Measurements of primary biological aerosol particles and ice nuclei at the Amazon Tall Tower Observatory.

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Bioaerosols may play important role in the water cycle by acting as cloud condensation and ice nuclei particles (INP). However, there are large uncertainties in their concentrations, sources, and physical as well as chemical properties. In this study we present the measurements of bioaerosols and their contribution as INP at the remote Amazon Tall Tower Observatory located in the central Amazon Basin during the period of 6th to 18th September 2018. In order to measure the number of INP which are active in the deposition and condensation modes, aerosol samples were collected by Programmable electrostatic aerosol collector and then analyzed using the ice nucleus counter FRIDGE. The relationship of INP concentration with temperature and RHice is presented. In addition, aerosol particles were collected by successive filtration using four filters of decreasing porosity to separate particles into defined size ranges. For each size range, total and biological (heat sensitive) INP were quantified by using a droplet freezing array 'LINDA' (LED-based Ice Nucleation Detection Apparatus) between - 5 oC and -14 oC. A small portion of each filter paper was analyzed using Scanning Electron Microscope (SEM) coupled with Energy-dispersive Spectra Detector (EDX). Based on SEM analysis, the abundance and morphological properties of various bioaerosol types (e.g. pollen, fungi etc) are presented. The data presented in current study will help elucidate the role of biological particles on cloud microphysical processes in numerical modeling.