

## **Extending tracking algorithms to estimation of cyclone geometry and compositing**

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We discuss the problems of extending cyclone tracking to the analysis of cyclone size and geometry and further cyclone compositing. Besides identification of storm trajectories, estimation of cyclone numbers and frequencies and basic parameters of the cyclone life cycle of an importance is the quantification of cyclone size and geometry as well as the analysis of intra-cyclone structure of the key-atmospheric variables. For this purpose we incorporate into the tracking algorithms estimation of cyclone size by using co-ordinate transform and co-locating cyclone centers with the virtual pole at each tracking step. Then the new coordinate system is used for the analysis of azimuthal SLP gradients and estimation cyclone geometry and size. Being armed with this methodology, we developed methodology for cyclone compositing by introducing scaling of the radial distributions of the characteristics and using actual to circular transform of cyclone geometry. Besides the analysis of the distribution of the parameters, compositing allows for the integration within the cyclone area of different terms of heat and water vapor balances for different cyclone life time stages. We provide comparative analysis of cyclone composites from different data sets and discuss potential reasons for differences. We also looked on the interannual variability in cyclone composites in different data in order to quantify the uncertainty of estimation of changes in the cyclone structure.