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Multi-year analysis on cirrus cloud optical and geometrical properties at Goddard Space Flight Center in the frame of the NASA MPLNET lidar network

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In this study, we present the results of 20 years of cirrus cloud optical and geometrical properties retrieved from lidar observations at NASA Goddard Flight Space Center, a permanent site of the Micropulse lidar network (MPLNET). In this research, moreover, we also focus on determining the consistency of lidar long-term measurements, i.e. assessing the Signal-To-Noise variation over the two decades and its relationship to detection sensitivity and/or the quality of the calibration procedure. Through this research, it is possible to assess how changes in optical and geometrical properties of the cirrus clouds over twenty years impacted the Earth-atmosphere radiative budget, both at the surface and at the top-of-the-atmosphere. This unique and unprecedented study is the first step in assessing how climate changes influence cirrus cloud formation and lifetime and their feedback to climate. The same analysis will be then carried out for all the MPLNET permanent observational sites deployed at global scale.