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# Investigating the interactions between Forest Cover Change and Hydroclimatic patterns in the Bolivian Amazon basin over the last 30 years

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Large evidences support the strong impacts on rainfall amount and the increasing of dry-season length on the Amazonian forest. All of these effects are usually attributed to large scale atmospheric circulation and to land cover changes as part of anthropogenic effects. In this research we assess statistical and modeling approaches to investigate the interaction between changes in forest cover and hydroclimate processes on a regional and local scale.

Henceforth, the deforestation areas and climatic indexes for the southern Amazon basin (south of 14°S) were evaluated. The deforestation map was estimated for the 1992-2018 period, based on global land cover maps at 300 m of spatial resolution produced by the European Space Agency (ESA) Climate Change Initiative (CCI) by using several remote sensing datasets. The CHIRPS rainfall dataset (P) for the 1981-2018 period was used to estimate the dry day frequency (DDF, P<1mm) and the wet day frequency (WDF, P>10mm). In addition, the mean actual seasonal evapotranspiration (AET) was GLEAM and ET-Amazon evapotranspiration datasets for the 1980-2018 and 2003-2013 periods respectively. In order to determine the local and the regional climatic effect for each pixel of the climatic index (DDF, WDF and AET), the deforestation fraction was estimated considering different spatial radii of influence (20 to 50 km).

The first results indicate a particular pattern in the southern Bolivian Amazon where two groups of areas were identified, considering the common period of analysis (1992-2018). One of them shows a significant relationship between increasing trend of DDF and decreasing trend of WDF while deforestation fraction is high, what mainly occurs during the wet season. In addition, this region is clearly placed in areas with values of deforestation fraction above ~30%, a closest value to the

usually estimated Amazon Tipping Point (~40%). Below this value, the second group is also located in regions with positive trends of DDF and negative trends of WDF. This region has probably a strongest link with the large-scale climate.

Considering these preliminary results, the statistical approaches developed in this research could give some insights about the interactions between forest change and the regional hydro climatology, which might improve the understanding of this interaction based on large-scale hydrological modeling.