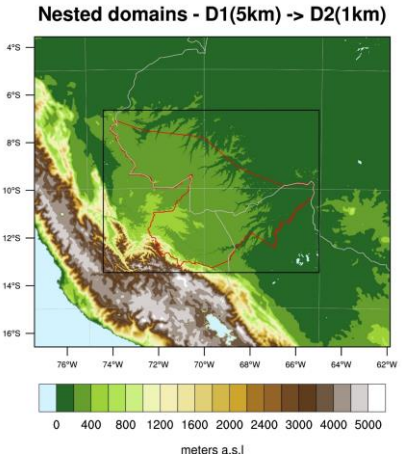
Project: **1177**

Project title: **Prodigy**

Principal investigator: **Juergen Boehner**

Report period: **2021-05-01 to 2022-04-30**

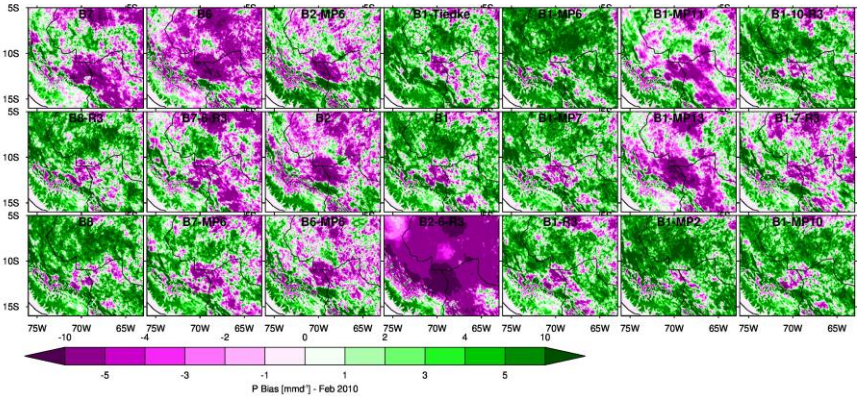
Study Area: *The project focuses on Madre de Dios, Acre, and Pando states in the southwest Amazon. The WRF model was set up at a single domain at 5km grid spacing covering the MAP region plus the buffer zone. The following experiments have been completed so far.*



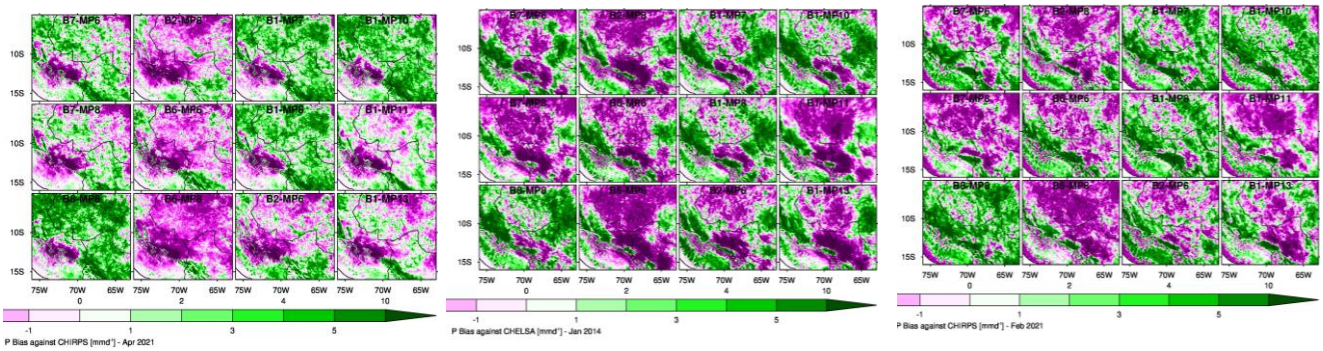
1. Sensitivity Experiments: *One-month-long sensitivity experiments have been conducted for the wettest and driest months of the wettest and driest years. For this, first, the driest and the wettest years have been identified based on the ERA5 reanalysis and observational datasets. Then for each year, the driest and the wettest months were selected, which are the following:*

- *February 2010:* *wettest month of the driest year over the 2010-2021 period*
- *January 2014:* *wettest month of wettest year over the 2010-2021 period*
- *February 2021:* *wettest month over the 20201-2021 period*
- *April 2021:* *normal month over the 2010-2021 period*

February 2010: *Total of 21 experiments each with one month simulation using select physics*



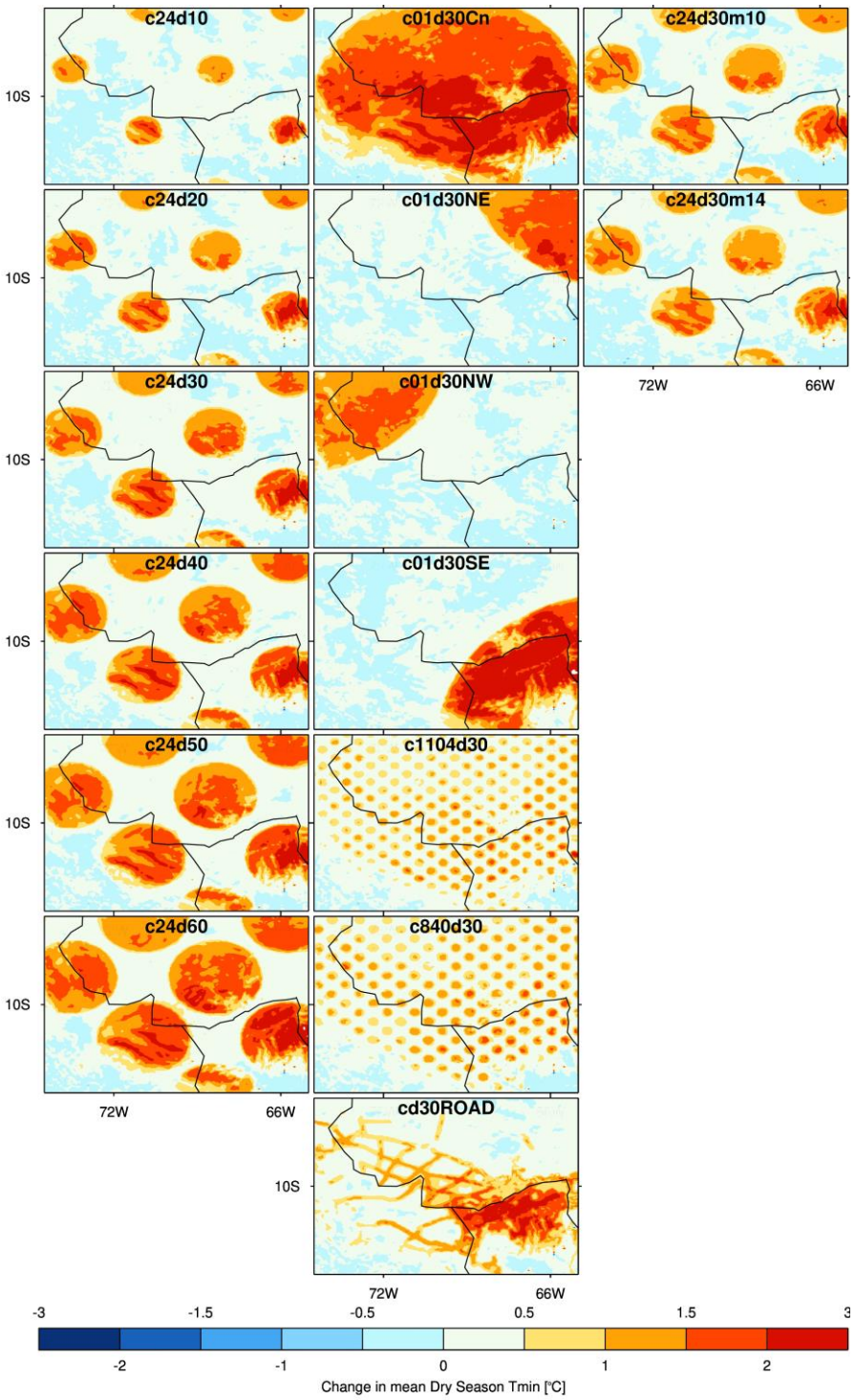
January 2014 & February 2021 & April 2021: *Total 36 experiments, 12 for each month*



The biases have been assessed against CHIRPS precipitation only, however validation is in process against the station observations, which believed to be more robust.

2. BASELINE Experiment: Based on chosen physics, an 11-year (2010-2021) baseline was produced by dynamically downscaling ERA5 reanalysis on 5km using explicitly resolved convection. The whole simulation was divided into yearly simulations with a 15-day spin-up. The data has been delivered to the project partners for onward ingestion into the agriculture and land-shift models.

3. LANDUSE Change Experiments: Around 15 experiments were run with different deforestation intensity, patterns, and land use based on yearly simulations for the year 2020 in addition to the reference/control simulation without any change. Initial results will be presented in the EGU 2023. Further investigation on how deforestation in the southwest Amazon will affect the local climate is ongoing. It also requires additional experiments, for which resources are requested in this year's application.



Change in mean dry season minimum temperature over MAP region.