

USE OF TRMM MEASUREMENTS IN THE STUDY OF DEFORESTATION AND REGIONAL CLIMATE OVER AMAZONIA

R. Bras(1), J. Wang(1) and F. Chagnon(1)

(1)Massachusetts Institute of Technology

The rapid loss of rain-forest over the Amazon basin has motivated active research aimed at understanding its impact on regional and global hydrological cycle and climate. Previous studies have concluded that atmospheric response depends on the scale and extent of the deforestation. Large scale deforestation (~2500km) could lead to reduction in rainfall and weakening of large-scale circulation. Deforestation at regional scale (~250km) may reduce local rainfall but may not affect the large-scale circulation. A series of numerical simulations are on-going to further investigate the impact of deforestation on regional rainfall. The simulated distribution of rainfall will be compared with the TRMM month rainfall data to detect signals of possible climate change over Amazonia. Our recent analytical and numerical modeling studies at local scale (~25km) further reveal that the land surface heterogeneity due to the partial clearance may induce mesoscale circulations under the condition of relative weak synoptic forcing during the dry and transition season. Such mesoscale circulations could trigger convection leading to an enhancement of cloudiness and local precipitation. The enhancement of shallow cumulus has been observed by the VIS/IR images from GOES data which show an evident correlation between the low cumuli with the variable land cover. A statistical study is underway to establish a relationship between the distribution of deforestation and that of clouds. The preliminary examination of the correspondence between the local rainfall and the land cover over the region under study as seen in TRMM PR measurements is inclusive. A collaborative study is on-going on this subject.