

165 [S-1]: FOREST CARBON CHANGES OF THE UNITED STATES IN RESPONSE TO IMPACTS OF DISTURBANCES, SUCCESSION, CLIMATE VARIABILITY AND ATMOSPHERIC CHEMISTRY

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U.S. forests and forest products currently offset about 20% of the nation's fossil fuel emissions. Two of the most significant recent scientific findings cast doubt on the sustainability of this offset. First, there are clear indications that the strength of the U.S. forest carbon offset is weakening due to increasing forest age, climate variability, and increasing natural disturbances. Second, climate change is expected to further increase frequencies of natural disturbances in forest ecosystems, consequently influencing forest carbon pools in a significant way. In addition, responses of forests may vary noticeably from one region to another because of variability in climate changes, land-use changes, disturbances, and impacts. We aim to improve understanding and quantification of critical impacts of land disturbances and climate variability on forest carbon dynamics.

We integrate remote sensing and land inventory data to generate spatial information addressing consequences of disturbances. We use ecosystem models, including a modification of InTEC, to incorporate age-climate growth and mortality equations in response to disturbance, and attribute carbon changes to main causes: land management, climate variability, disturbances, and other factors. The study provides annual estimates and maps of forestland-atmosphere carbon exchange, and establishes a basis for projecting expected changes in carbon stocks under scenarios of future climate and disturbances.