

Disdrometer Gravitational Sorting Signature in a Mediterranean Environment

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The motivation behind this research was initially the observation and the subsequent modelling of the gravitational sorting of precipitation in disdrometer-based spectra. The gravitational sorting signature (GSS) is expected to be observed when every drop impact measured by the disdrometer is time tagged and then displayed as a scatter plot diagram of drop diameter (D) versus time (t). The resulting D - t diagrams exhibit marked diagonal features and gravitational sorting signatures are characterized by a negative slope. However, because of the way that manufacturers and researchers process disdrometer data, this signature is typically wiped out.

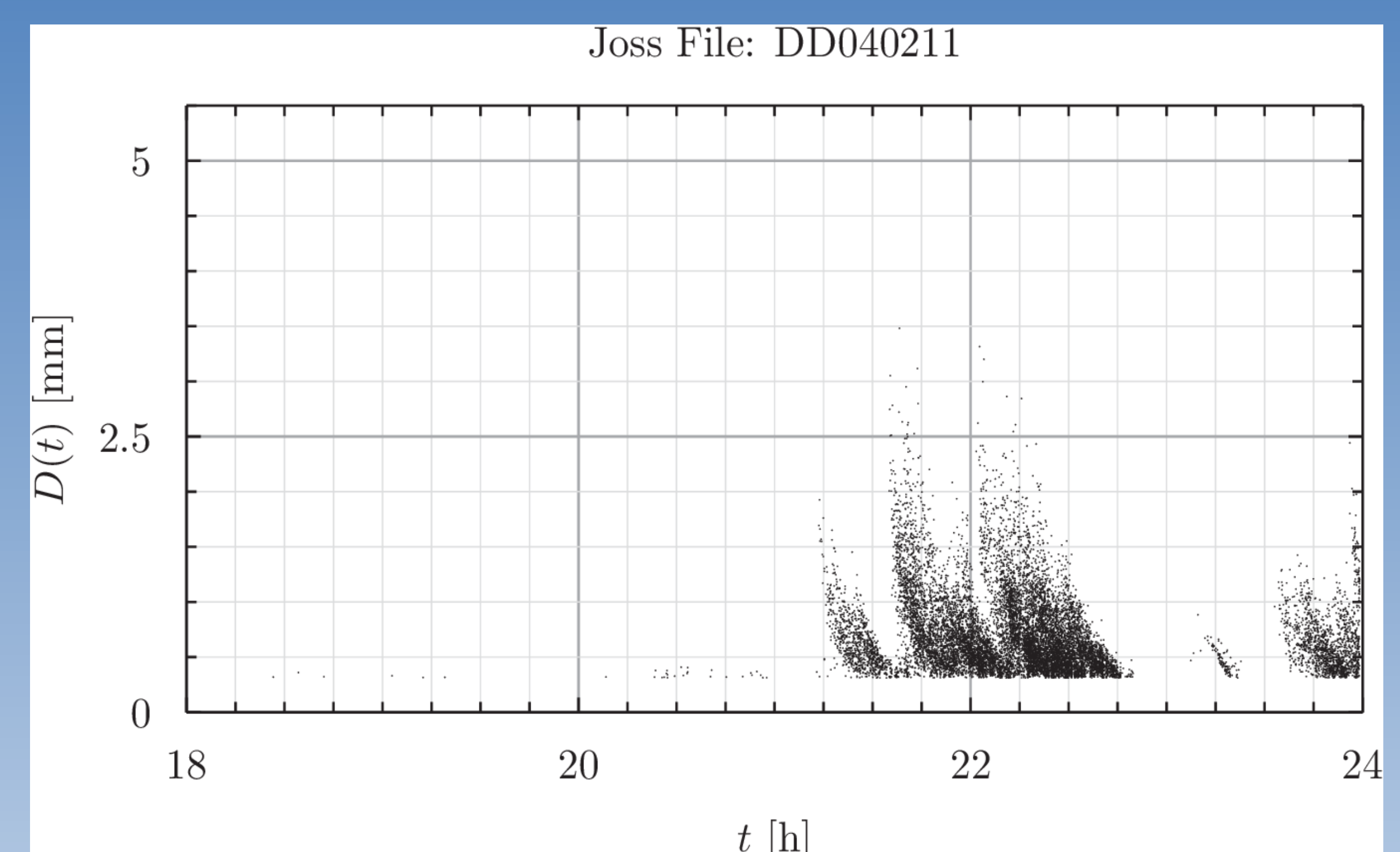
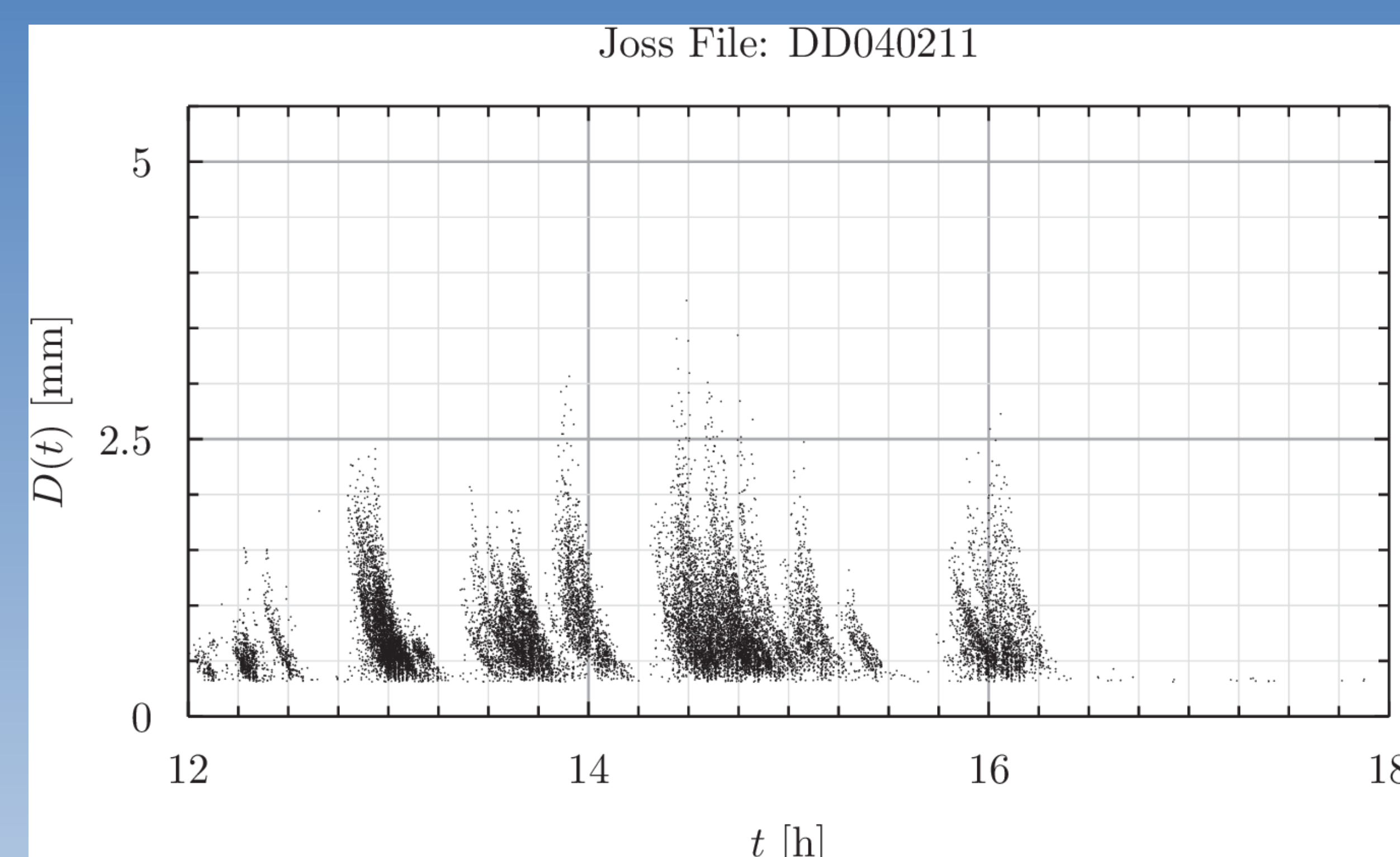
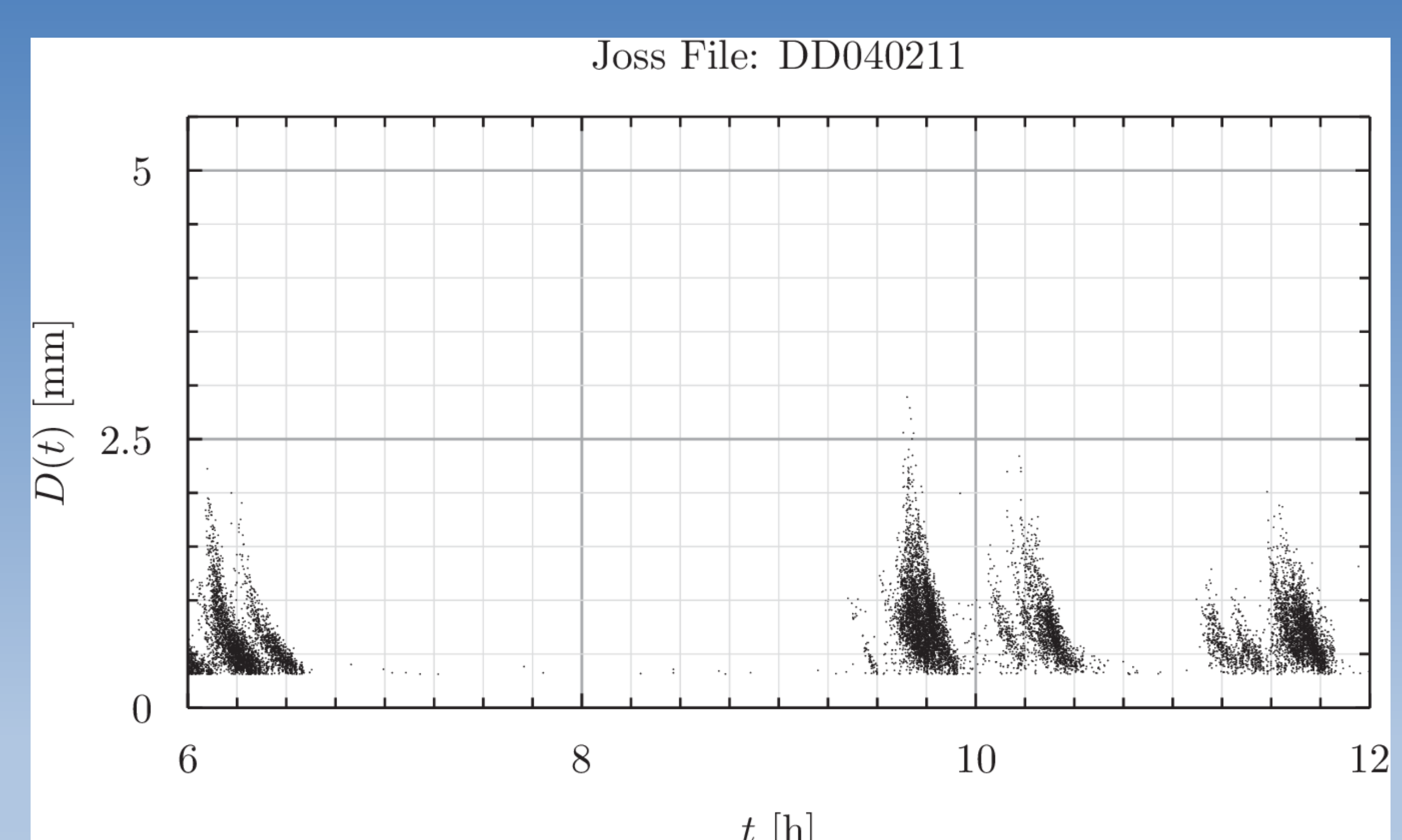
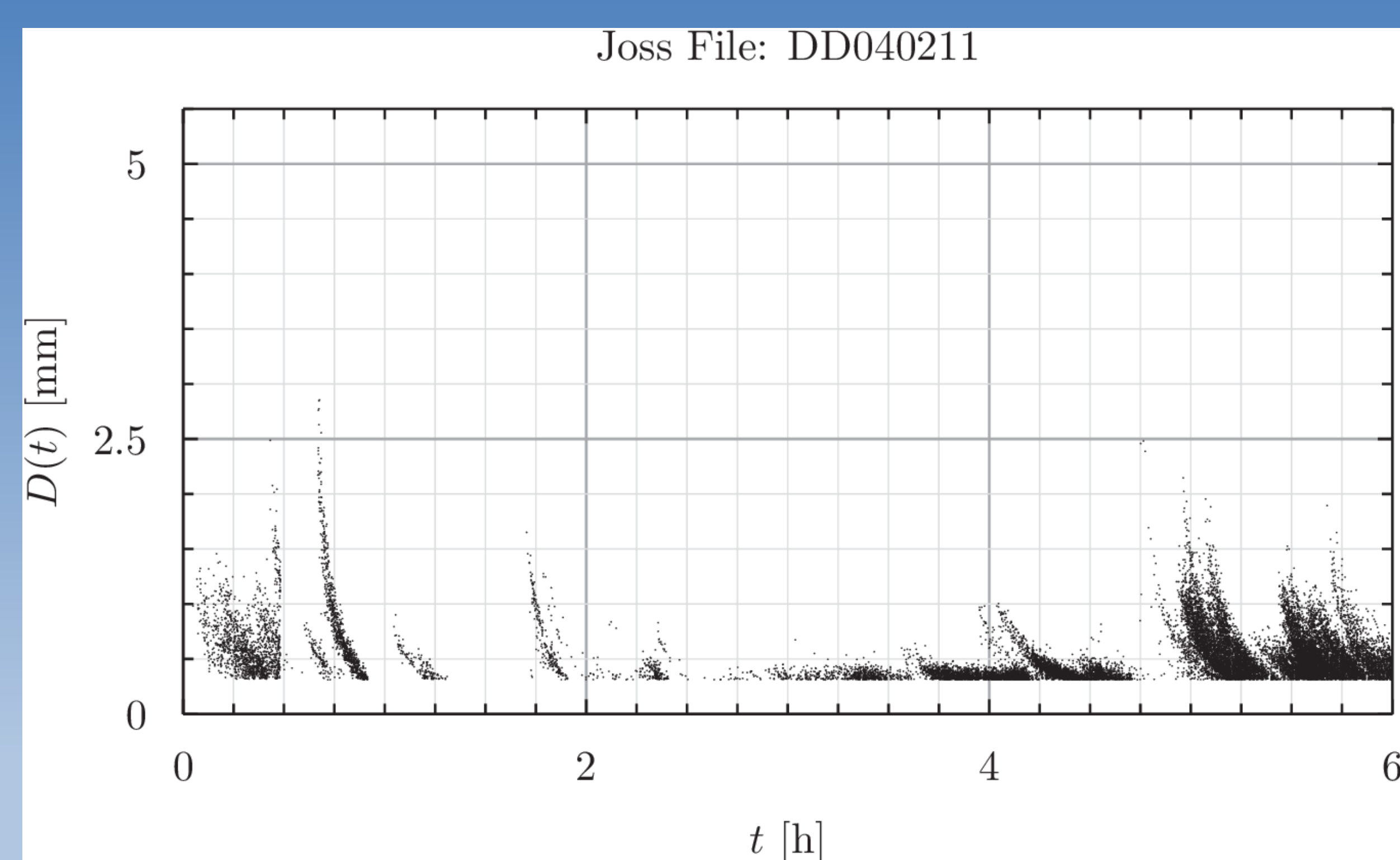
This research is based on the assumption that if a rain producing cloud that goes through a complete rain process from start to end, remains fixed (no advection) over a disdrometer site, then some GSS should occur; if advection dominates, then GSS may not be observable. In this latter case, precipitation may move over the disdrometer. In this paper, two cases are presented one in which GSS was detected and another in which GSS was absent.



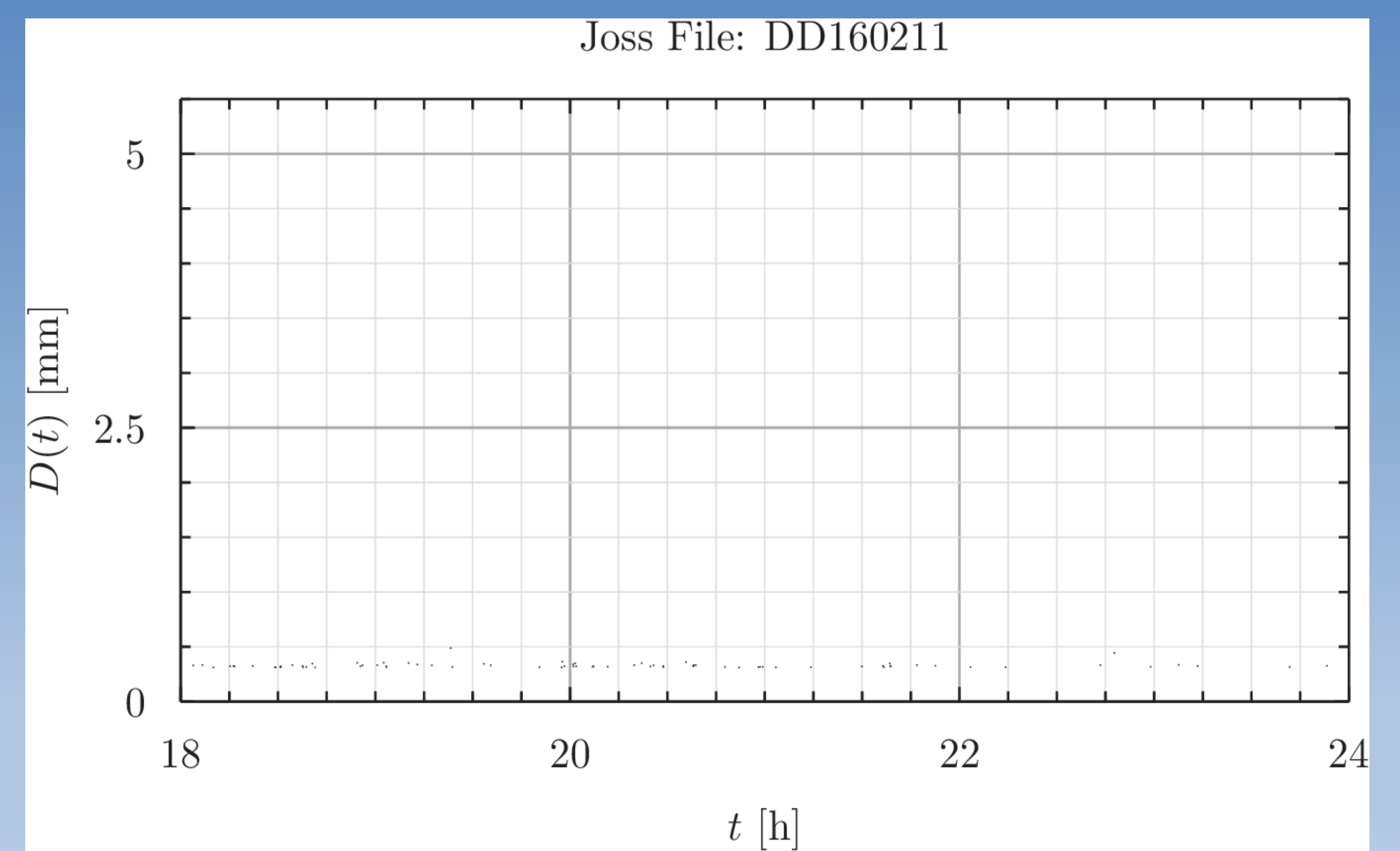
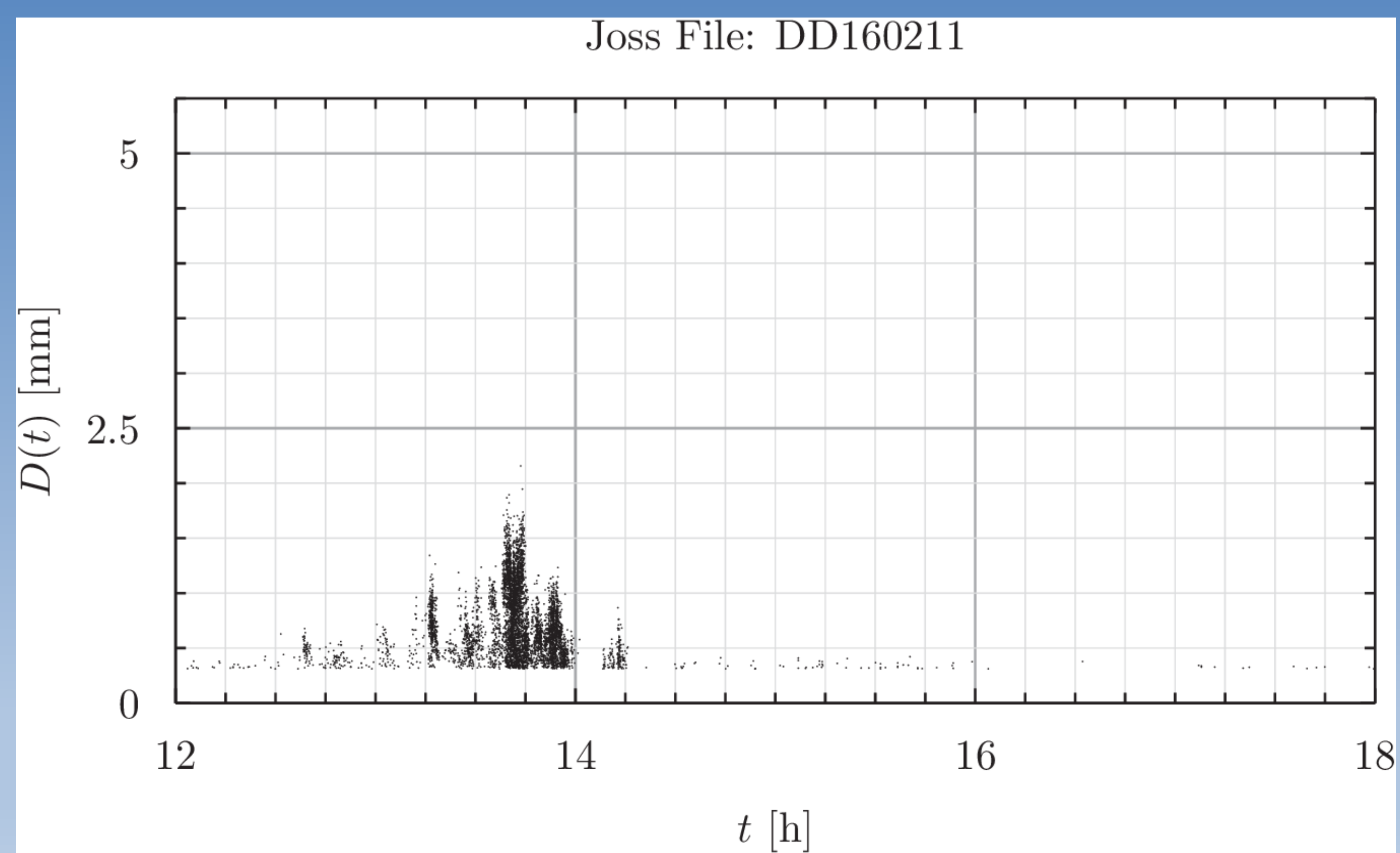
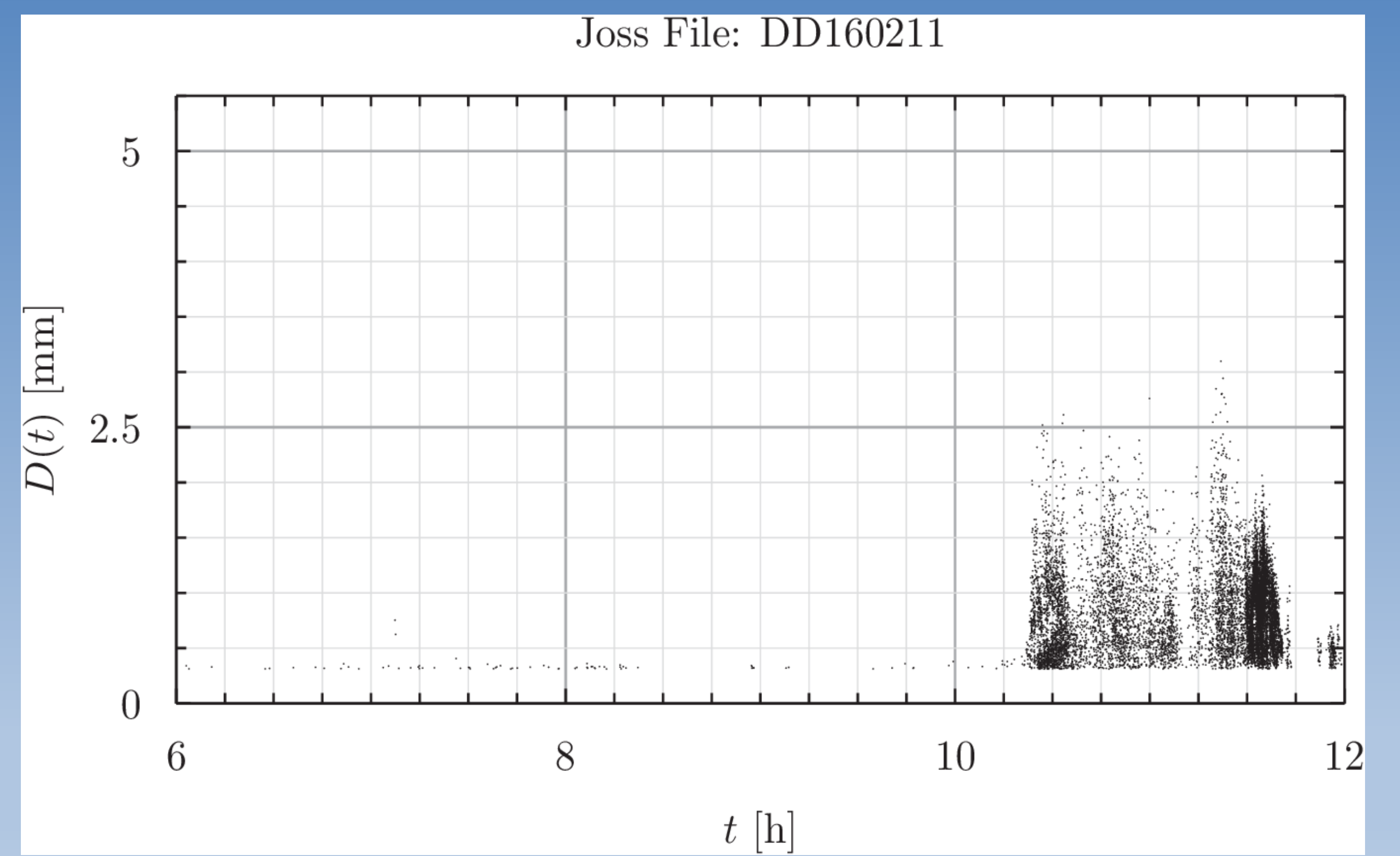
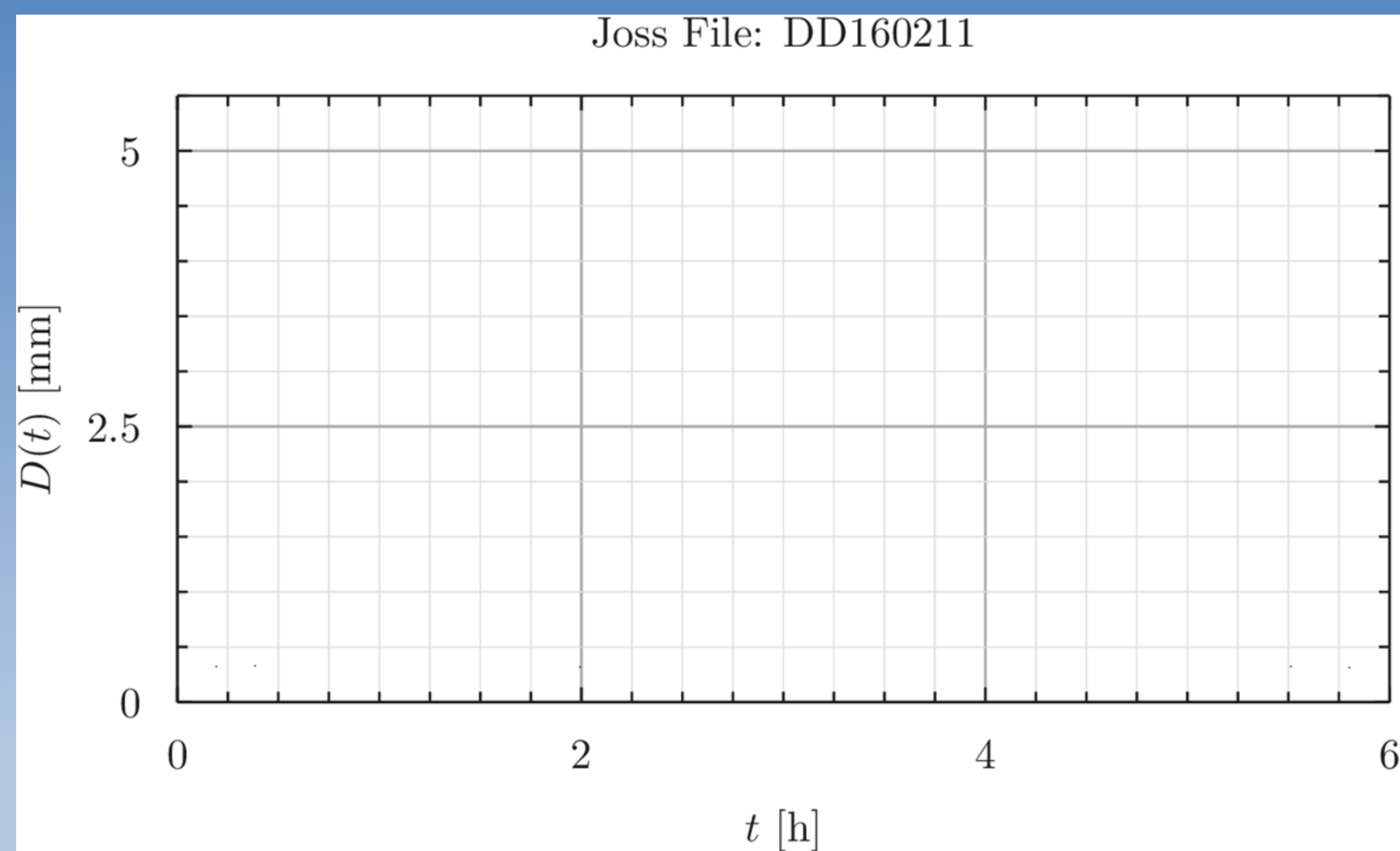
The disdrometer site at Athalassa.

The disdrometer data used in this study were recorded by using a Joss-Waldvogel impact disdrometer located on the roof of a building of the meteorological station at Athalassa, Cyprus (35.15°N , 33.40° , 161.0 m above Mean Sea Level, MSL). The Joss-Waldvogel impact disdrometer used is able to record drop diameters from 0.3mm to 5.5mm in ten-second intervals, allowing for the establishment of the Drop Size Distribution (DSD) representing this range of drop sizes.

GSS detected (4 February 2011)



GSS not detected (16 February 2011)



When the raindrop spectra are plotted as D versus t (*raindrop diameter versus time*), the resulting D - t plots often show marked diagonal features, where these gravitational sorting signatures are characterized by a negative slope.

Two cases are presented above, one where the GSS is quite marked (4 February 2011) and the other without any GSS observed (16 February 2011).