1163-37-1401 **Ivan Sudakov*** (isudakov1@udayton.edu), 300 College Prk., Dayton, OH 45469. *Complex bifurcations in fast-slow climate-ecosystem dynamics.*

Understanding the effects of the climate on ecosystems and biodiversity has been a focus of intense theoretical and empirical research recently. Much less attention has been paid to the possible feedback that ecosystems and the biosphere more generally can have on the climate. Meanwhile, the is evidence that such feedbacks do exist: one example is readily given by the dependence of the ocean albedo on the phytoplankton abundance. In this paper, we consider the stability of the global climate system by linking a conceptual climate model to a generic population dynamics model with random parameters. We first show that the dynamics of the corresponding coupled system possesses multiple timescales and hence falls into the class of slow-fast dynamics. We then investigate the properties of a general dynamical system to which our model belongs and prove that the feedbacks from the population dynamics cannot break the system's stability as long as the biodiversity is sufficiently high. That may explain why the climate is apparently stable over long time intervals. Interestingly, our coupled climate-biosphere system can lose its stability if biodiversity decreases; in this case, the evolution of the biosphere under the effect of random factors can lead to a global climate change. (Received September 15, 2020)