Welcome!

Please join us for the ATOC Colloquium on **February 8, 2019** from **11:00am-noon** in **SEEC S228** featuring ATOC Graduate Students **Nicola Bodini, Jessica Tomaszewski and Devon Dunmire**. Come early for coffee starting at 10:45am, and lunch will be served after!

Towards a better understanding of turbulence dissipation rate

Despite turbulence being a fundamental transport process in the boundary layer and an essential quantity to consider in wind energy projects, the capability of current numerical models to represent it is undermined by the limits of the adopted assumptions. We have then leveraged the potential of extensive observations in determining the variability in turbulence dissipation rate (ε) from different field campaigns, from both in-situ and remote sensing instruments. We find that over land ε shows strong diurnal and annual cycles, with larger values during daytime conditions and in summer. Orographic features have a strong impact on the variability of ε, with larger values found in sites located downwind of complex orographic structures or in wind farm wakes. ε shows much smaller values and suppressed cycles offshore, except for when the wind is coming from the land. (**Bodini**)

Quantifying wake impacts on downwind wind farms using the WRF Wind Farm Parameterization

As wind energy continues to grow worldwide, increasing amounts of competing wind farms are built side-by-side in order to capture as much valuable wind as possible. A consequence of this dense development arises when the wake (an area of reduced winds) behind an "upwind" wind farm encroaches on a neighboring "downwind" wind farm, resulting in reduced power production and subsequent revenue. In order to better understand the frequency, timing, and impact on power production of these waking events, we employ the Wind Farm Parameterization included in the Weather Research and Forecasting model to simulate a region in Texas characterized by neighboring, competing wind farms that frequently wake one another. The hourly temporal resolution of the mesoscale simulations reveal how simulated wind farm wakes vary as a function of wind speed, wind direction, and atmospheric stability. Furthermore, simulated wakes created by the "upwind" wind farm cause an 8% drop in power production at the "downwind" wind farm over duration of one month. (**Tomaszewski**)

In situ and remote observations of a subsurface lake collapse in East Antarctica

The presence of meltwater influences Antarctic ice shelf dynamics in a way that is poorly understood. In addition to surface meltwater, subsurface meltwater lakes have been discovered close to the ice shelf grounding line. Drainage and collapse of these subsurface lakes may induce hydrofracturing and poses a potential threat to ice shelf stability. Here, we present unique direct observations of the near-surface firn and ice shelf structure before and after the collapse of a subsurface meltwater lake near the grounding line of the Roi Baudouin Ice Shelf (RBIS). We also investigate the usefulness of remote data sets to detect these subsurface lake collapses, indicating that these events can be detected remotely. (**Dunmire**)

About the ATOC Colloquium

The Department of Atmospheric and Oceanic Sciences Colloquium is held **every other Friday** from **11:00 AM-noon** in **SEEC S228**. Colloquia will alternate between the following formats: (A) Full-length talk by a faculty member or invited speaker, (B) Three conference-length talks by graduate students. If you would like to nominate a speaker (including self), please email the ATOC Colloquium Committee Chair, Prof. Jan Lenaerts (jan.lenaerts@colorado.edu). Please visit www.colorado.edu/atoc/colloquium for further details and the upcoming schedule.