



Tuesday, October 27, 2015

3:30pm-4:30pm (refreshments at 3:15pm)

Bechtel Collaboratory in the Discovery Learning Center (DLC)

University of Colorado, Boulder

Effects of climate oscillations on wind-resource variability in the United States

Peter Hamlington, University of Colorado, Boulder

Natural climate variations in the United States wind resource are assessed by using cyclostationary empirical orthogonal functions (CSEOFs) to decompose wind reanalysis data. Compared to approaches that average climate signals or assume stationarity of the wind resource on interannual time scales, the CSEOF analysis isolates variability associated with specific climate oscillations, as well as their modulation from year to year. Contributions to wind speed variability from the modulated annual cycle (MAC) and the El Niño-Southern Oscillation (ENSO) are quantified, and information provided by the CSEOF analysis further allows the spatial variability of these effects to be determined. The impacts of the MAC and ENSO on the wind resource are calculated at existing wind turbine locations in the United States, revealing variations in the wind speed of up to 30% at individual sites. The results presented here have important implications for predictions of wind plant power output and siting.

Atmospheric inversions for biosphere-atmosphere exchange of CO₂ yield new insights into climate-carbon dynamics in the Amazon

Caroline Alden, University of Colorado, Boulder

New investigation of climate impacts on carbon cycling in one of the world's most biodiverse and carbon-rich biomes is now possible following four years of regular sampling of vertical profiles by aircraft over the Brazilian Amazon. This rich new dataset is used in a regional inversion for net biome exchange (NBE) of CO₂ in the Amazon at monthly and regional time and space scales, yielding novel evidence for the links between climate extremes and NBE response. This talk will cover the inversion framework and unique methods for constraining flux and observation uncertainty, including background inflow, as well as highlight findings for the years 2010-2012.