



Deforestation effects on local temperature change inferred from MODIS satellite observations

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Changes to land surface cover affect climate by modifying the local energy balance and by altering atmospheric CO₂ concentrations. We analyze high-resolution (0.05°x0.05°) satellite derived global land cover and temperature observations to determine the local temperature change associated with deforestation by considering two year temperature averages for pre and post deforestation. The temperature response to deforestation shows large spatial heterogeneity with some latitudinal trends. Deforestation between 20° and 50° South is associated with localized cooling of 0.1 to 0.2° K, while deforested areas between 20° and 50° North show warming of 0.15 to 0.25° K and equatorial regions between 20° S and 20° N also show cooling of approximately 0.22° K. The change in temperature after deforestation was also examined for 5 distinct IGBP forest types: Evergreen Needleleaf, Evergreen Broadleaf, Deciduous Needleleaf, Deciduous Broadleaf and Mixed Forest. There does not however appear to be any consistent forest type dependent temperature response to deforestation. We plan to use satellite derived albedo and evapotranspiration to gain further insight into the temperature response due to deforestation.