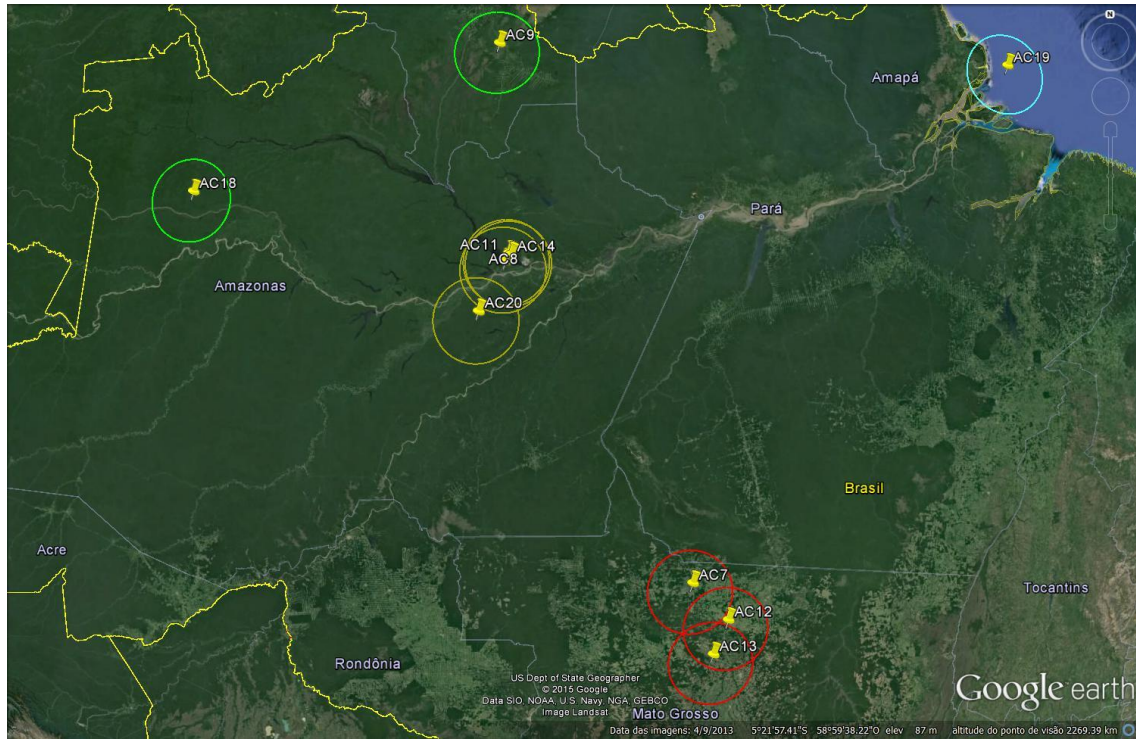


## **Amazonian clouds microphysical profiles measured by HALO**

The HALO aircraft performed 14 flights during the GoAmazon2014/5 second IOP, covering a wide range of scientific observations such as atmospheric chemistry and radiation, aerosol composition and cloud microphysical properties. Cloud profiling sections were performed in 10 flights providing around 1h20m of in-cloud data. The long-range capabilities of the aircraft allowed for different types of clouds to be measured, according to the region of sampling. Figure 1 shows the location of all profiles, highlighting the different conditions for cloud formation concerning surface properties and, consequently, aerosol concentrations and composition. Three profiles were performed on the northern part of Mato Grosso state, which is a region of intense deforestation activity with frequent biomass-burning events. Flights AC9 and AC18 contained cloud profiling sections over remote Amazon, which presents a pristine atmosphere. Four profiles were sampled during the coordinated flights with G-1 (AC8, AC11, AC14 and AC20) where the atmosphere can alternate between clean and polluted due to the contrast of the natural and urban-affected air. A profile over the Atlantic Ocean was also performed for the maritime clouds reference. The main goal of this study is to compare cloud microphysical properties under different conditions.

Forested, deforested and maritime regions differ not only on aerosol characteristic but also on thermodynamics. The diverse surface properties interact differently with the atmosphere, with distinct exchanges through the turbulent fluxes. Additionally, the temperature and humidity profiles may differ significantly and the instability factor has to be taken into account. The proposed methodology intend to evaluate cloud aerosol loading for nearly the same thermodynamic conditions, using the updrafts and downdrafts as main descriptors of the instabilities. This evaluation will be assessed mainly with respect to the clouds warm-phase formation. However, the characteristics of the cloud's mixed phase will also be evaluated. The specific results to be shown consist of vertical profiles of droplets size distributions (DSD), effective diameters, concentrations and liquid content, all normalized with respect to the vertical velocity. The altitude of the first ice formation will also be analyzed and its relation to aerosol conditions explored.



**Figure 1:** Cloud profiles locations and the corresponding surface conditions.