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Measuring forest resilience and exploring tipping point behavior

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Forests provide an important ecological service by partially balancing the global carbon budget, sequestering about one quarter of anthropogenic emissions (2.4 Gt C per year). However, several forest biomes are subject to increasing stress and tree mortality due to invasive pests, drought and fire and these appear to be exacerbated by climate change. A question arising for forest managers and policy makers is how to anticipate and deal with the acceleration of forest stress and mortality with on-going warming climate. To provide a baseline to which anticipated changes may be compared. We attempt to answer questions: how can we quantify and measure forest resilience? What kind of climate trend or pattern is the key control to forest tipping point? And what are tipping point behaviors of forests? We have explored these questions by using tree-ring data, remote sensing images, eddy flux tower data, and nonlinear stability theory. Here, we report some initial results along with the pilot-studies.

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