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Intercomparison Study of Cloud Feature Extraction and Tracking Algorithms

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Clouds and precipitation systems are fundamental features in the global climate cycle and are one focus aspect of recent high resolution, cloud resolving simulations and measurement modalities. Highly resolved data sources allow for more precise methodologies to extract and track cloud features on different scales and enable novel evaluation tasks such as life-cycle tracking, feature-based statistics, and feature-based comparison of simulation and measurements.

However, their complex dynamics and highly variable shape morphology makes extraction and tracking of clouds a challenging tasks with respect to stable and reliable algorithms. In this work we will present our efforts on establishing an community-wide inter-comparison study to provide an overview of state-of-the-art algorithms for cloud extraction and tracking. We propose a set of 2D and 3D benchmark data sets (from simulations and measurements) that are used as a common basis for comparison. In addition we describe a joint feature-based evaluation framework and provide an in depth analysis and comparison of those algorithms.

The goal is to systematically compare and assess numerical extraction and tracking techniques for cloud features in meteorological data and provide a comprehensive overview of suitable application scenarios, describe current strengths and limitations, and derive statements about their variability for feature-based analysis tasks.