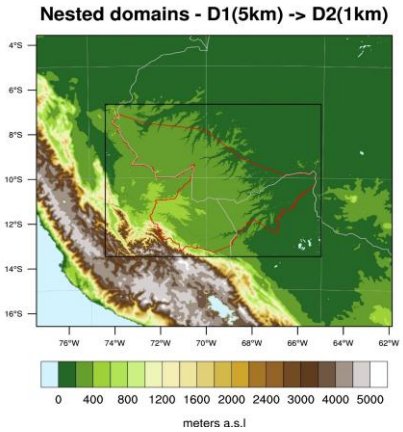
Project: **1177**

Project title: **Prodigy**

Principal investigator: **Juergen Boehner**

Report period: **2024-07-01 to 2025-06-30**

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 a 5km grid spacing covering the MAP region plus the buffer zone. The following experiments have been completed so far.*



Sensitivity experiments, baseline simulations, and a subset of land experiments have already been reported in previous reports. Here we report mainly the land use experiments with the select list that includes additional scenarios as well.

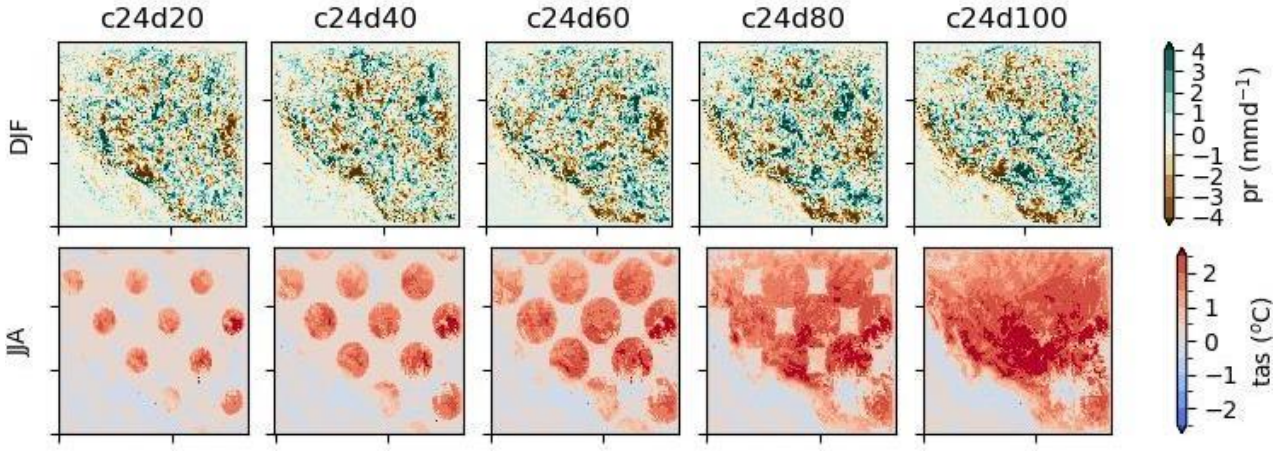
3. LANDUSE Change Experiments: In total, 26 experiments are carried out.

- Control simulation without any land use change for the year 2020
- 10 yearly experiments, each corresponding to deforestation intensity ranging from 10-100%.
- Seven yearly experiments, each corresponding to a different pattern of deforestation, where intensity remained ~30%.
- Three yearly experiments, each corresponding to a different land cover transition after deforestation. For 30% and 100% deforestation intensities.

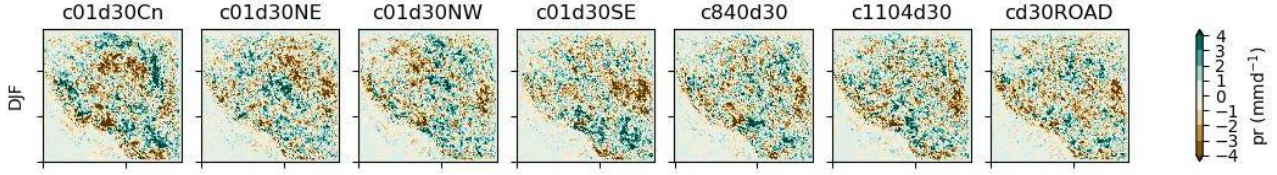
These experiments were run on a yearly basis for the year 2020, taking forcing from ERA5, in addition to the reference/control simulation without any change. The analysis of the experiments is ongoing, and the draft manuscript is in preparation. The land use land cover change experiments under future climatic conditions are additional experiments, for which resources are being requested this year.

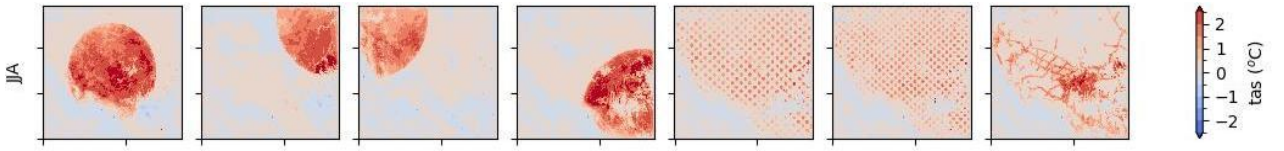
Changes in pr, tas in Deforestation experiments relative to the control experiment for dry (JJA), and wet (DJF) seasons over the MAP region

Deforestation Intensities: here, only 20%, 40%, 60%, 80%, and 100% deforestation intensities

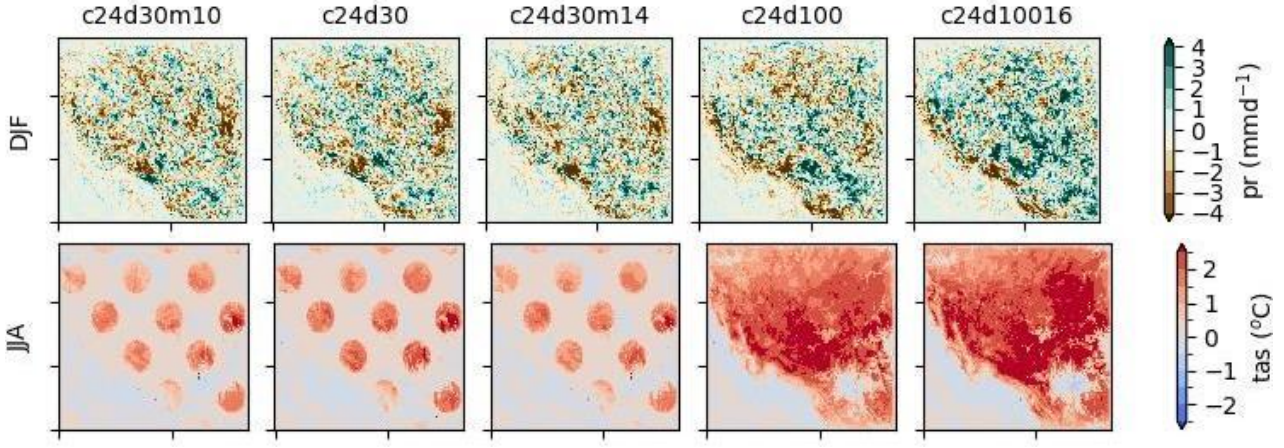


Deforestation Patterns: Here, seven patterns are reported.





Deforestation Land Cover Transitions: five patterns



Generally, temperature linearly increases with deforestation intensity and matches well the pattern of deforestation, whereas such pattern for precipitation is quite chaotic. However, area-integrated response for each land cover class yields a distinct response of precipitation to deforestation.

Intra-annual changes for each land cover class

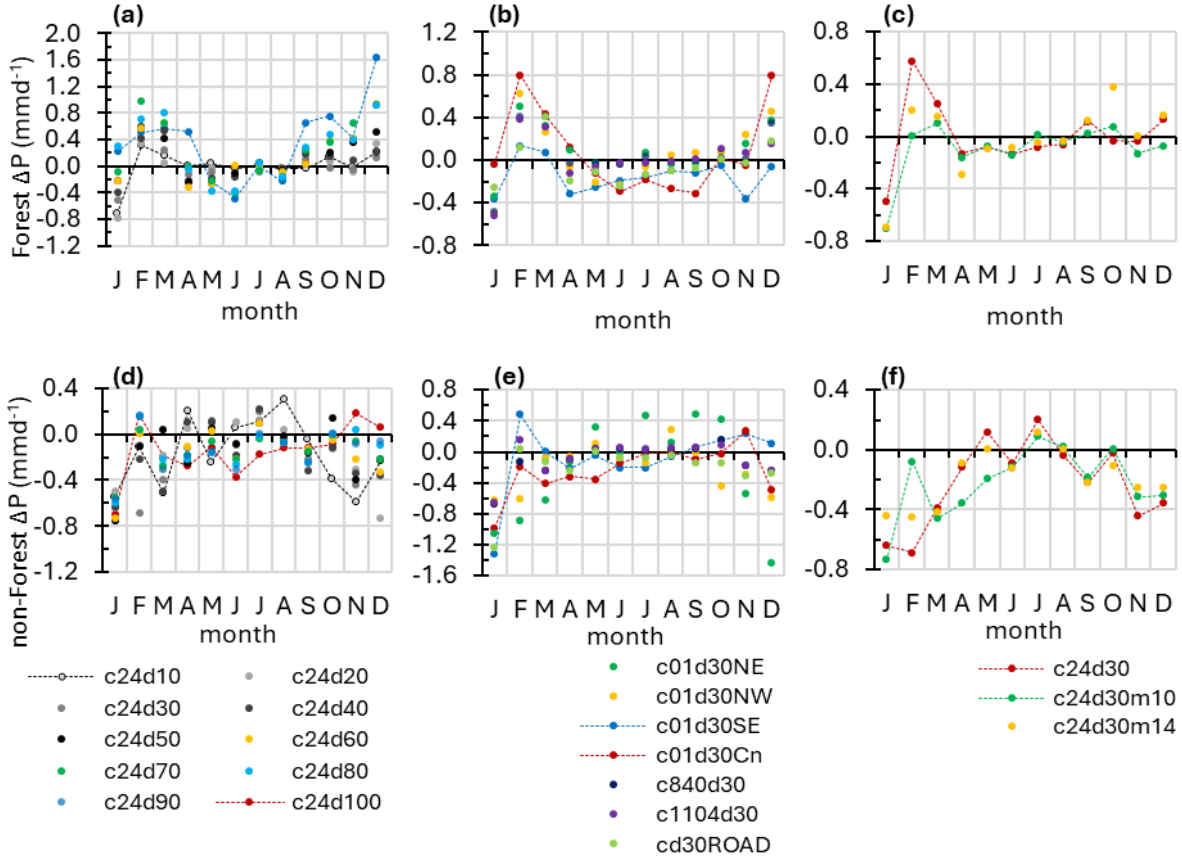


Figure XX. Change in precipitation over Forest (upper row) and non-Forest land cover (lower row) with change in deforestation intensity (left column), change in deforestation pattern (middle column), and change in deforested land to a particular land cover class (right column). The 'c' denotes a circular deforestation, 24 refers to the number of circular deforestations, d10 to d100 refers to deforestation intensity from 10% up to 100%, NE, NW, SE, and Cn refer to deforestation in the northeast, northwest, southeast, and central region. In all scenarios, deforested land was converted to cropland, m10 refers to grassland, and m14 refers to natural vegetation.