EGU21-9251
https://doi.org/10.5194/egusphere-egu21-9251
EGU General Assembly 2021


# Deforestation impacts on Amazon-Andes hydroclimatic connectivity

**Juan Sierra**[1], Jhan Carlo Espinoza[1], Clementine Junquas[1], Jan Polcher[2], Miguel Saavedra[3], Jorge Alcides Molina Carpio[4], Marcos Andrade[5], Thomas Condom[1], and Laura Ticona[5]

[1]Université Grenoble Alpes, IRD, CNRS, G-INP, IGE (UMR 5001), Grenoble, France
[2]Laboratoire de Météorologie Dynamique, Institut Pierre□Simon Laplace, Sorbonne Université-CNRS-École Normale Supérieure□PSL Research University-École Polytechnique□IPP, Paris, France
[3]Instituto Geofísico del Perú, Universidad Nacional Mayor de San Marcos - Facultad de Ciencias Físicas, Lima, Perú
[4]Instituto de Hidráulica e Hidrología (IHH), Universidad Mayor de San Andrés, La Paz, Bolivia
[5]Laboratorio de Física de la Atmósfera, Instituto de Investigaciones Físicas, Universidad Mayor de San Andrés, La Paz, Bolivia

The Amazon rainforest is a key component of the climate system and one of the main planetary evapotranspiration sources. Over the entire Amazon basin, strong land-atmosphere feedbacks cause almost one third of the regional rainfall to be transpired by the local rainforest. Maximum precipitation recycling ratio takes place on the southwestern edge of the Amazon basin (a.k.a. Amazon-Andes transition region), an area recognized as the rainiest and biologically richest of the whole watershed. Here, high precipitation rates lead to large values of runoff per unit area providing most of the sediment load to Amazon rivers. As a consequence, the transition region can potentially be very sensitive to Amazonian forest loss. In fact, recent acceleration in deforestation rates has been reported over tropical South America. These sustained land-cover changes can alter the regional water and energy balances, as well as the regional circulation and rainfall patterns. In this sense, the use of regional climate models can help to understand the possible impacts of deforestation on the Amazon-Andes zone.

This work aims to assess the projected Amazonian deforestation effects on the moisture transport and rainfall behavior over tropical South America and the Amazon-Andes transition region. We perform 10-year austral summer simulations with the Weather Research and Forecasting model (WRF) using 3 one-way nested domains. Our finest domain is located over the south-western part of the basin, comprising two instrumented Andean Valleys (Zongo and Coroico river Valleys). Convective permitting high horizontal resolution (1km) is used over this domain. The outcomes presented here enhance the understanding of biosphere-atmosphere coupling and its deforestation induced disturbances.