1163-05-214   **Jacob Brown*** (jbrown18@ithaca.edu), Department of Mathematics, Ithaca College, Ithaca, NY 14850, and **Adam Giammarese**, School of Mathematical Sciences, Rochester Institute of Technology, Rochester, NY 14623. *A Networks Perspective on the Sensitivity of the Global Climate to Perturbations over the Amazon.*

The Amazon rain forest is one of the tipping elements of the global climate system; widespread deforestation is predicted to lead to permanent changes in rainfall patterns, hotter temperatures, and forest dieback over the region. Network analysis has been used to study several local and global climate systems; in this work, we employ it to study the impact of the deforestation of the Amazon rain forest on the stability of the global climate system. We analyze surface air temperature from the NCEP/NCAR reanalysis data set and transform this data into networks on various time scales. Employing a multitude of measures from network analysis and dynamical systems, we show that the Amazon rain forest is a significant component of the global climate. We simulated deforestation as an attack on the global climate network and discovered that removal of the Amazon-produced a 27.0% decrease in average communicability in the network, as compared to an 8.6% decrease produced via random removal of any other region of the same size on the planet. Using Lyapunov exponents and the spectra of adjacency matrices and graph Laplacians, we also analyze the stability of the dynamics of the global climate under deforestation of the Amazon. (Received August 27, 2020)