2.7 CHARACTERISTICS OF CONVECTIVE AGGREGATION IN MID-LATITUDES IDENTIFIED IN A DOPPLER C-BAND RADAR NETWORK

I. PSCHEIDT[1], S. TRÖMEL[1]

[1] Meteorological Institute, University of Bonn, Auf dem Hgel 20, 53121 Bonn, Germany
pscheidt@uni-bonn.de

Cloud-resolving models have shown that convective aggregation can spontaneously emerge in homogeneously forced simulations and affect the mean state of the atmosphere. Aggregated convection leads to drier free atmosphere and thus, to more outgoing longwave radiation. This phenomenon might have possible implications for climate and climate change. A better knowledge of the physical processes that favour convective clouds to aggregate, their characteristics and impact on the environmet is fundamental to improve climate prediction. Renewed attention has been given to the understanding of convective aggregation, specially over the tropical region. In this study we proposed to characterize convective aggregations in the mid-latitudes. We aim at answering the questions: i) how aggregated is convection outside the tropical region, ii) what is the frequency of occurrence and iii) what are the common characteristics. For this purpose we focused on the region of Germany and used radar reflectivities from the Doppler C-band radar network operated by the German Weather Service (DWD). The period of interest comprehended the months from April to September of 2014 and of 2015. Signatures of convective clouds were identified on the radar fields by means of a segmentation algorithm. Organization indices were applied to the segmented objects to determine their characteristics, namely the spatial arrangements (random, regular or aggregated), the degree of aggregation, the number of objects, the geometrical distances, the dominat shape of the objects and the amount of rainfall that they produced. In approximately 98% of the time convective clouds were aggregated emphasizing their importance for the German summer. The degree of aggregation was dependent on the distance between all possible pairs of clouds, however, it did not present significant relationship with the amount of rainfall, the shape and the number of clouds. Random and regular arrangements were identified in 1.5% and 0.5% of the time, respectively. These arrangements showed to be associated with fewer convective clouds than in aggregations. In an effort to understand more the differences and similarities in convective aggregations in the tropical and in the mid-latitude regions, the current results will be compared with the results obtained with a Doppler S-band radar located in Barbados.