

Effects of simulated warming on bacterial diversity and abundance in tropical soils from East Malaysia using open top chambers

ABSTRACT

The effects of global warming are increasingly evident, where global surface temperatures and atmospheric concentration of carbon dioxide have increased in past decades. Given the role of terrestrial bacteria in various ecological functions, it is important to understand how terrestrial bacteria would respond towards higher environmental temperatures. This study aims to determine soil bacterial diversity in the tropics and their response towards in situ warming using an open-top chamber (OTC). OTCs were set up in areas exposed to sunlight throughout the year in the tropical region in Malaysia. Soil samples were collected every 3 months to monitor changes in bacterial diversity using V3–V4 16S rDNA amplicon sequencing inside the OTCs (treatment plots) and outside the OTCs (control plots). After 12 months of simulated warming, an average increase of 0.81 to 1.15 °C was recorded in treatment plots. Significant changes in the relative abundance of bacterial phyla such as *Bacteroidetes* and *Chloroflexi* were reported. Increases in the relative abundance of *Actinobacteria* were also observed in treatment plots after 12 months. Substantial changes were observed at the genus level, where most bacterial genera decreased in relative abundance after 12 months. This study demonstrated that warming can alter soil bacteria in tropical soils from Kota Kinabalu.