The influence of deforestation in the moisture transport from the Amazon Forest to the South America continent

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INTRODUCION

Changes in the atmospheric circulation, water budget, and heat fluxes are developing to the increase of Amazon deforestation and global warming in the South American continent. Therefore, the work objective is to evaluate how the Amazon deforestation process may impact the moisture transport and the water budget in the Brazilian southeastern (S/SE) region in a 2º C warmer world (SWL2 approach) during the austral autumn.

METHODOLOGY

Using the Brazilian Atmospheric Model (**CPTEC-BAM 1.2** - 200 km and 28 vertical levels) was possible to simulate the total conversion from the tropical forest (00DEF) to the pastureland (100DEF). The atmospheric model was driven by the IPSL-CM5A-LR Sea Surface Temperature (SST) condition. The vertically integrated moisture flux (from surface up to 500 hPa) from the Amazon Forest (represented by a domain ranging from 10ºS up to 3º N and from 75º W up to 50º W) to the S/SE region (20º S up to 27º S and from 53º W up to 45º W) was computed.

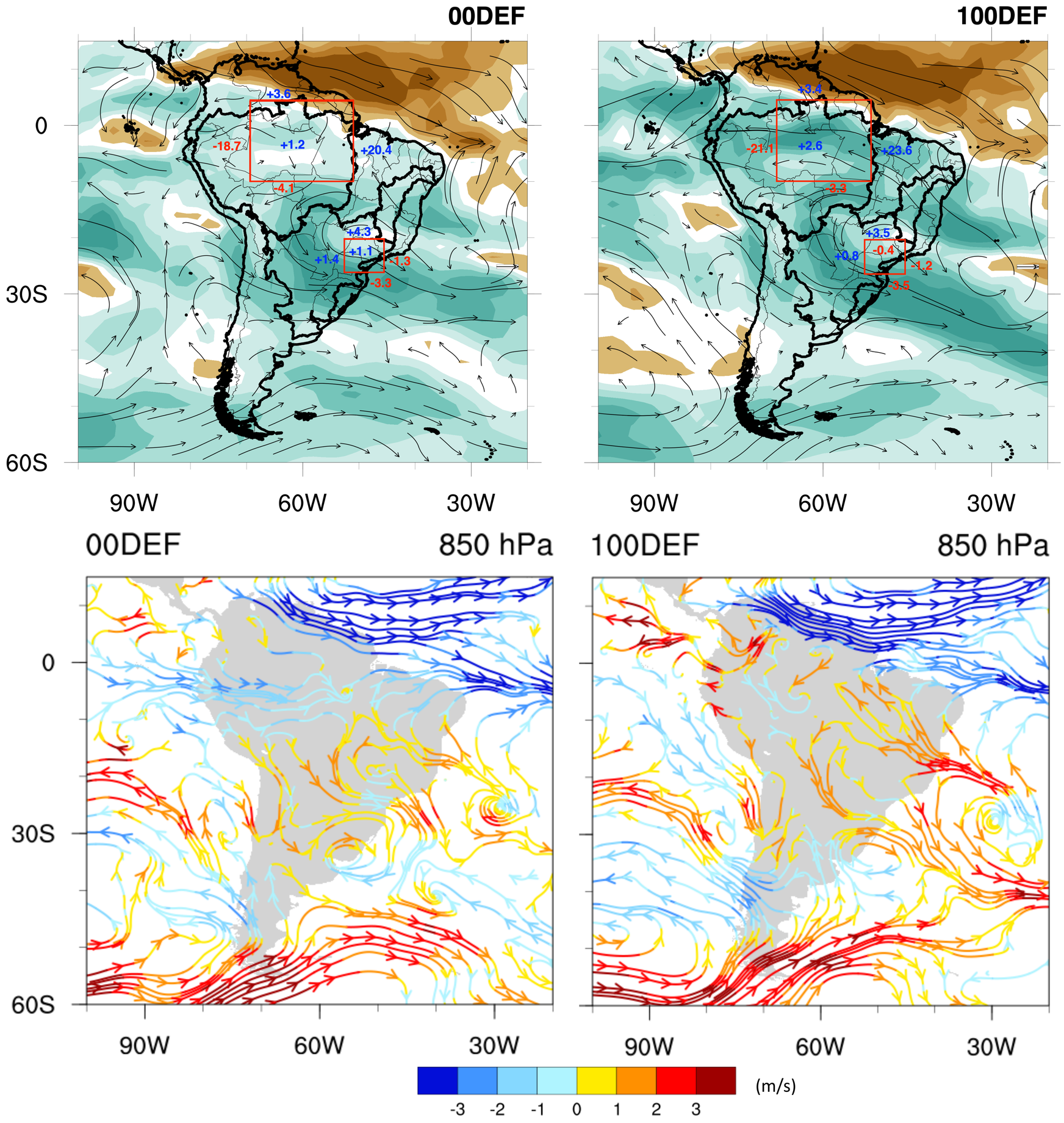

Figure 1 – Seasonal (MAM) anomaly (experiments minus control) of Vertically Integrated Moisture Flow (500hPa) and wind pattern (850 hPa) for both scenarios.

RESULTS AND CONCLUSIONS

As a result, there was an intensification of the influx from the Atlantic Ocean (+23.6 kg m^{-1} s^{-1}) to the Amazon region. Furthermore, the result indicated a decrease in the moisture transport to the S/SE (-3.3 kg m^{-1} s^{-1}).

In addition, there were observed some changes in the Walker cell (an increase in the subsidence movement – +2.5 Pa/s), low-level jet pattern (+3 m/s), and a decrease in the jet stream velocity (-4 m/s) were essential drivers which modulated the incoming of moisture in the S/SE regions.

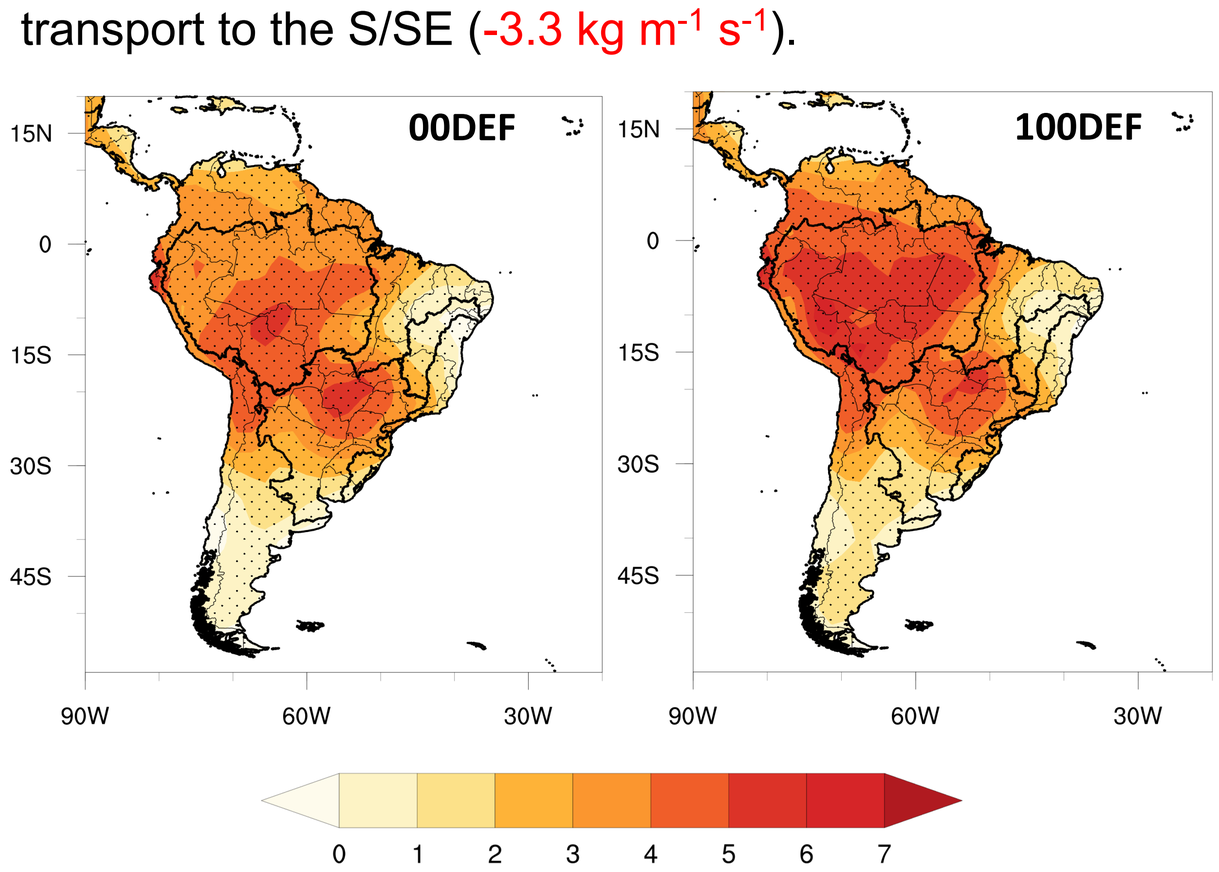

Figure 2 Anomaly of annual temperature (SWL2) (ºC) for 00DEF and 100DEF scenarios.

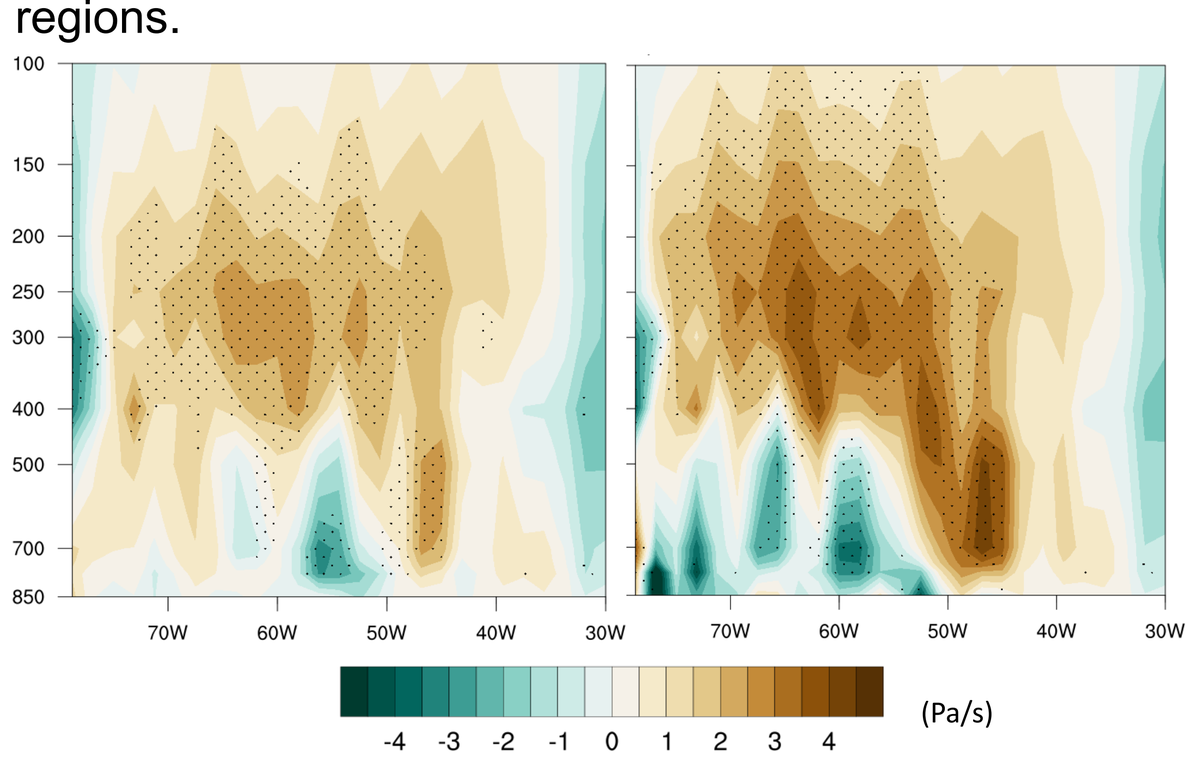

Figure 3 – Seasonal (MAM) Anomaly of Walker cell for both scenarios.

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