

NEON: Climate and climate-related ecological impactsHenry Loescher[†];[†] National Ecological Observatory Network, USALeading author: hloescher@neoninc.org

The changing abiotic environment directly affects that biotic environment in ways we still do not fully understand--and can also feedback to the abiotic environment. While climate observations and modeling are maturing, understanding the interplay with the terrestrial biotic environment and associated feedbacks are still nascent. This is particularly true when we wish to scale these understandings in time and space, and in planning adaptation strategies. We introduce a new, pioneering observatory approach that links the drivers (abiotic), the ecological processes (biotic function) and their interaction effects from the local (ecosystem) to the continental scale. The same suites of abiotic and biotic measurements will be made consistently across the continent with the same data quality control. A spatiotemporal scaling strategy is applied to 7 grand challenges; biogeochemistry, biodiversity, climate change, ecohydrology, infectious disease, invasive species, and land use change. Data are produced from 20 hz to annual timesteps, from the plot-level to 400 km² and modeled to region to continent. We will produce over 500 level 1 data products and over 135 level 4 (spatially scaled) data products, which includes many data assimilated products. Data products are archived, free and openly available. Here, we explore how an observatory approach can link to climate and climate related processes through a fully coupled system in 3 case studies; i) ecosystem productivity (relationships among temperature, water, radiation, and chemical climate) ii) changes in plant communities (water use efficiencies), and iii) patterns of infectious diseases. A 5-y construction schedule began this summer, once build it is planned to operate for 30-y.