TempestExtremes: A Framework for Scale-Insensitive Pointwise Feature Tracking on Unstructured Grids

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This paper describes a new open-source software framework for automated pointwise feature tracking that is applicable to a wide array of climate datasets using either structured or unstructured grids. Common climatological pointwise features include tropical cyclones, extratropical cyclones and tropical easterly waves. To enable support for a wide array of detection schemes, a suite of algorithmic kernels have been developed that capture the core functionality of algorithmic tracking routines from throughout literature. A review of efforts related to pointwise feature tracking from the past three decades is included. Selected results using both reanalysis datasets and unstructured grid simulations are provided.