Comparison of different cloud types from surface and satellite cloud classification products over China

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Different cloud types usually have different cloud dynamic process and micro-physical characteristics, and the relative cloud radiation forcing effects vary much. In recent years, the focus of cloud classification is the algorithm development, as well as the analysis on total cloud amount, high/middle/low cloud amount. While, research on the different cloud types (like cirrus, stratus, and cumulonimbus) is not enough. In this research, we use multi-resources cloud classification products including FY-2, Cloudsat and surface observation to obtain the temporal-spatial distribution characteristics and evolvement of different cloud types in different regions of China, analyze the quantitative difference of multi-source products and the reasons. According to the temporal and spatial scales of cloud, and temporal-spatial representation of cloud classification products based on CloudSat, etc, the scaling is necessary to explore in temporal-spatial matching/validation research. This research have important scientific significances on understanding the regional characteristics of different cloud types in China, improving the remote sensing retrieve algorithms on cloud classification, temporal-spatial matching/validation techniques of satellite data, and cloud vertical structure parameterized methods in numerical models.