

On the observation of mesospheric dust particles by rocket probes.

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Some of the most outstanding questions to be answered when investigating the mesospheric PMSE layers is to find the charges and sizes of the dust particles which control the PMSE. From various rocket dust probe observations it appears that the charges can be both positive and negative and that sometimes large amounts of dust particles of opposite charge signs can coexist. This represents a serious challenge when attempting to model dust charging and coalescence of dust, and it will also probably require that the dust particles contain a considerable amount of material other than water ice.

We will investigate in detail observations made by the first dust probe DUSTY on two flights. We will analyze the observed currents to the probe and its two grids according to two models. In the first model the observed currents are taken to be due only to the direct impact of charged dust particles so that positive currents corresponds to impact of positively charged dust . In the second model we include the possible contribution of secondary effects to explain the cases when positive currents were observed. Our results indicate that secondary effects, where dust particles can rub off negative charge from the grids, is the most likely candidate for explaining the cases where positive currents to the probe are observed.