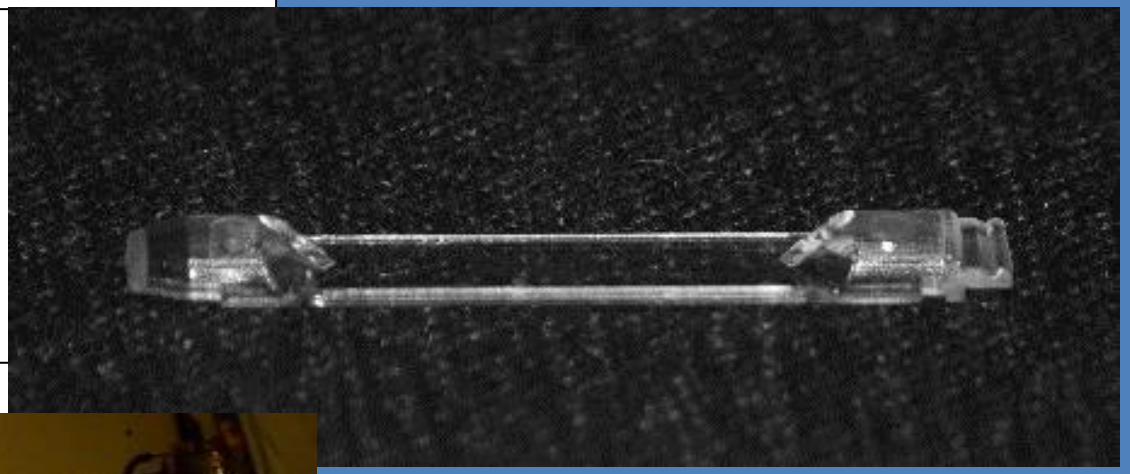
Giant aerosol particles in ICE-T: Jorgen Jensen NCAR/EOL

Sampled with Giant Nuclei Impactor (GNI)

The NCAR GNI slide impaction system.

Initial funding with a grant from the NCAR Director's instrument fund.



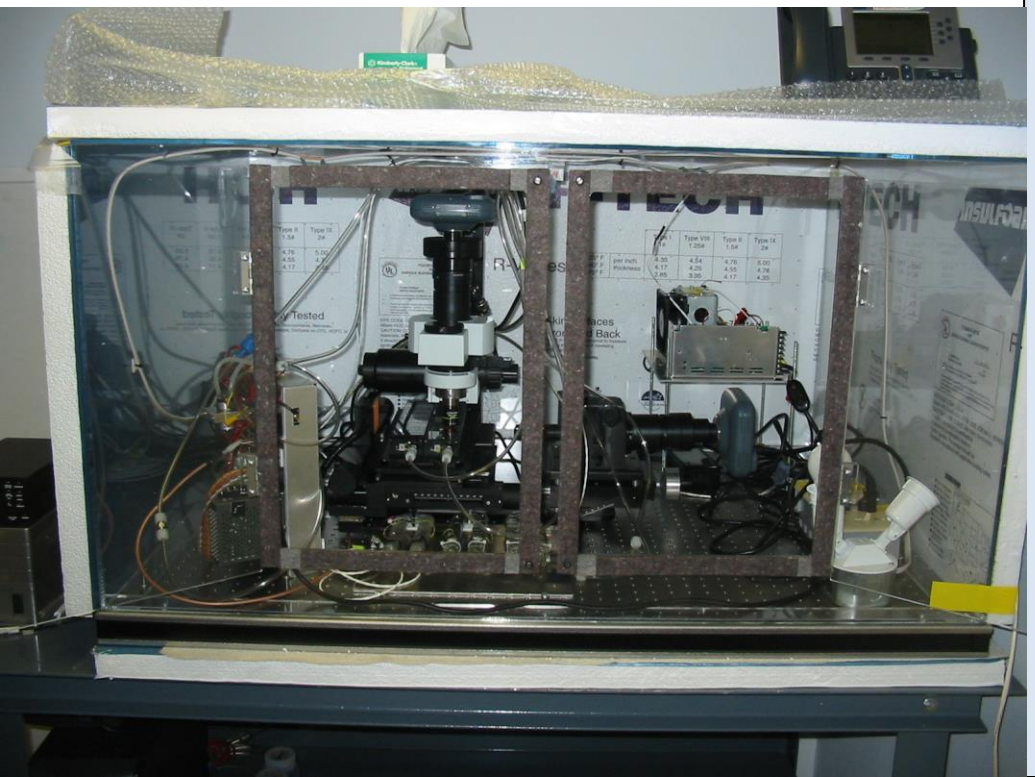
Glass microscope slides also used by e.g. Woodcock (1953), Johnson (1976).

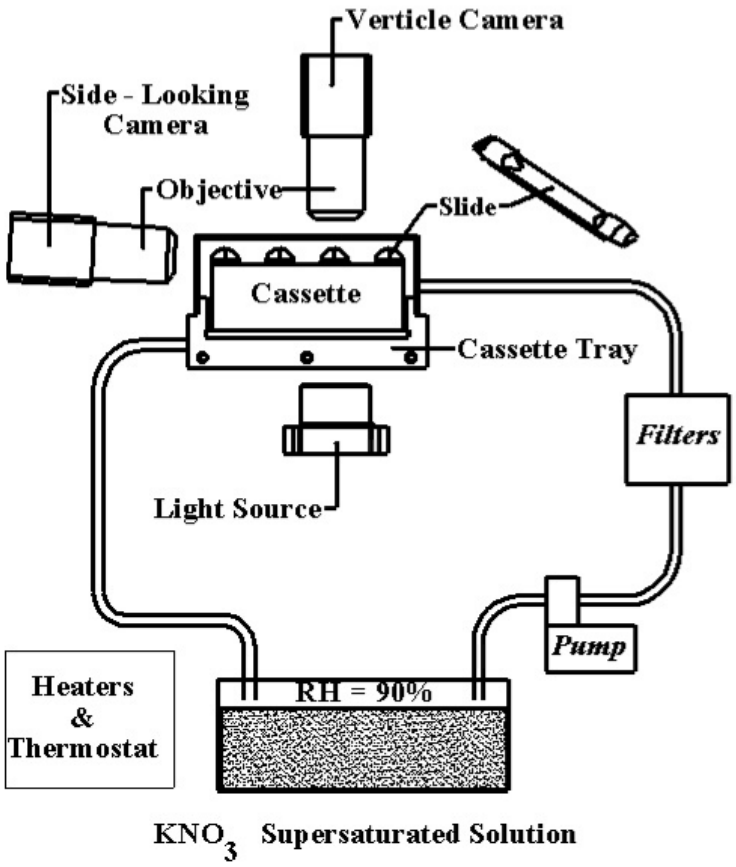
Optical microscope and image analysis:

Automatic digital microscopy, in a temperature-controlled cabinet.

Slides are kept in humidified air (90% RH), and sea-salt particles deliquesce to form spherical cap drops.

40 slides can be analyzed in one batch.



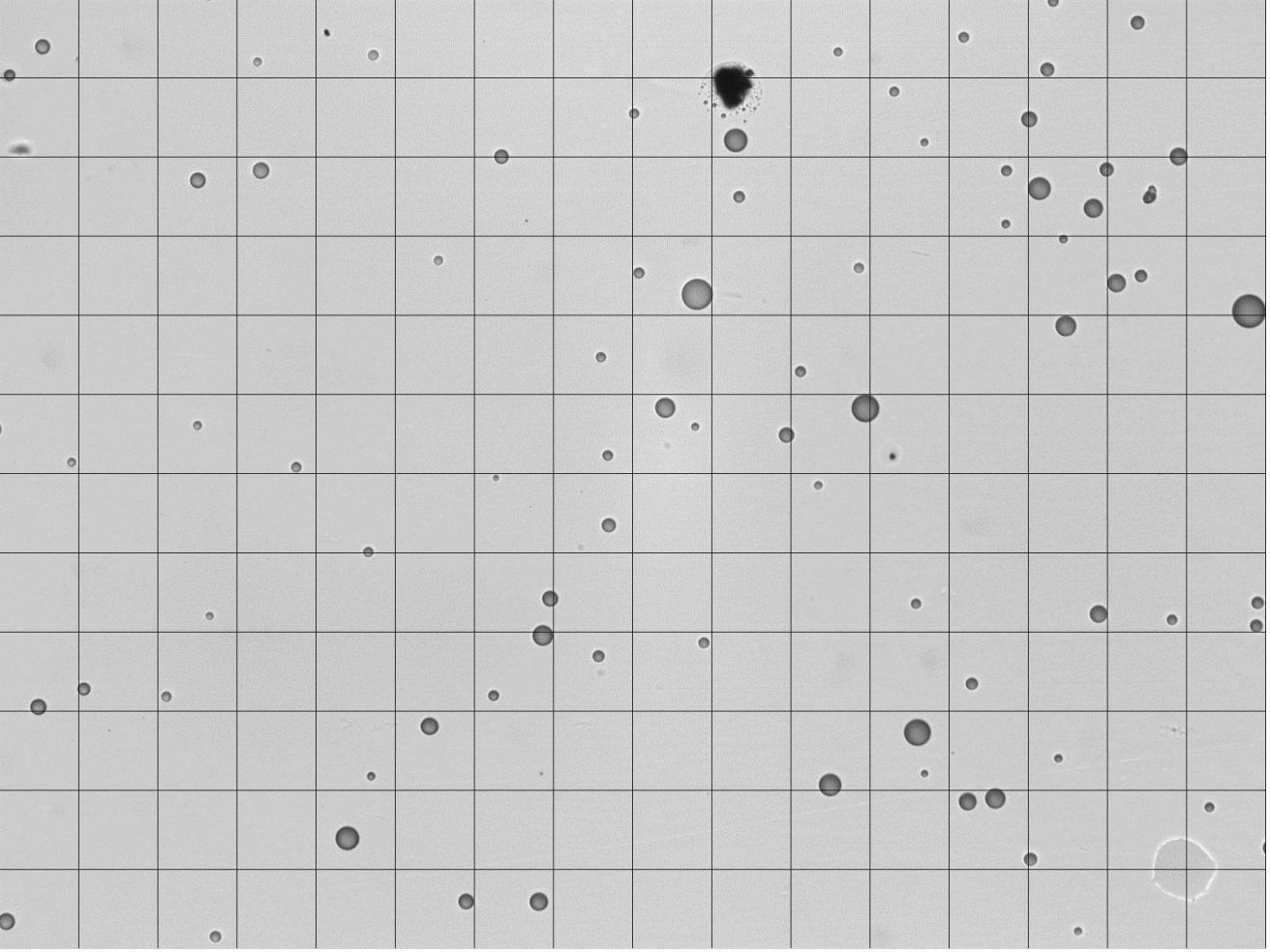


1600 x 1200 pixels (0.37 μm res.)
8-bit monochrome images

350 images per slide

0.92 cm^2 analyzed area

10 L/s sample volume at 110 m/s air speed.
(about 500 times more than an FSSP)



July 23
715 m altitude

37 micron between black lines

Seasalt is round, divide particle size by a factor 4 to get dry size.

Bio-organic: Black, 15-micron particle

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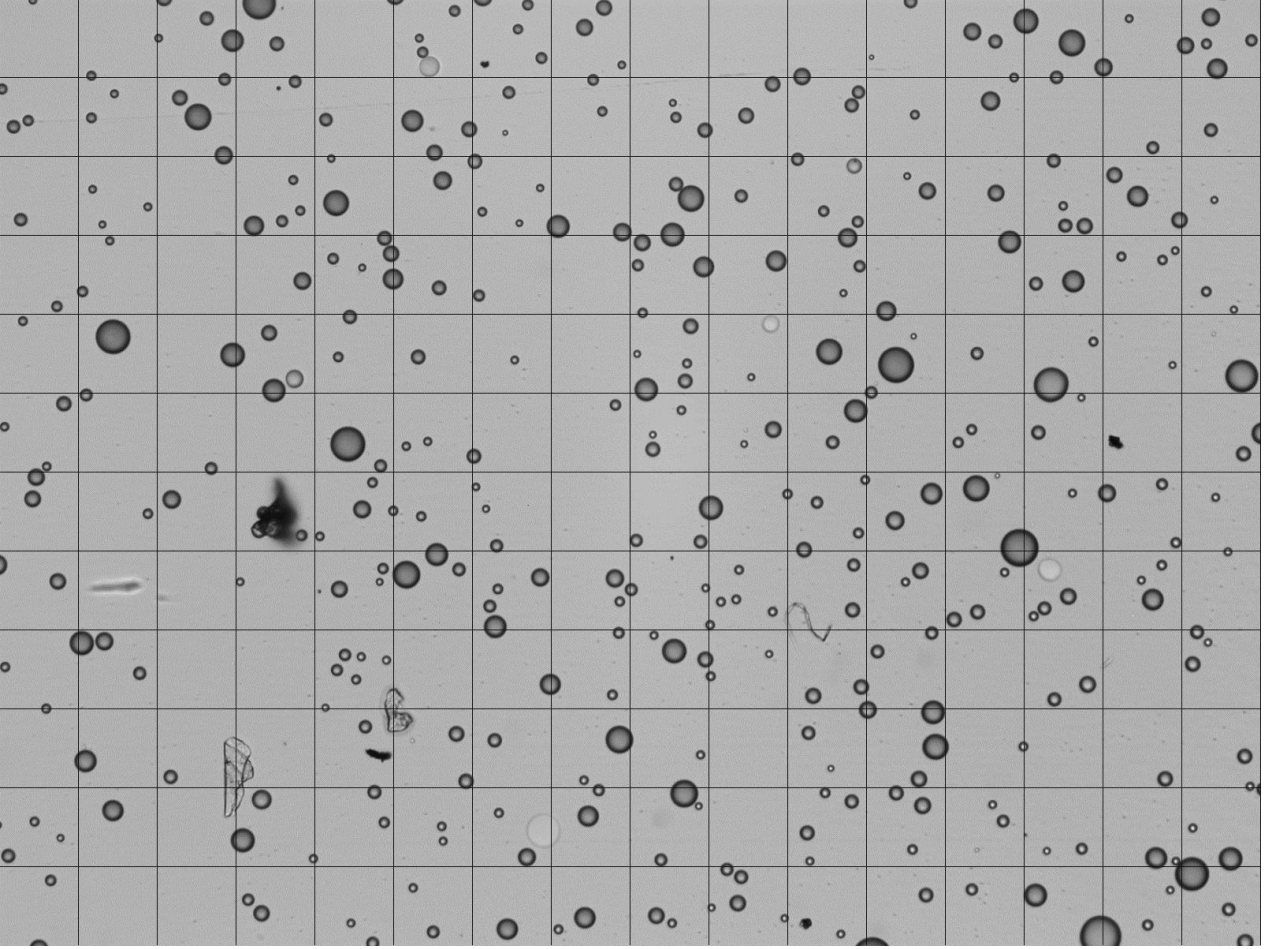
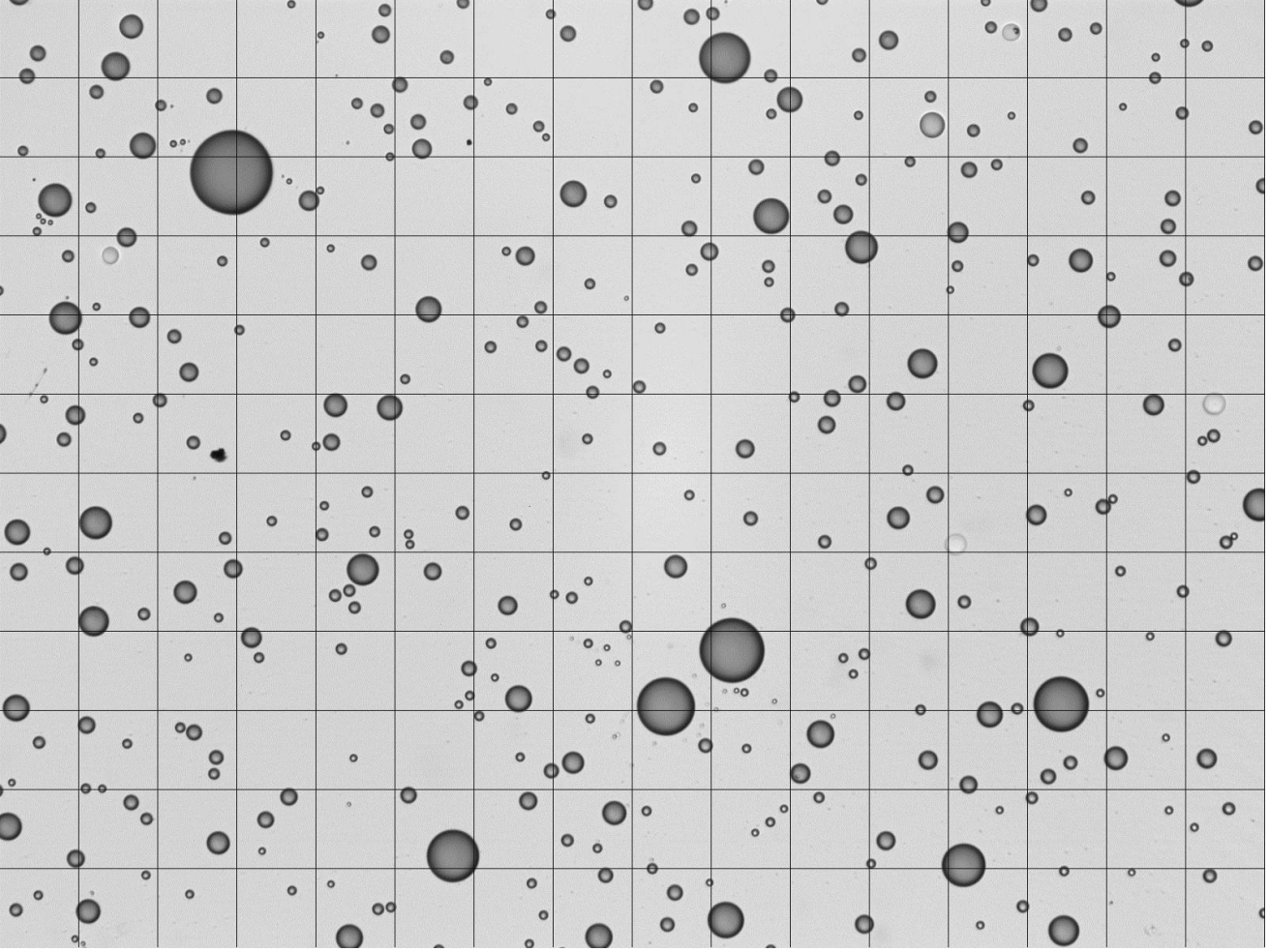


July 30
170 m altitude

37 micron between black lines

Seasalt is round, divide particle size by a factor 4 to get dry size.

Dust/bio-organic: Black



July 30
170 m altitude

37 micron between black lines

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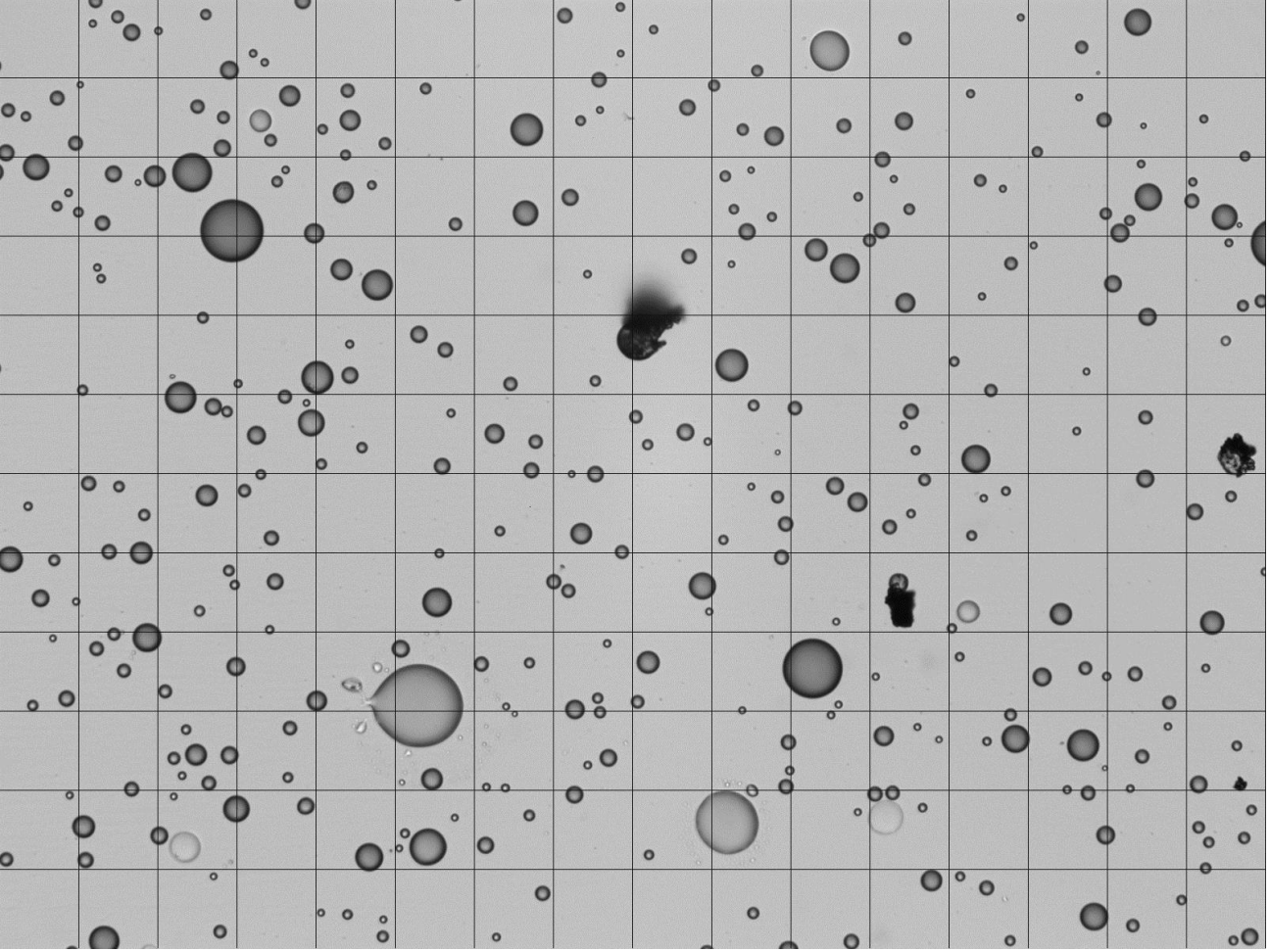

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170 m altitude

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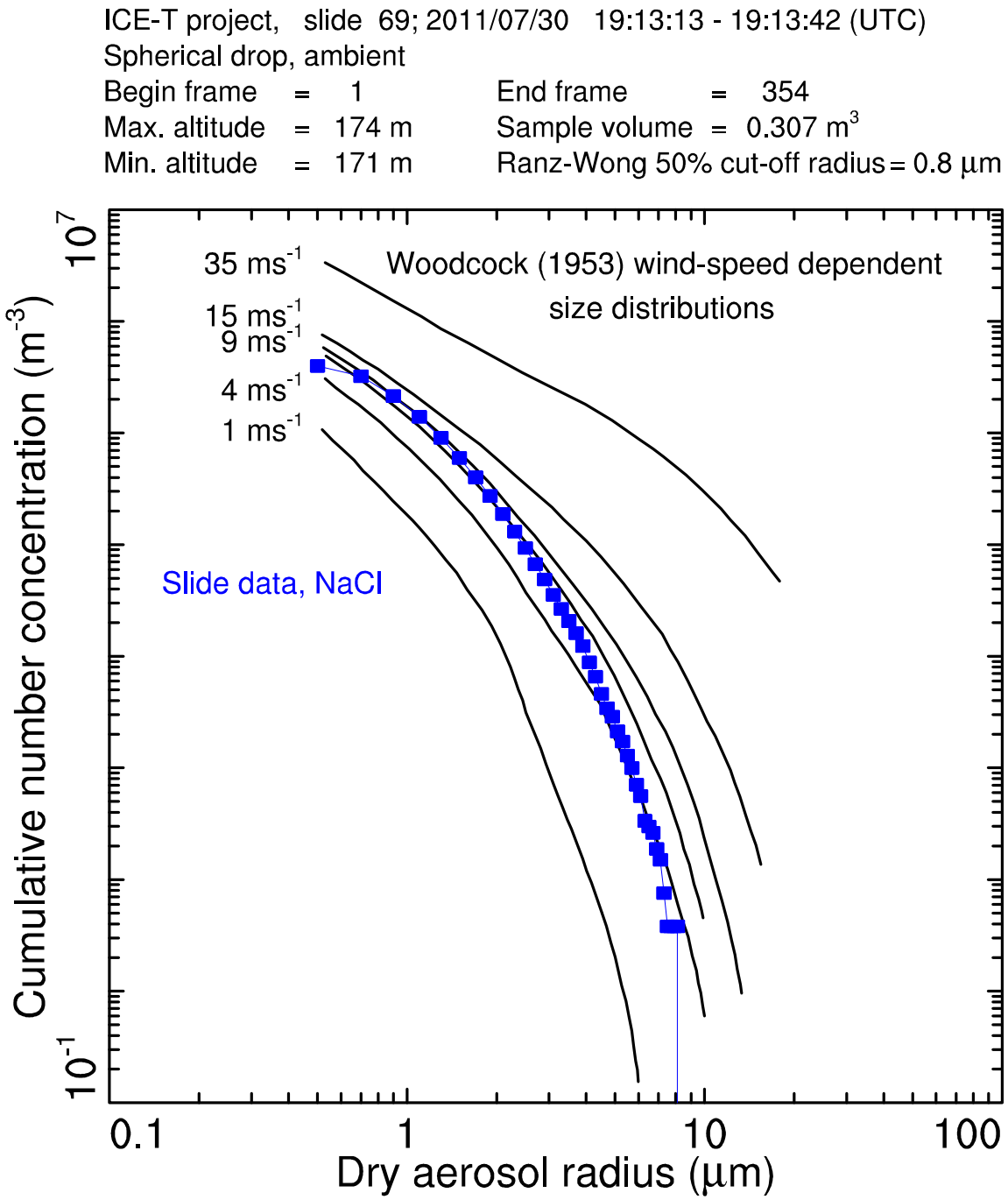
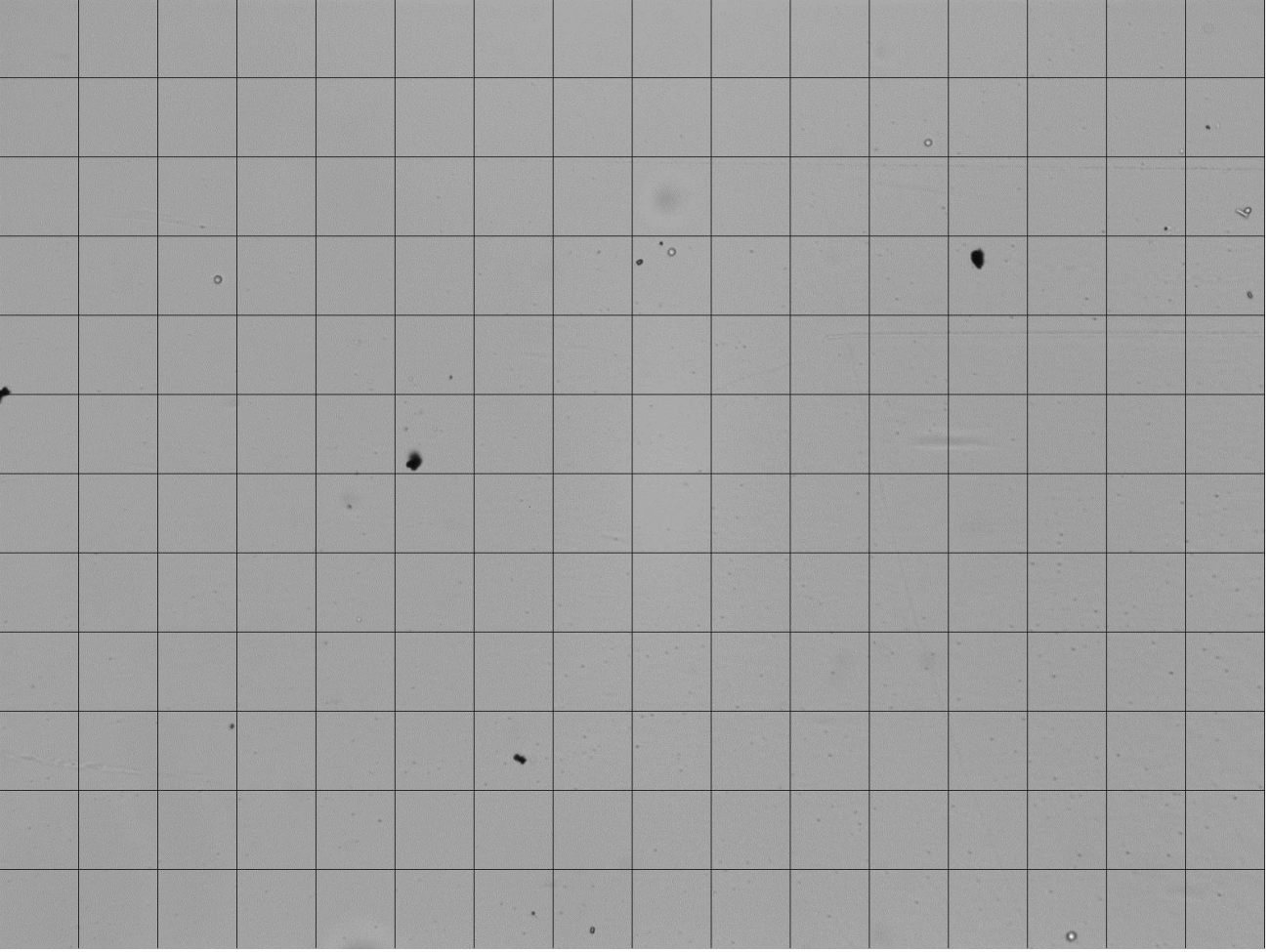
Dust/bio-organic: Black



July 30
170 m altitude

1 per litre ~ 4 micron Radius (only sea salt, dry radius)

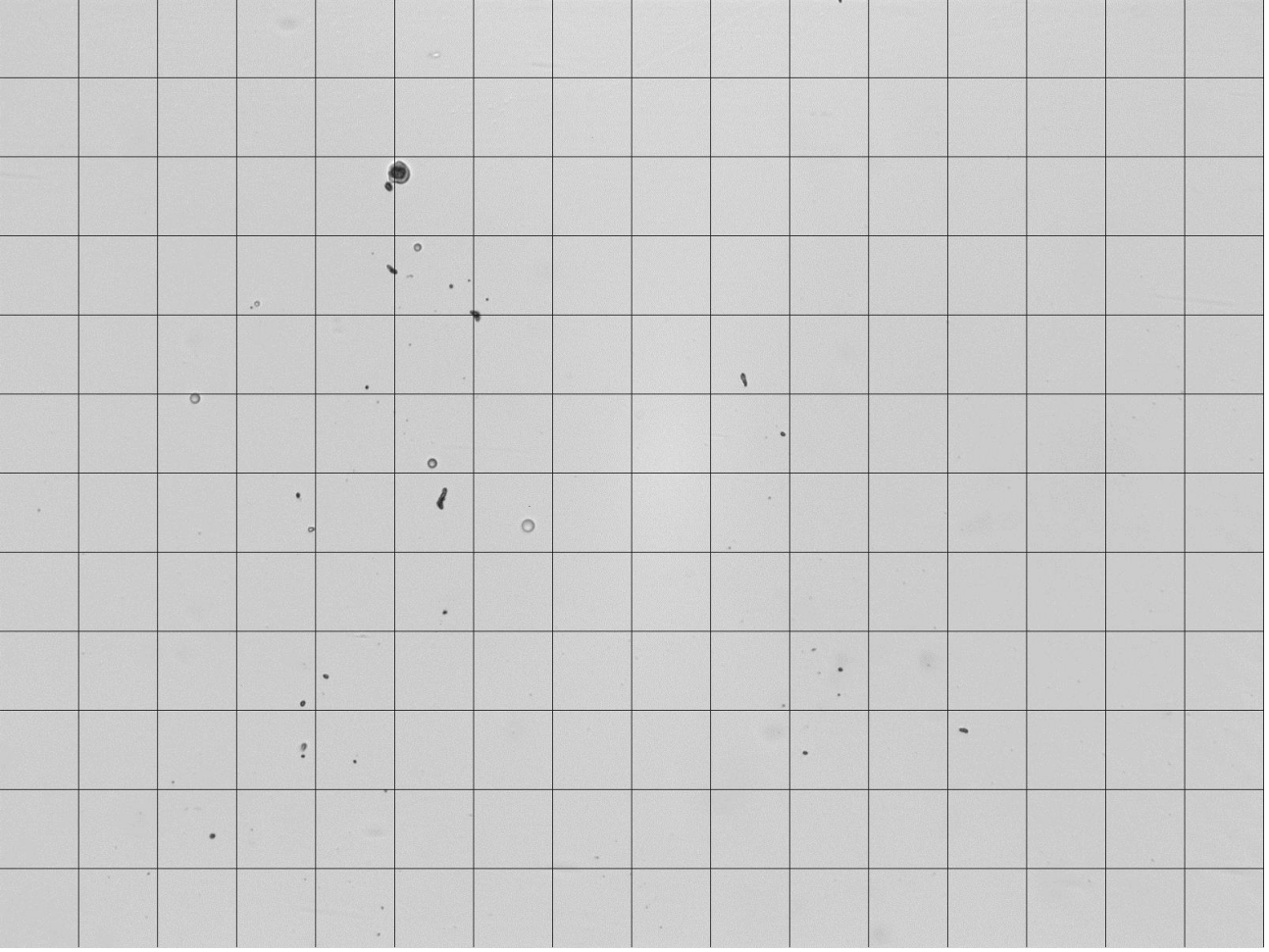


July 30
6800 m altitude

37 micron between black lines

Seasalt is round, divide particle size by a factor 4 to get dry size.

Dust/bio-organic: Black,
6-micron particle

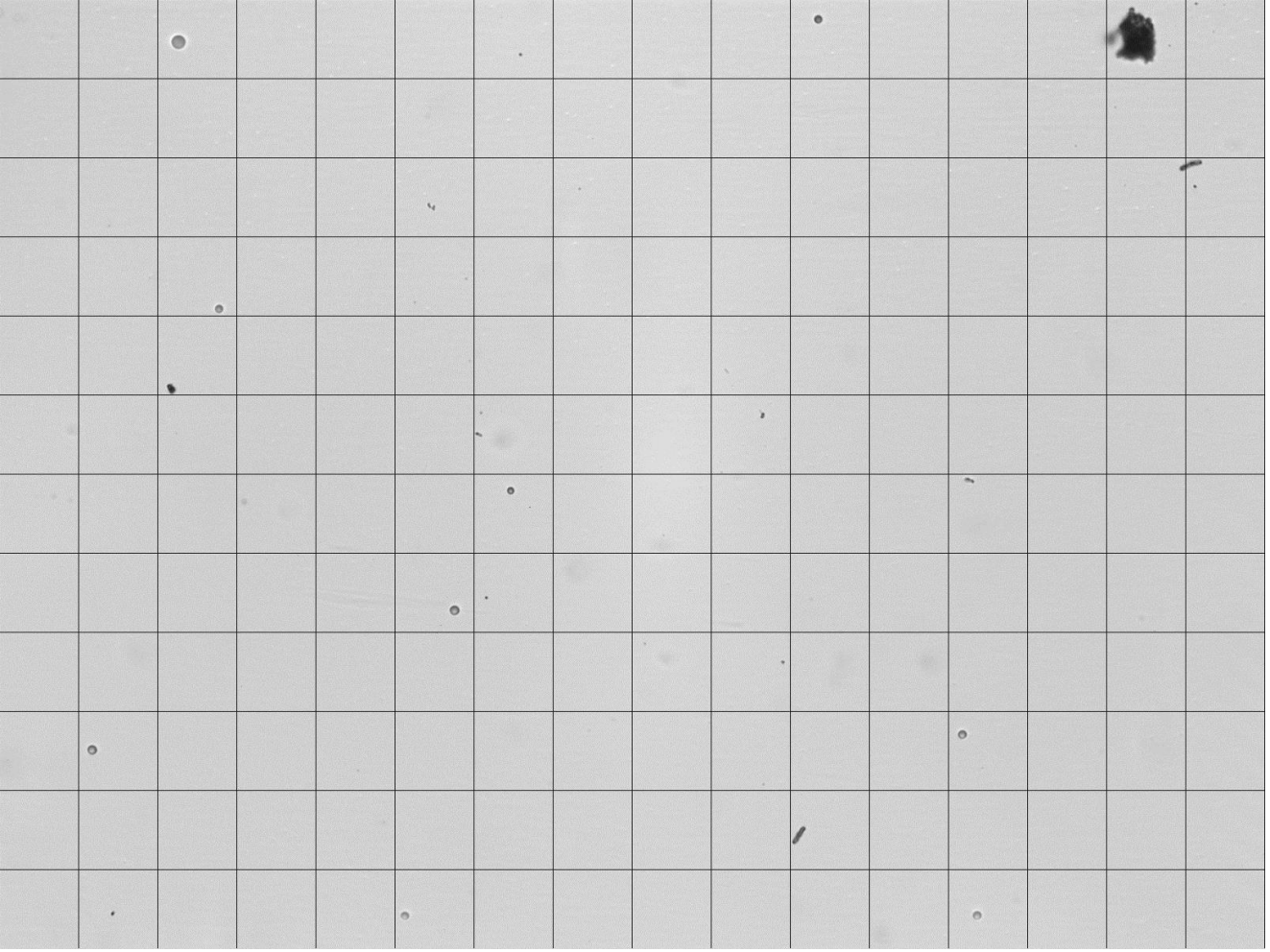


July 30
6800 m altitude

37 micron between black lines

Seasalt is round, divide particle size by a factor 4 to get dry size.

Dust/bio-organic: Black,
6-micron particle

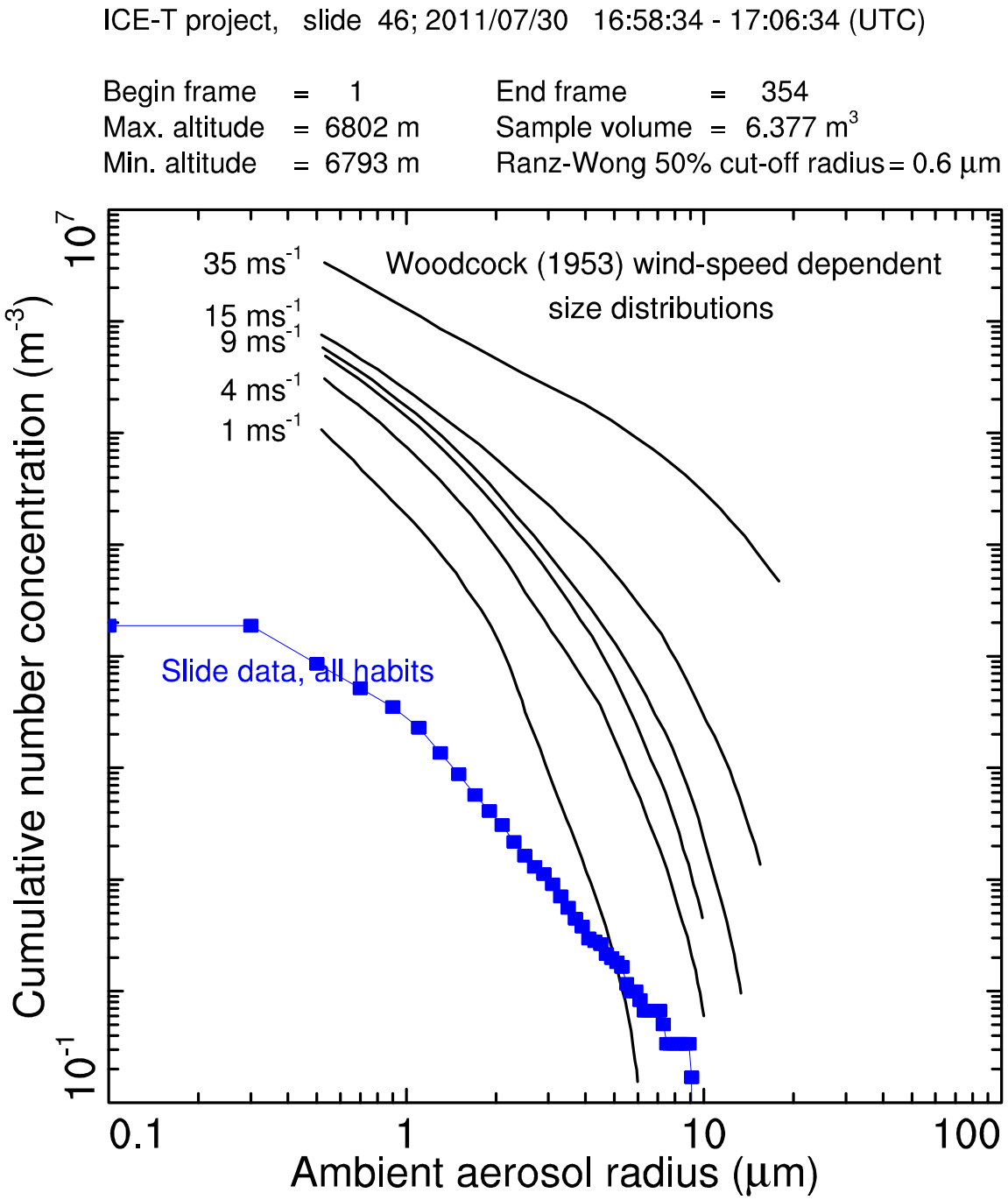


July 30
6800 m altitude

37 micron between black lines

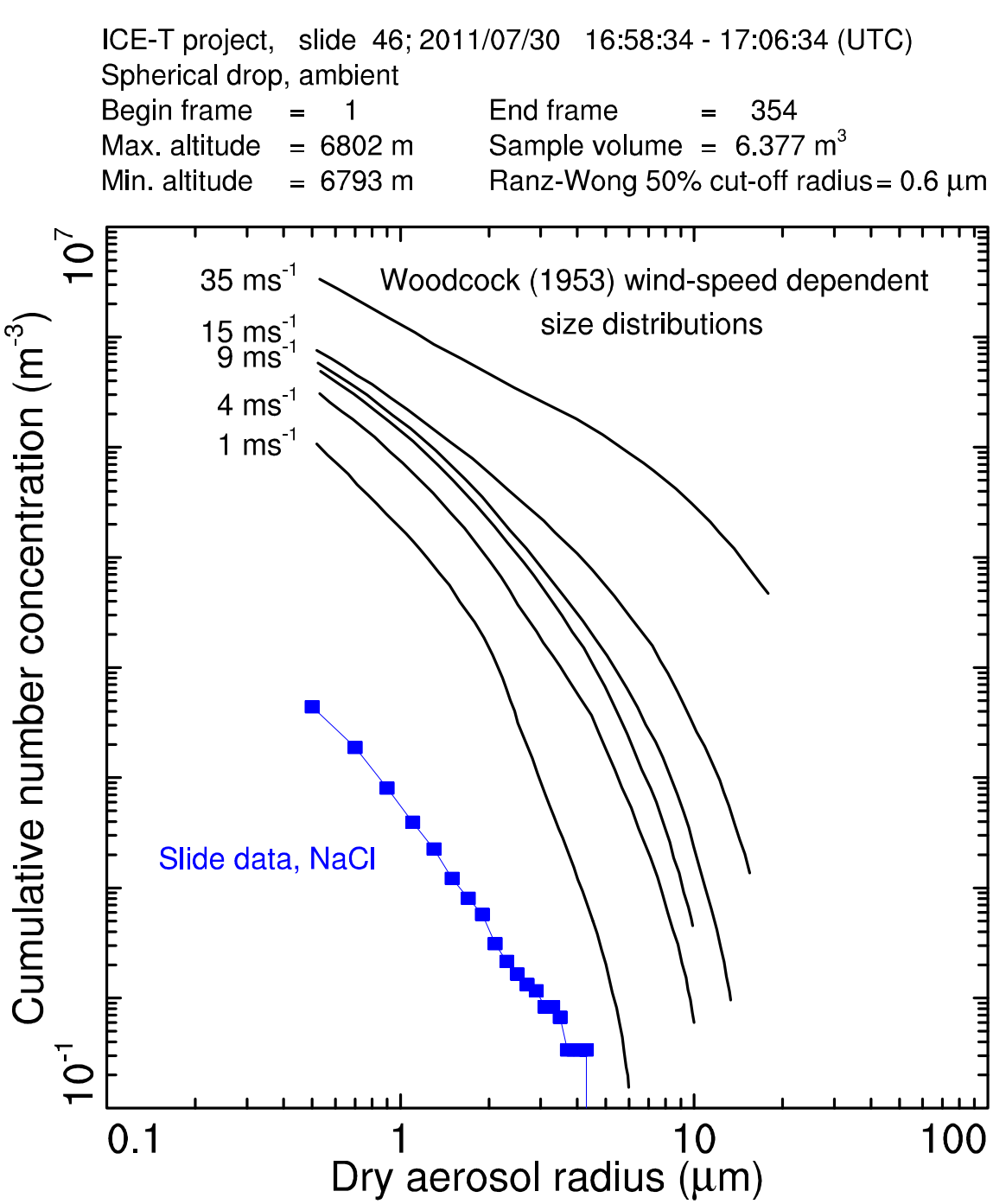
Seasalt is round, divide particle size by a factor 4 to get dry size.

Dust/bio-organic: Black,
25-micron particle



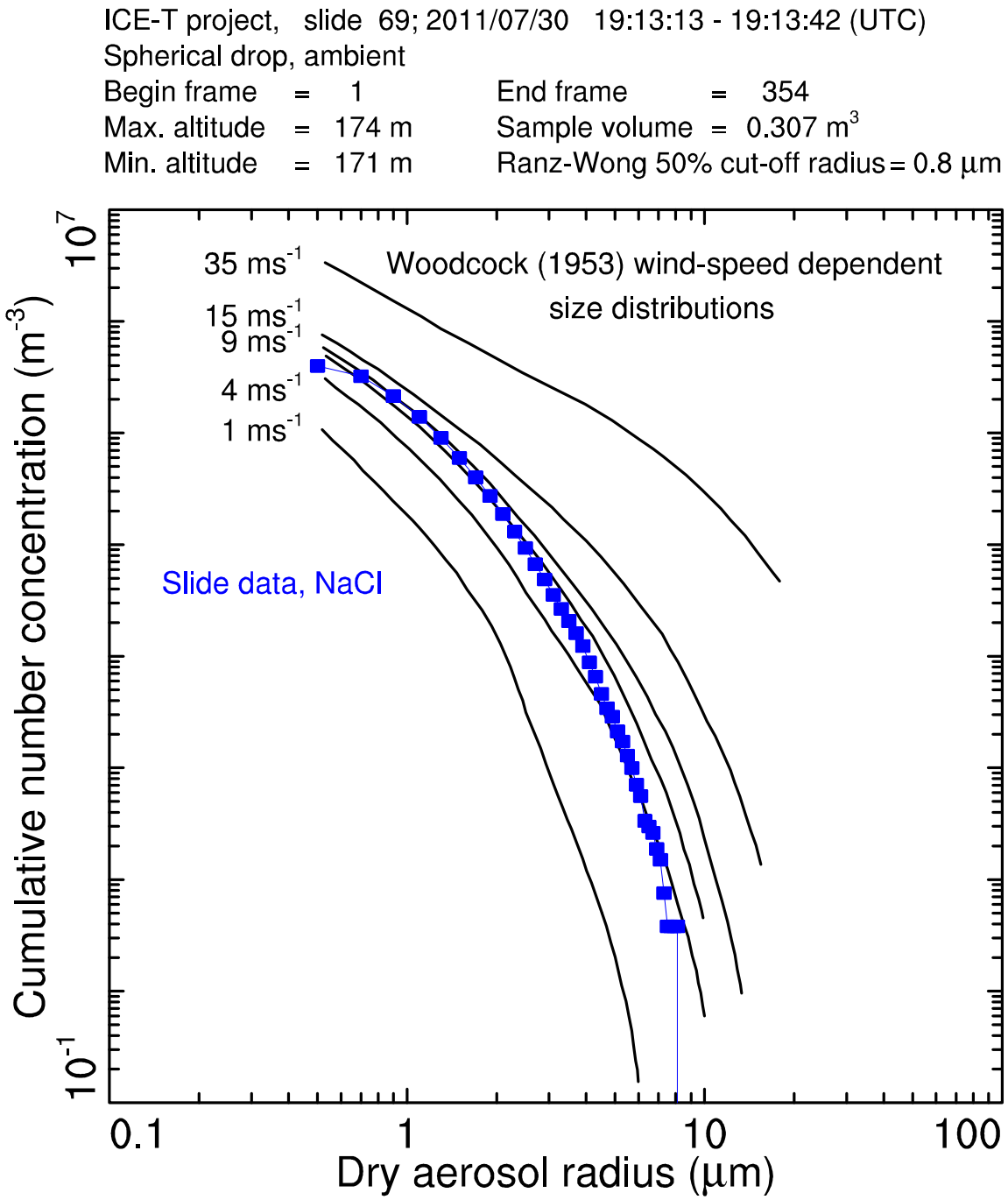
July 30
6800 m altitude

1 per litre ~ 0.5 micron (all particles, ambient size)



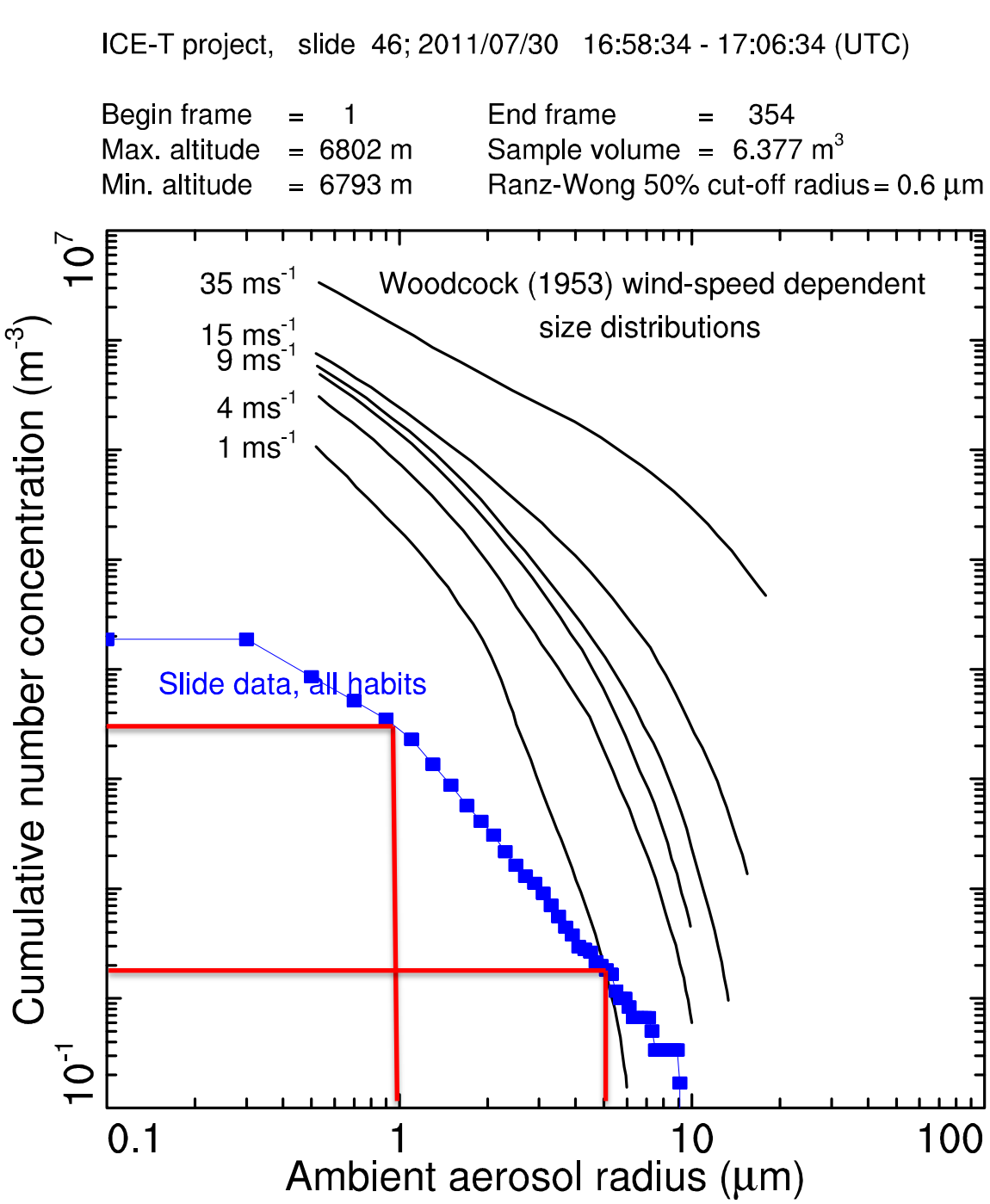
July 30
6800 m altitude

1 per litre < 0.5 micron (sea-salt particles, dry radius)



July 30
170 m altitude

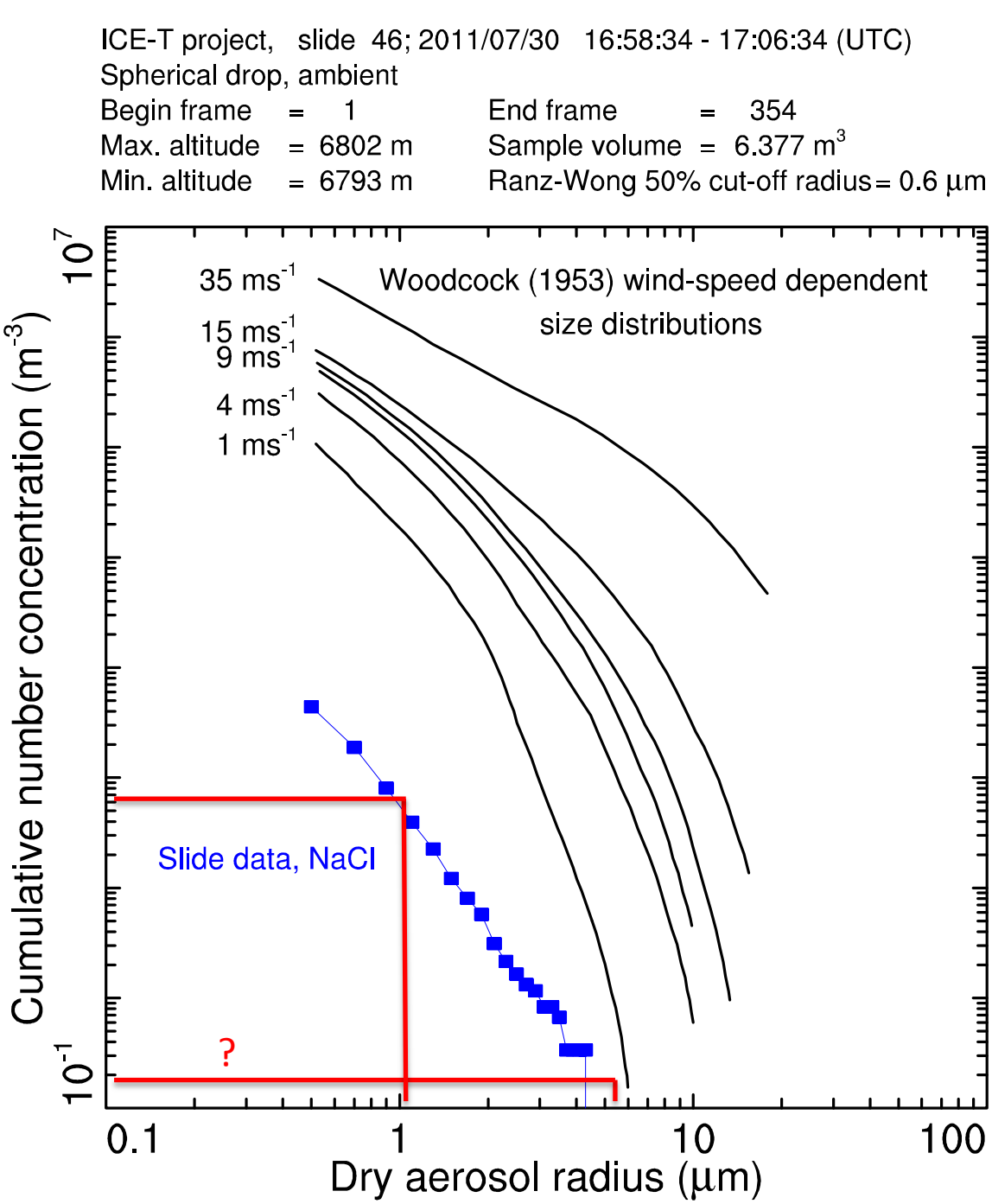
1 per litre ~ 4 micron Radius (only seasalt, dry radius)



July 30

6800 m altitude

1 per litre ~ 0.5 micron (all particles, ambient size)

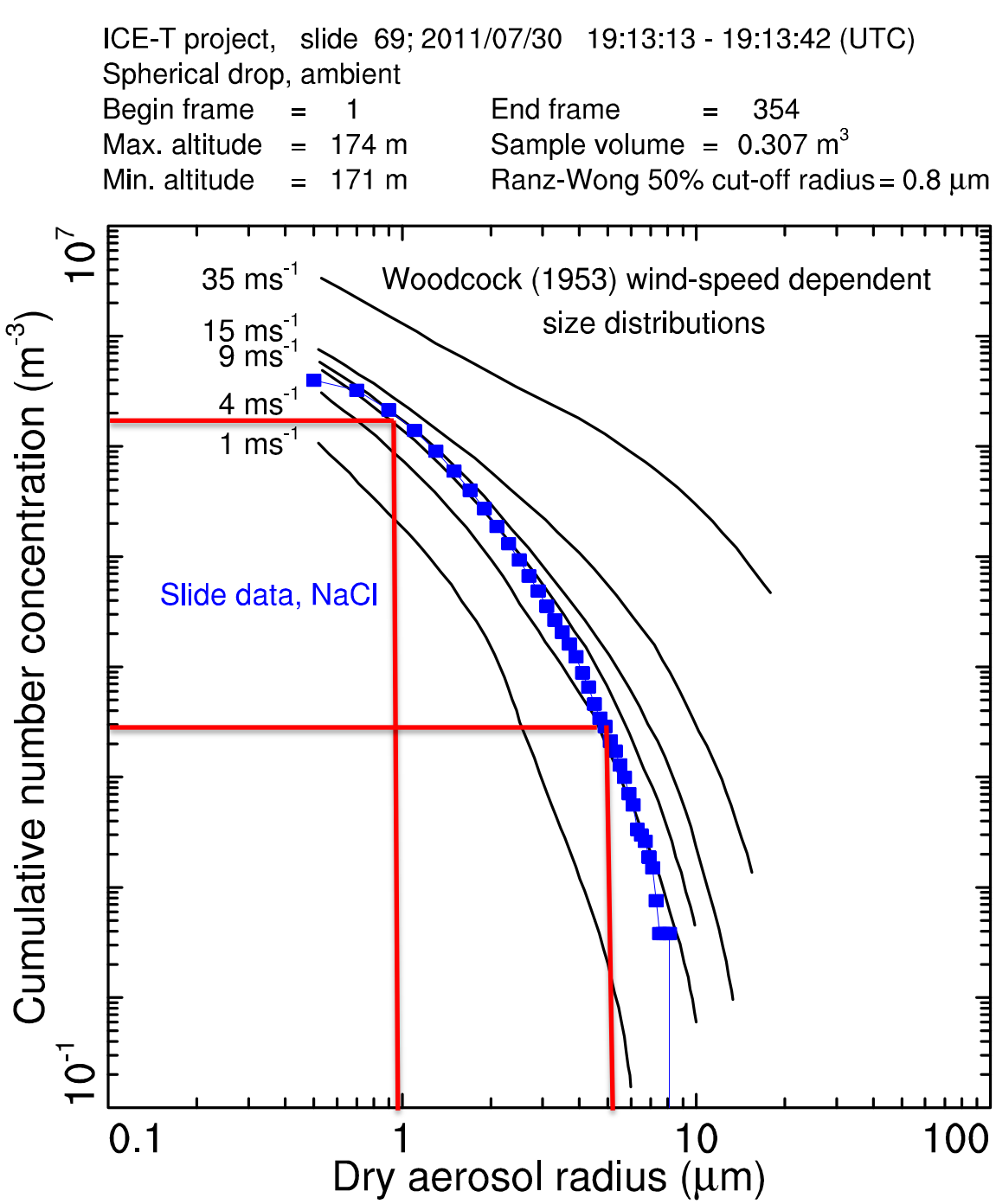


July 30
6800 m altitude

1 per litre < 0.5 micron (sea-salt particles, dry radius)

1-micron particles are reduced by a factor 4000

5-micron particles: cannot determine, none left (in concentrations allowing sampling)



July 30
170 m altitude

1 per litre ~ 4 micron Radius (only seasalt, dry radius)

Giant aerosol particles in ICE-T:

287 slides exposed – below and outside cloud

Vastly higher sea-salt concentrations at low altitude, similar to Woodcock (1953)
Some bio/mineral particles at low altitude

Low sea-salt concentrations at high altitude
Few bio/mineral particles at high altitude (but some VERY LARGE)

This is only samples: Data needs 5 days for QC control to be released