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Extra-Tropical Cyclones at Climate Scales: Comparing Models to Observations

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Climate is often defined as the accumulation of weather, and weather is not the concern of climate models. Justification for this latter sentiment has long been hidden behind coarse model resolutions and blunt validation tools based on climatological maps. The spatial-temporal resolutions of today's climate models and observations are converging onto meteorological scales, however, which means that with the correct tools we can test the largely unproven assumption that climate model weather is correct enough that its accumulation results in a robust climate simulation. Towards this effort we introduce a new tool for extracting detailed cyclone statistics from observations and climate model output. These include the usual cyclone characteristics (centers, tracks), but also adaptive cyclone-centric composites. We have created a novel dataset, the MAP Climatology of Mid-latitude Storminess (MCMS), which provides a detailed 6 hourly assessment of the areas under the influence of mid-latitude cyclones, using a search algorithm that delimits the boundaries of each system from the outer-most closed SLP contour. Using this we then extract composites of cloud, radiation, and precipitation properties from sources such as ISCCP and GPCP to create a large comparative dataset for climate model validation. A demonstration of the potential usefulness of these tools in process-based climate model evaluation studies will be shown.