



The fractal perimeter dimension of noctilucent clouds/polar mesospheric clouds

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Noctilucent clouds or polar mesospheric clouds are optically thin water ice clouds. They occur in the polar mesopause region (at about 83 km altitude for latitudes larger than 50°) within a 12-week period around summer solstice, since this is the coldest time in the mesosphere due to summer upwelling and adiabatic cooling. We identified cloud clusters exceeding a certain albedo threshold based on satellite images of cloud fields taken with the CIPS (Cloud Imaging and Particle Size) experiment onboard of NASA's AIM (Aeronomy of Ice in the Mesosphere) spacecraft.

By using the area and perimeter values of each cloud, which scale over almost 3 orders of magnitude, we found fractal perimeter dimensions of noctilucent clouds to be around 1.34. Although this numerical value varies between 1.23 and 1.35 depending on the albedo threshold, there is good agreement with results of the fractal perimeter dimension of tropospheric cloud and rain fields, determined by S. Lovejoy in 1981.

It is an open question as to which dynamical processes are responsible for the distribution of mesospheric clouds. One possible physical process could be turbulent mixing, because this seems to be the case for tropospheric clouds. But also gravity waves might influence the distribution and the shape of noctilucent clouds. First results on a connection between the fractal perimeter dimension of noctilucent clouds and the gravity wave activity will be presented in this poster.