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Combining observations from the National Ecological Observatory Network to meet the climate challenge

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The National Ecological Observatory Network has been designed to monitor ecological responses to climate change over the next 30 years. Ecologists are challenged to understand the effects of a range of environmental perturbations to the Earth system from global phenomena like climatic or atmospheric change to land use transformations. Today ecologists can observe, collect, record and store more data, more frequently and more extensively than ever before. One approach to address these problems and opportunities is to fuse observations with mathematical models using data assimilation or model optimization techniques to infer responses to climatic change. I discuss how these techniques can be applied to the planned NEON data set and to existing ecological data sets to carry out investigations of the response of net ecosystem exchange to climatic variability. I also discuss the challenges and opportunities of using these techniques with multiple data streams at the continental scale and how this understanding can be used to inform future projections of climate change.