CGD SEMINAR

NCAR

DATE: Tuesday, 25 October 2016

TIME: 11 a.m.

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Tracking extremes in climate data: community defragging and understanding uncertainty

SPEAKER: Colin Zarzycki, NCAR/CGD

ABSTRACT:

  Algorithmic Lagrangian feature tracking is becoming more widely used in the climate community for detecting and tracking discrete extremes, including tropical and extratropical cyclones, atmospheric rivers, and mesoscale convection. As high-resolution datasets become more readily available, the number of trackers has continued to grow, producing an increasingly fragmented ecosystem of codebases. This presentation describes a new open-source, parallelized, software framework for automated feature tracking applicable to a wide variety of datasets on either structured or unstructured grids. Rather than define a new scheme, a generalized suite of algorithmic kernels has been developed to capture the core functionality of tracking routines from throughout literature.

  One recent application of this framework is the use of sensitivity analysis to screen for input parameter configurations (i.e., thresholds) that contribute significantly to sensitivity in output metrics (i.e., storm counts). As an example, tracked tropical cyclone (TC) trajectories in reanalyses are compared to a pointwise observational record. Results show that using vertically-integrated metrics for defining cyclone thermal structure are superior to single-temperature levels. Input thresholds defining vortex strength contribute the most variance in TC results. Integrated output metrics are shown to be less variable than traditional 'counting' metrics. An example of tracker optimization is shown, with tracked TCs demonstrating better hit and false alarm rates than previously published studies. Differences in climate extremes between experiments may vary as a function of input parameter space, underscoring the need to standardize tracker configurations and quantify confidence in multi-model experiments.

Live webcast: http://www.fin.ucar.edu/it/mms/ml-live.htm

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