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Is it feasible to relate CO₂ atmospheric measurements with land use and cover change data? -A primary assessment of land use and cover change datasets in the Amazon

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Atmospheric CO₂ concentrations have had a significant increase in recent years reaching levels never seen before. In the Amazon region, the main CO₂ emissions come from land use and cover change (LUCC), especially for the deforestation of natural forests. It is very important to understand the impacts of climate change and deforestation on the Amazon forests to understand their role in the current carbon balance at different scales. The lower-troposphere greenhouse gas (GHG) monitoring program “CARBAM project”, has been collecting bimonthly GHGs vertical profiles in four sites of the Amazon since 2010, filling a very important gap in regional GHGs measurements. Here we compare different LUCC datasets for the Amazon region to see if there is a relation between annual LUCC and bimonthly CO₂ aircraft measurements in the Amazon. We compared the annual (2010-2018) LUCC area from IBGE, PRODES and mapbiomas pan-amazon datasets for each mean influence area of the CARBAM sites and relate this LUCC areas with the annual CO₂ fluxes. We found differences in the classification methods of the LUCC data, showing differences in the total deforested area. The LUCC data have different tendencies in each CARBAM influence area having more deforestation in the east side of the Amazon CARBAM sites. There is no clear trend between LUCC and carbon fluxes in the last 8 years. Inter-annual CO₂ fluxes variability could be related with the several droughts that influence the photosynthesis/respiration. Here we highlight the scale issues regarding LUCC datasets, atmospheric CO₂ measurements and CO₂ modeling to better understand the current Amazon carbon balance.

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