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Cloud Classification and Characteristics Analysis of Stratocumulus Clouds over Bucharest-Magurele, Romania

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Stratocumulus clouds represent one of the key components of the Earth's radiative balance because it generally reflects incident solar radiation. The aim of the study is to understand the cloud occurrence and characteristics of stratocumulus clouds using satellite data collected from Dec 2019 to Feb 2021. The time series for cloud characteristics contained 10944 hourly profiles of which 1513 were for Stratocumulus clouds. We used a statistical cloud classification model based on data on cloud optical depth and cloud pressure top. Of the total clouds measured, Cumulus clouds were the most frequently detected (25 %), followed by Altocumulus clouds (17.48 %), Cirrus clouds (17.01 %) and Stratocumulus clouds (13.82 %). We focused on the Stratocumulus clouds. They represent a higher percentage of the total number of clouds detected, especially, in the winter months. A series of macrophysical and microphysical stratocumulus cloud parameters (cloud cover fraction, cloud top temperature, cloud top pressure, cloud height, cloud optical depth, liquid water path) were extracted from the Clouds and the Earth's Radiant Energy System (CERES) database for Magurele, a region in south west Bucharest, Romania. The highest median value for liquid water path was observed in winter 2020–2021 (61.4 g m^{-2}), reflecting the large number of Stratocumulus cloud observations during this period. The lowest median value for liquid water path was 35.14 g m^{-2} in summer 2020. The cloud water radius of the liquid particles has similar median values (8.67 - 8.92 μm) during the study period except for the winter 2020–2021, when the median value of the radius had the maximum value (9.69 μm). We calculated cloud geometric depth of the stratocumulus clouds, whose median value varied between 141.7 m (summer) and 187.3 m (winter). All these characteristics help us better understand the climatology of stratocumulus clouds [1].

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