Combination of object-oriented and areal tracking algorithm for improvement of radar echo prediction

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Many algorithms for radar echo tracking and prediction have been developed in past years. Several algorithms have been implemented and tested also in the Czech Hydrometeorological Institute. Areal algorithm COTREC is currently used as the main algorithm for tracking and extrapolation of radar echo. Object-oriented CELLTRACK algorithm is used as an addition to the COTREC in convective situations. In cases where a storm cell movement is significantly deviating from the movement of surrounding storms, the CELLTRACK is able to catch this movement better than the COTREC, motion vector field of which can be too smooth in these cases. Disadvantage of the CELLTRACK algorithm is that it works only with areas of high reflectivity. This loss of part of radar information is mainly important when the CELLTRACK is used as an alternative to the COTREC for quantitative precipitation forecast.

This contribution describes a new method of combination of COTREC and CELLTRACK outputs that has been developed in order to overcome the limits of individual methods. In the area of high reflectivity cores CELLTRACK motion vectors are relevant, on the borders of high reflectivity cores both CELLTRACK and COTREC motion vectors are blended together, in the remaining area COTREC motion vectors are used. Comparison of the COTREC, CELLTRACK and their combination is presented in the contribution.