



NO_x and O₃ above a tropical rainforest: an analysis with a global and box model

<http://www.firstlight.cn> 2010-11-11

A cross-platform field campaign, OP3, was conducted in the state of Sabah in Malaysian Borneo between April and July of 2008. Among the suite of observations recorded, the campaign included measurements of NO_x and O₃ – crucial outputs of any model chemistry mechanism. We describe the measurements of these species made from both the ground site and aircraft. We then use the output from two resolutions of the chemistry transport model p-TOMCAT to illustrate the ability of a global model chemical mechanism to capture the chemistry at the rainforest site. The basic model performance is good for NO_x and poor for ozone. A box model containing the same chemical mechanism is used to explore the results of the global model in more depth and make comparisons between the two. Without some parameterization of the nighttime boundary layer – free troposphere mixing (i.e. the use of a dilution parameter), the box model does not reproduce the observations, pointing to the importance of adequately representing physical processes for comparisons with surface measurements. We conclude with a discussion of box model budget calculations of chemical reaction fluxes, deposition and mixing, and compare these results to output from p-TOMCAT. These show the same chemical mechanism behaves similarly in both models, but that emissions and advection play particularly strong roles in influencing the comparison to surface measurements.

[存档文本](#)