

**OBSERVATIONS AND MODELING OF THE ICE PHASE IN A COLD
OROGRAPHIC WAVE CLOUD SAMPLED DURING MidCiX**

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Overview

- Data Presentation
- Model Calculations
- Summary and Conclusions

62700 sec/1725 UTC



QuickTime™ and a
Animation decompressor
are needed to see this picture.

WB57 Flight Track 5 May 2004

RH(>90%)=62472--62487, 64151

40.70

40.60

40.50

40.40

40.30

-106.0

-105.5

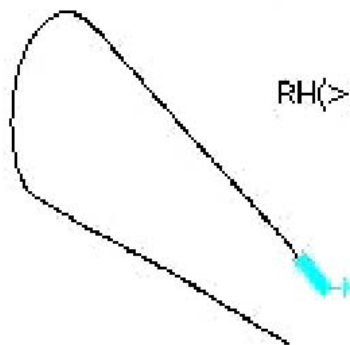
-105.0

-104.5

-104.0

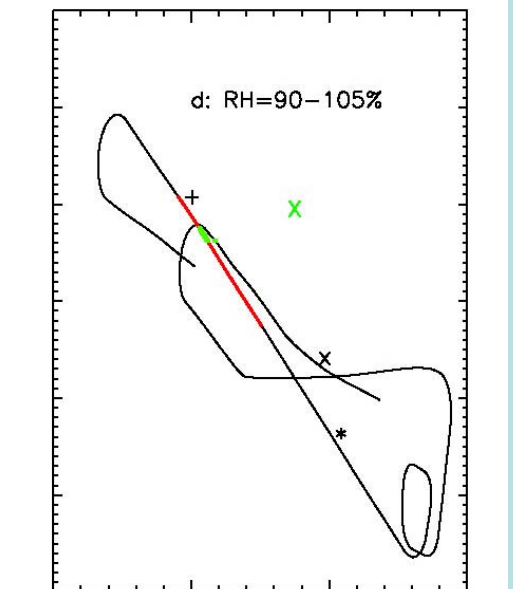
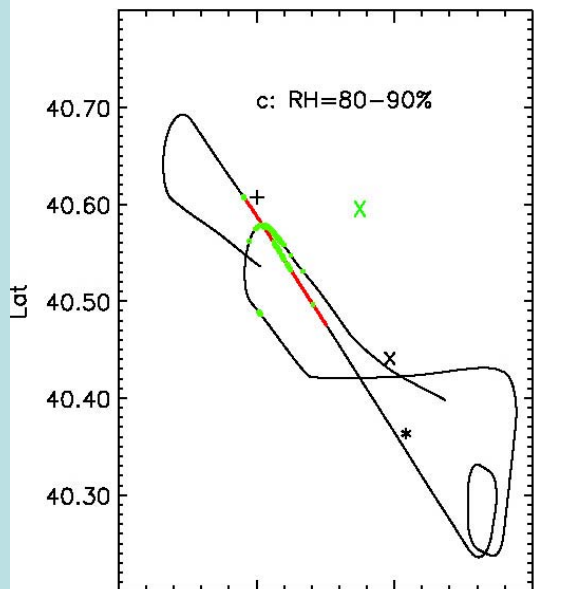
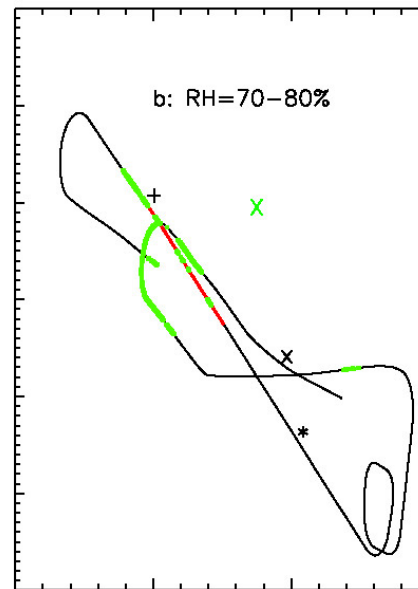
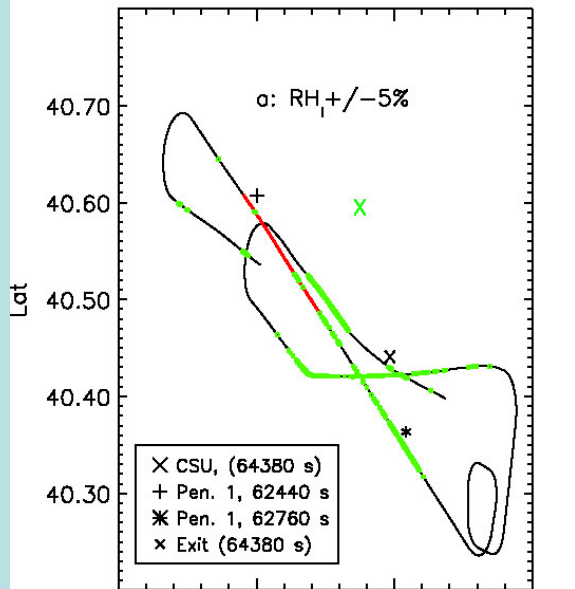
Lon.

62469.000



64260 s/1751 utc



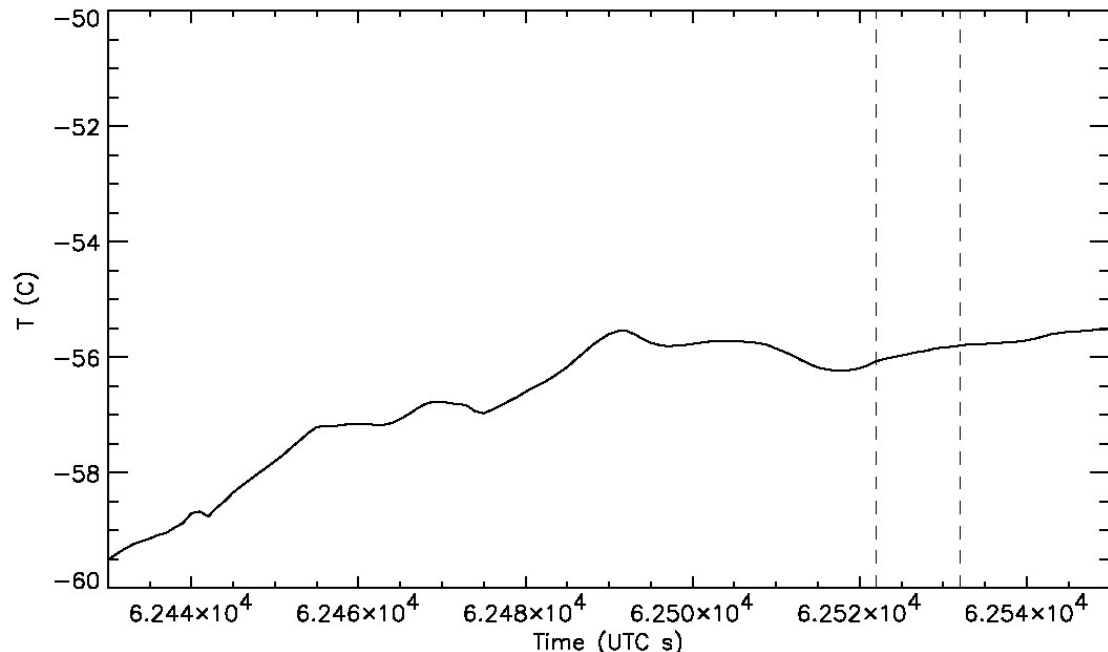
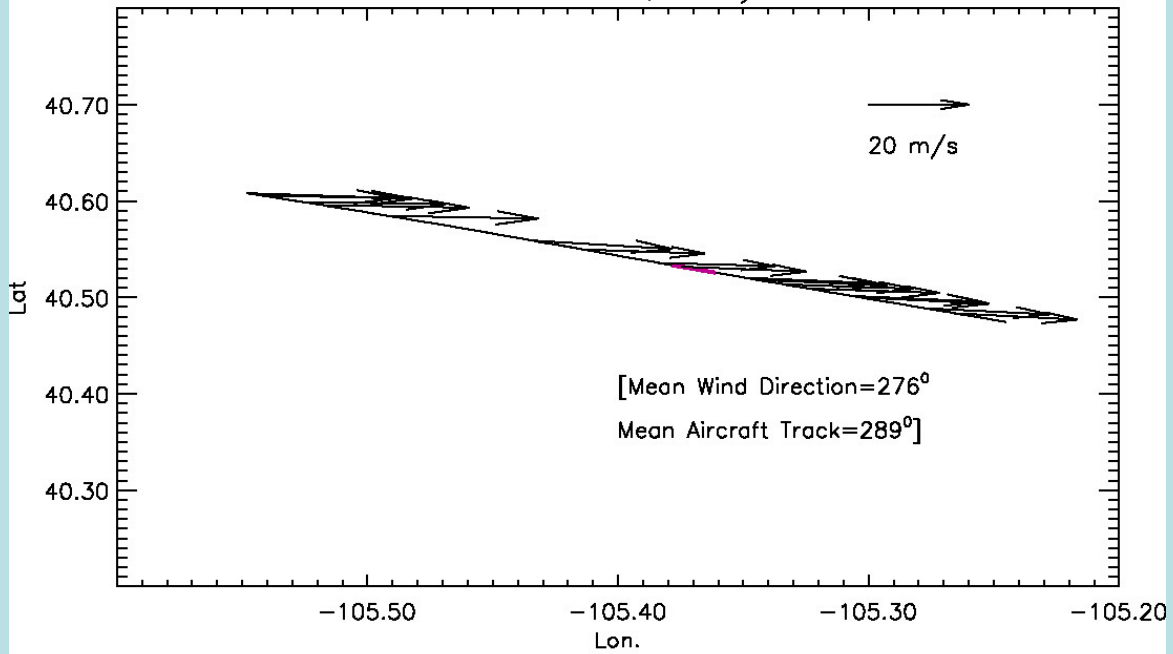


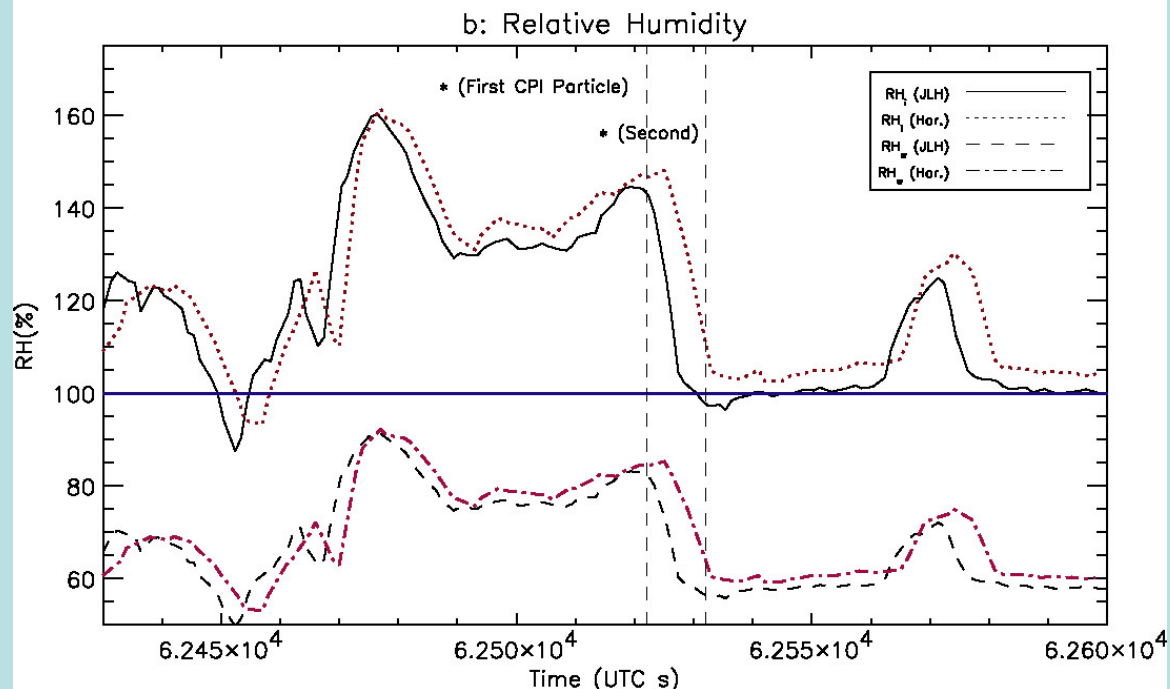
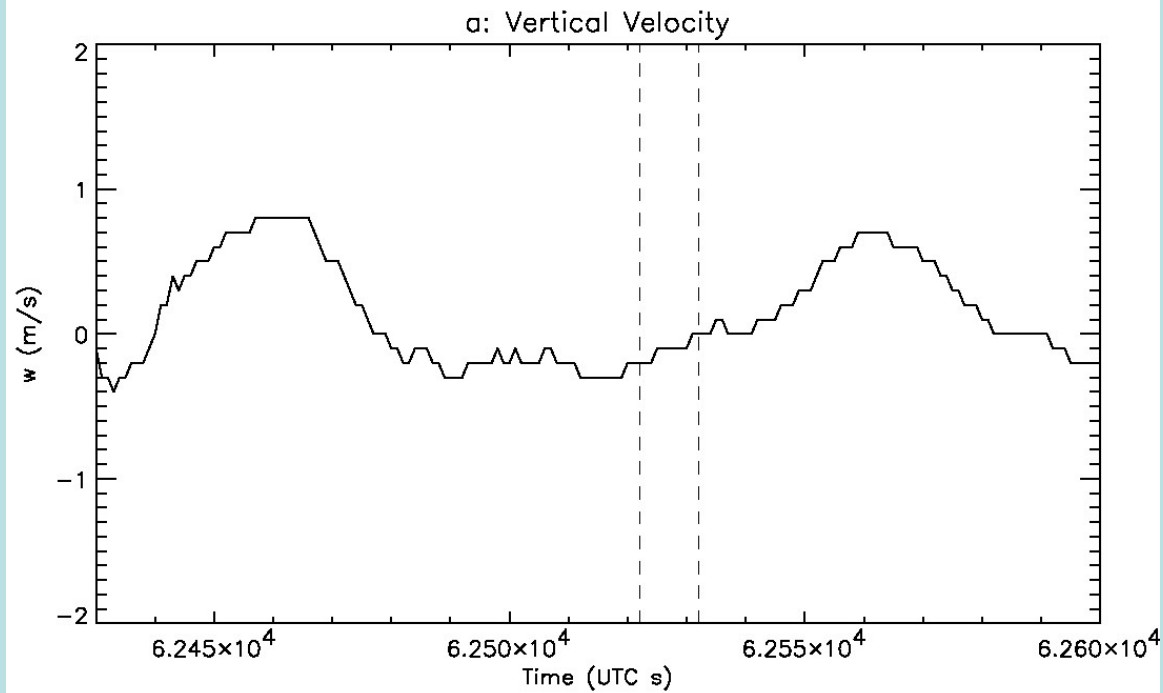
64920 s/1802 UTC

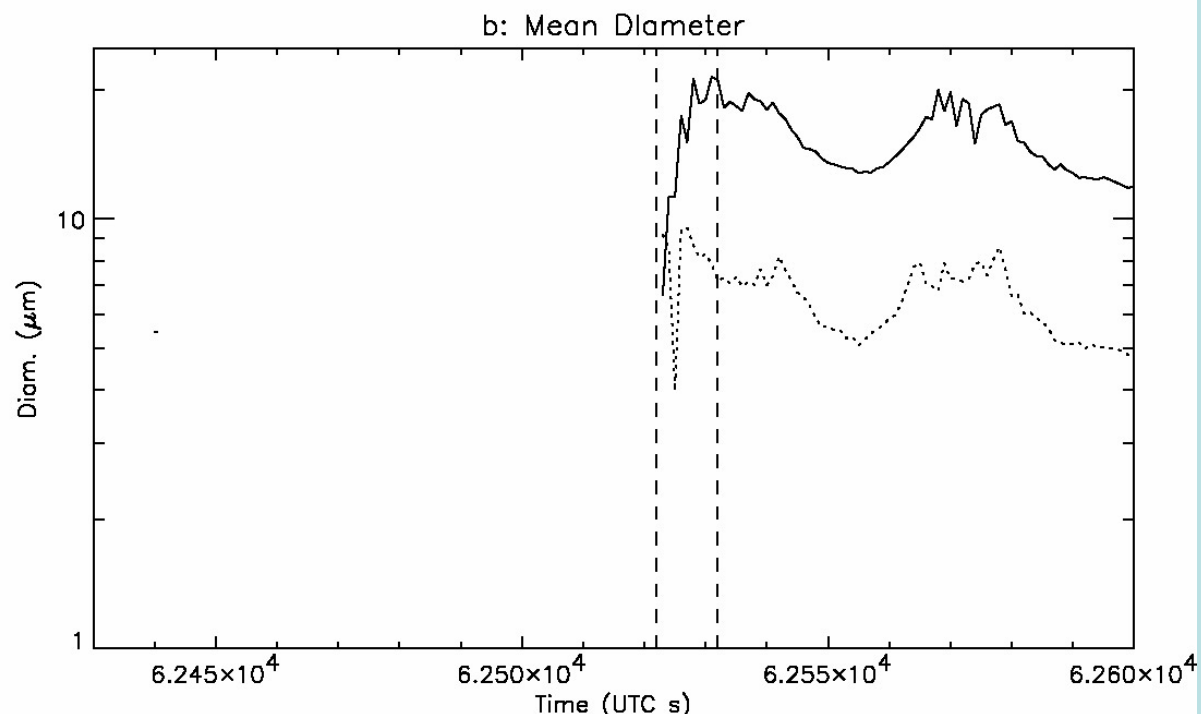
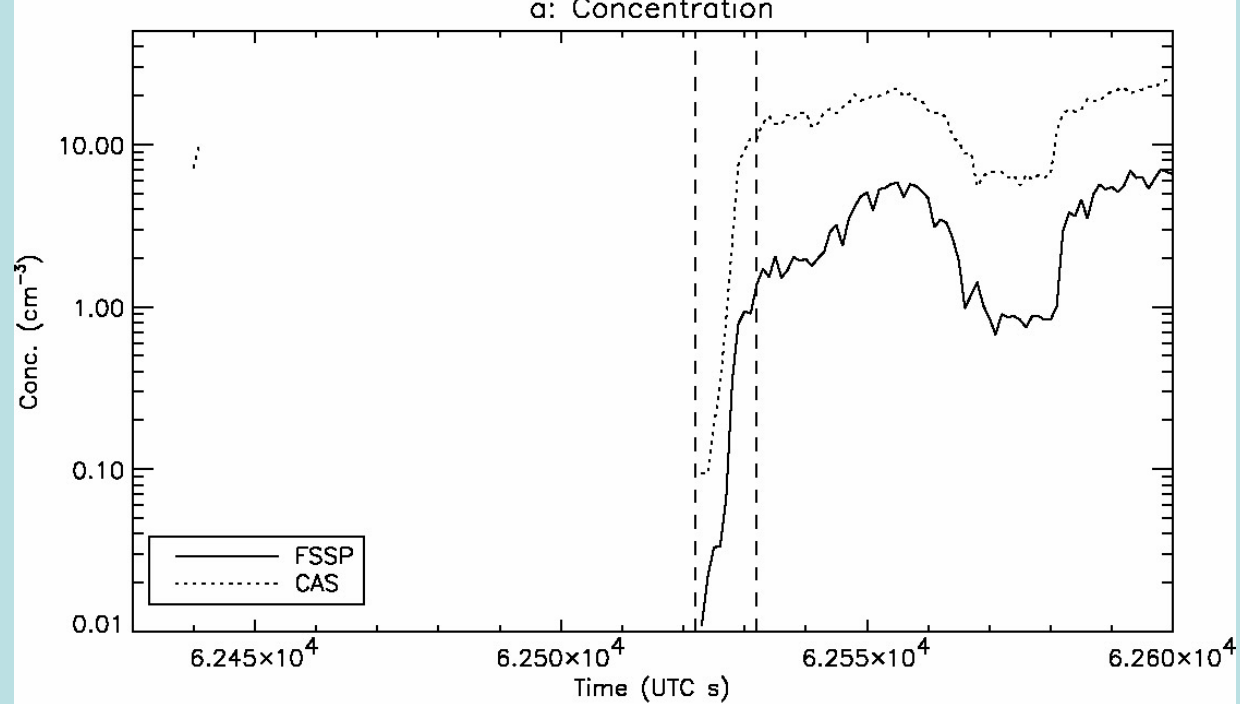


Overview, 5 May 2004, Penetration 1

WB57 Track, 5 May







62480 

62490

62500

62510 

62520 

62530 

62540 

62550 

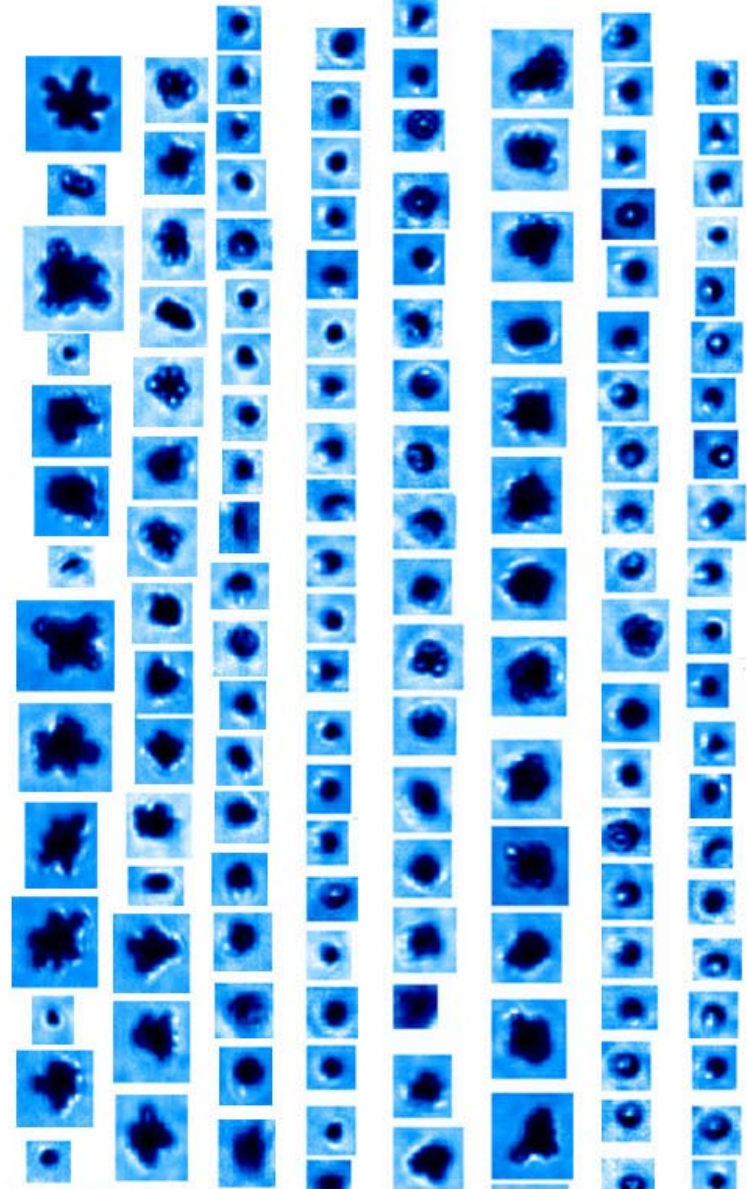
62560 

62570 

62580 

62590 

62600

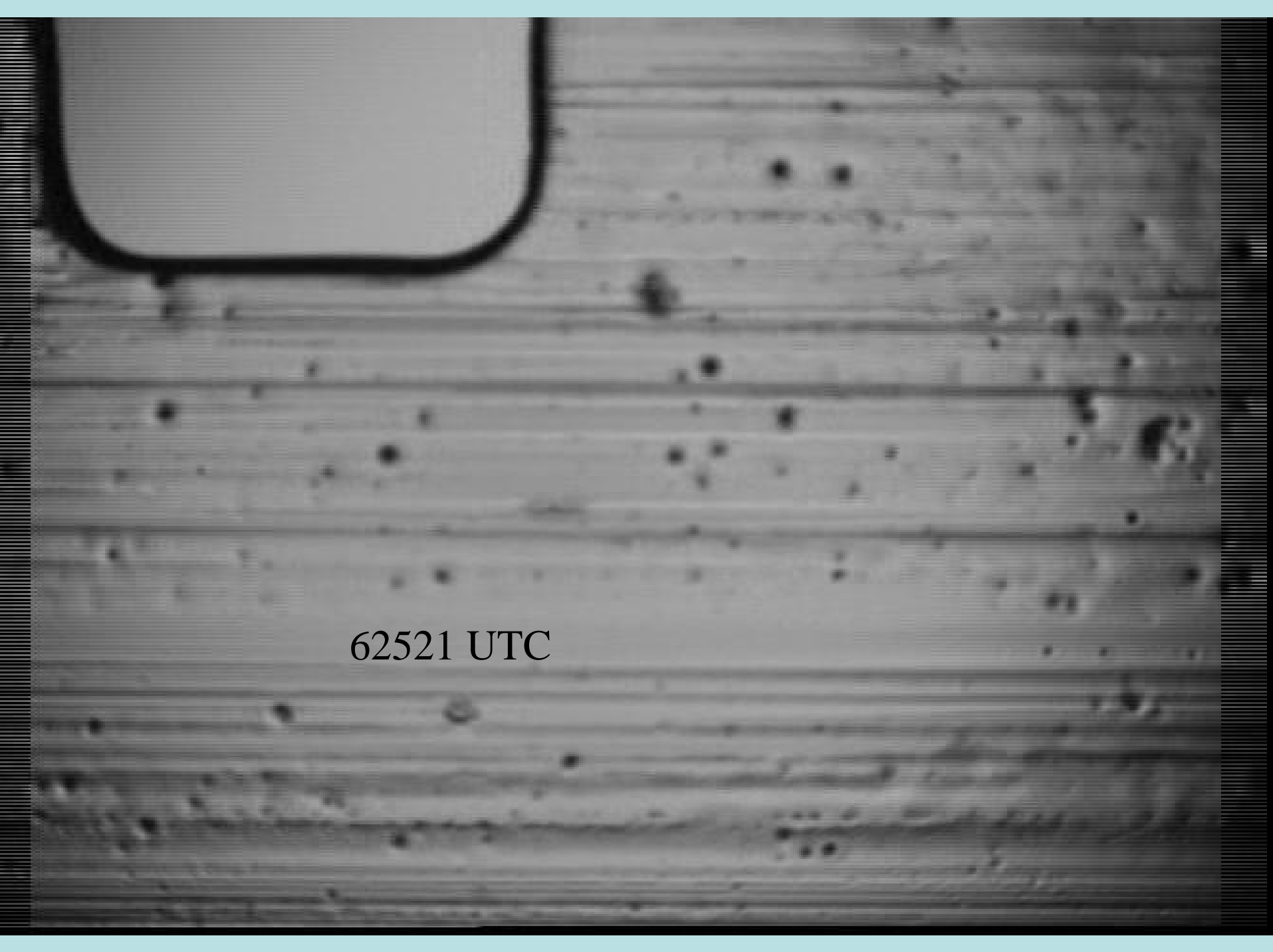


200μm

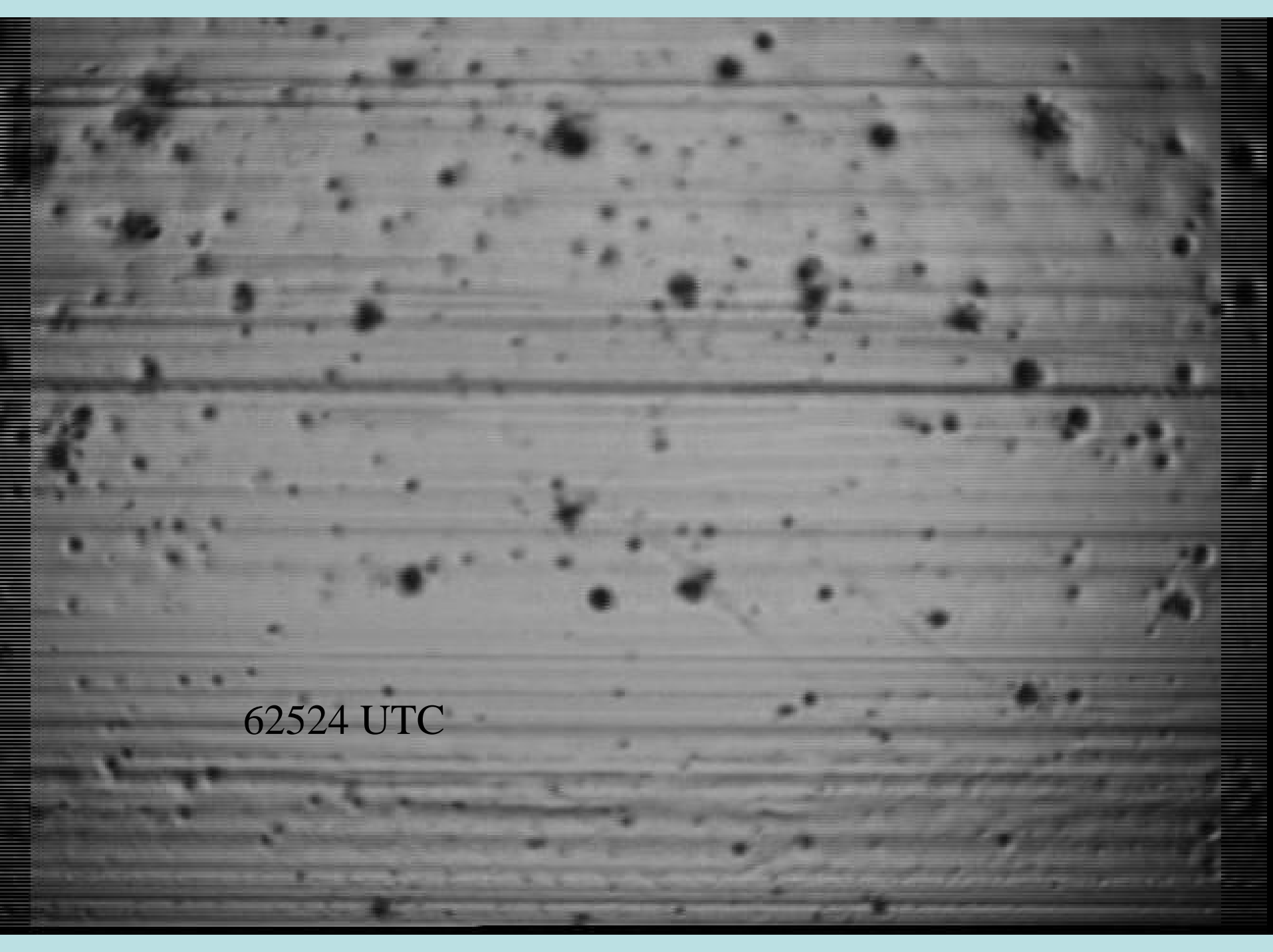
62514 UTC



62519 UTC



62521 UTC

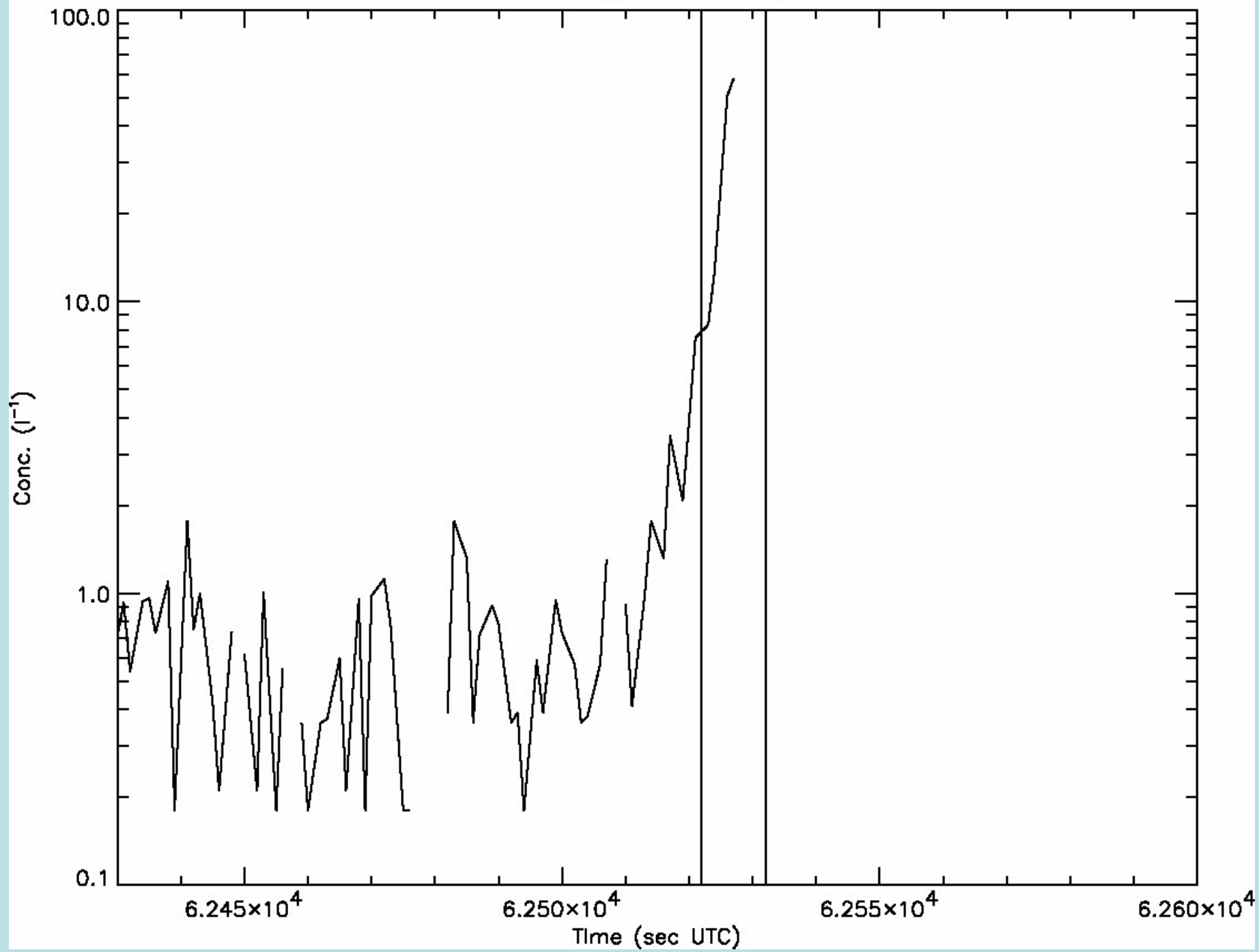
A black and white astronomical image showing a dense field of stars. The stars vary in brightness and size, with some appearing as distinct points and others as fainter, more diffuse spots. A grid of thin, light-colored lines is overlaid on the image, providing a reference for the positions of the stars. The overall appearance is that of a star catalog or a field of stars in a specific region of the sky.

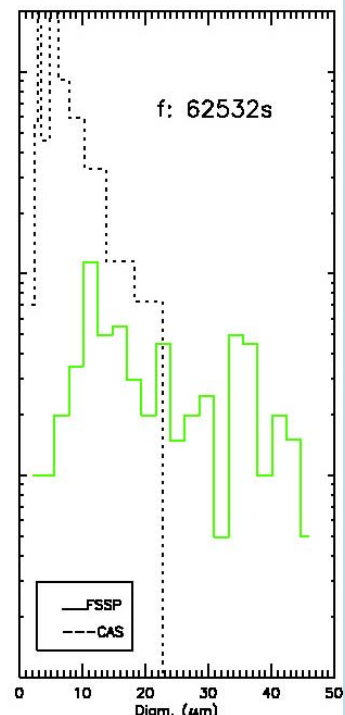
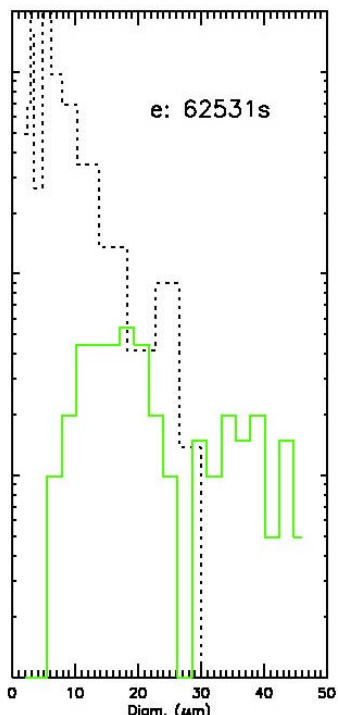
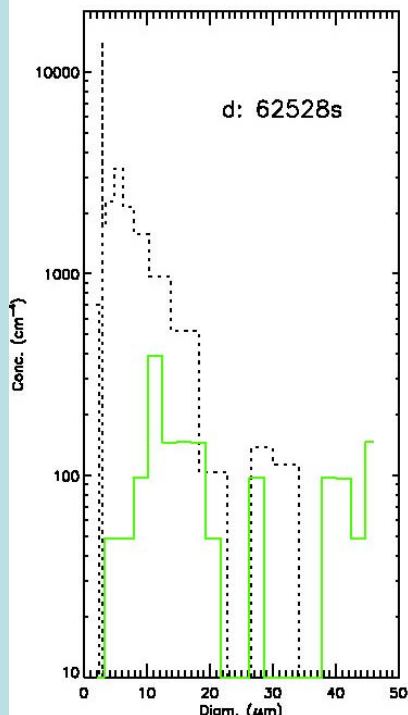
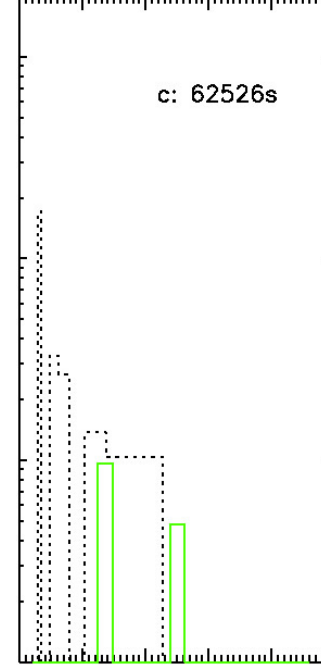
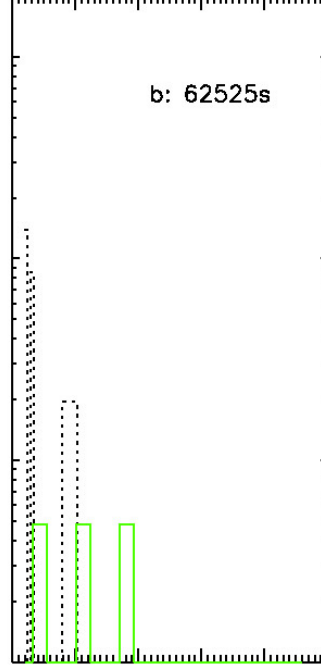
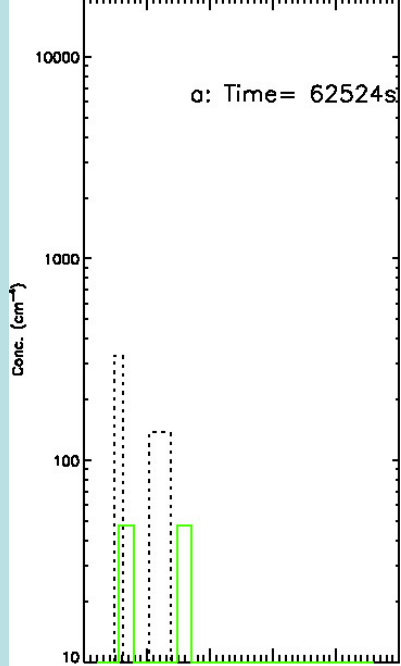
62524 UTC



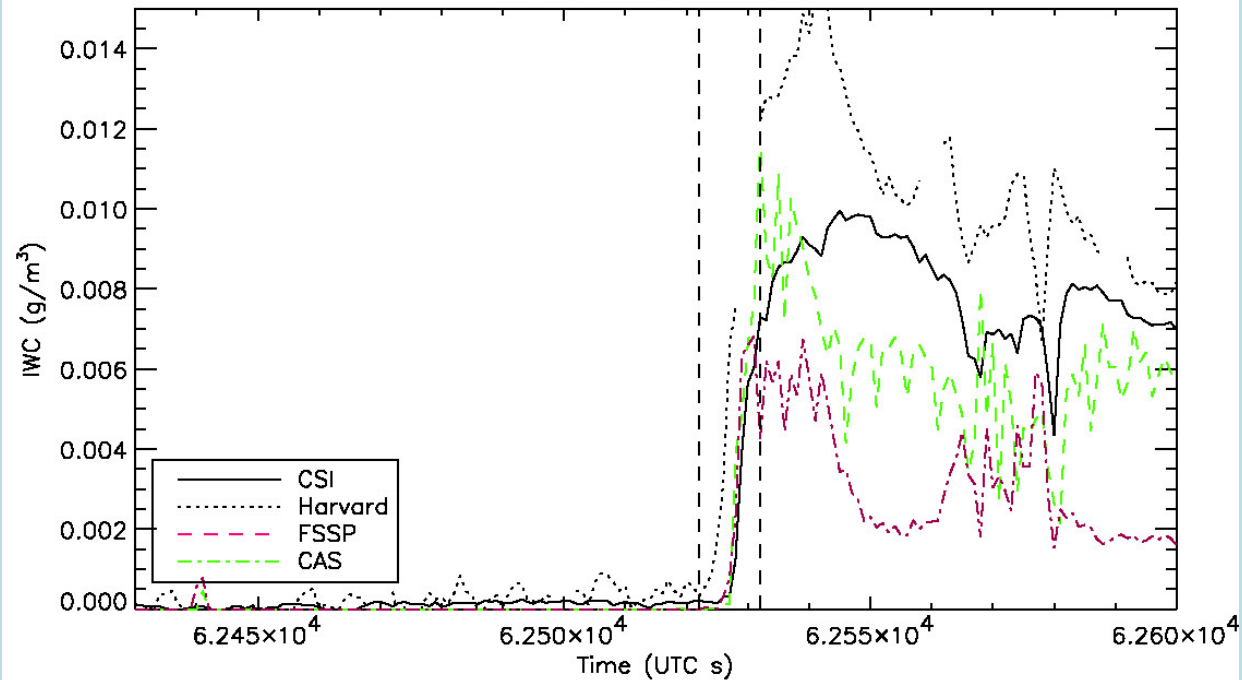
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VIPS Concentrations

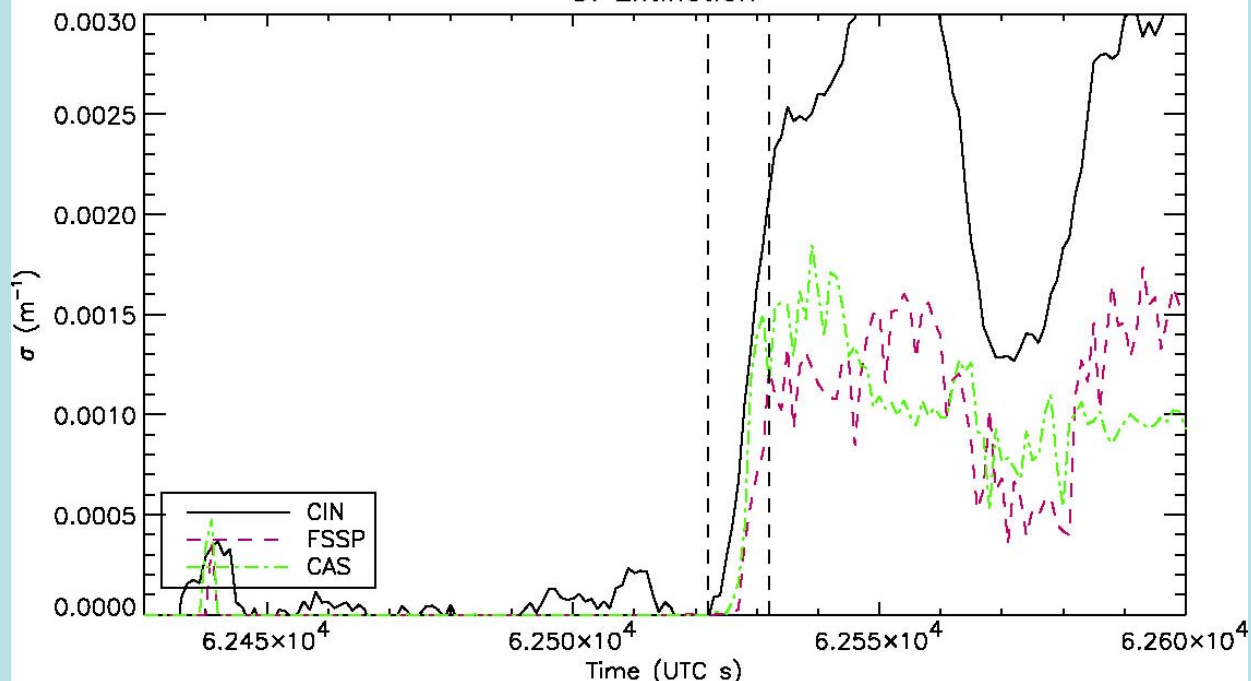




a: Ice Water Content

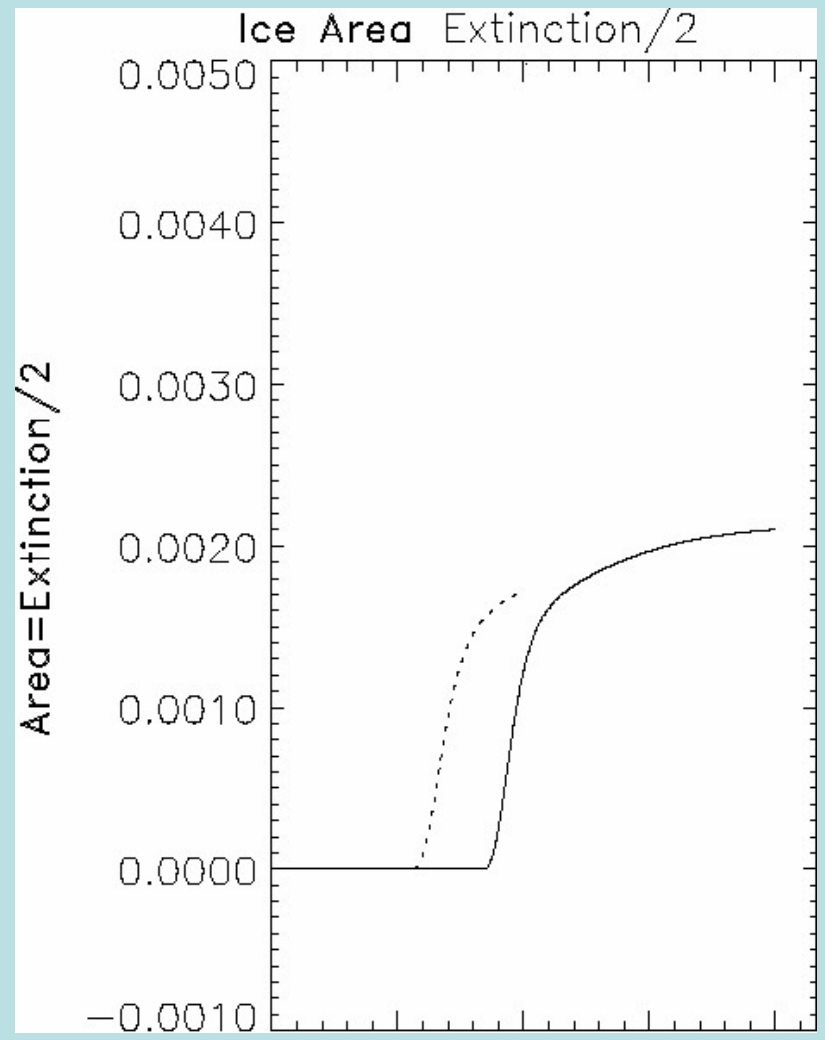
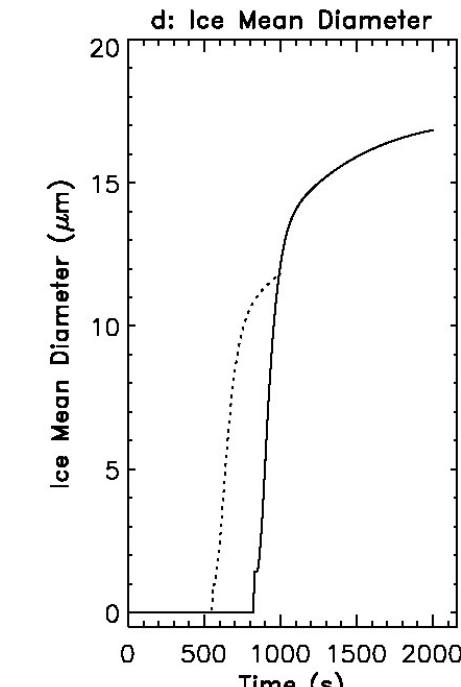
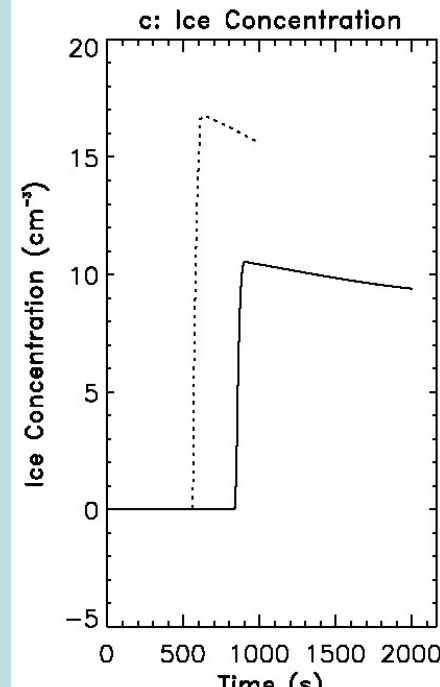
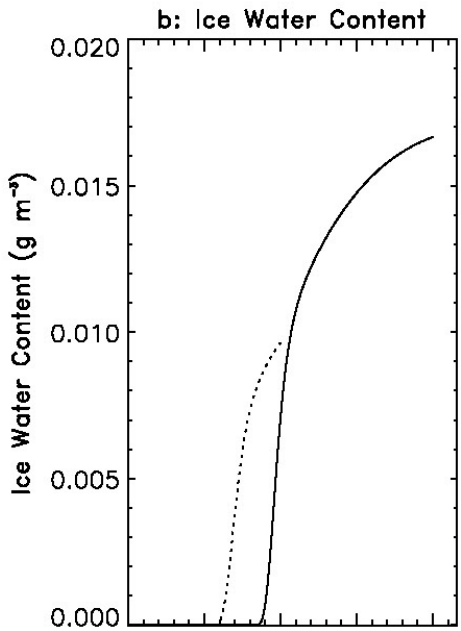
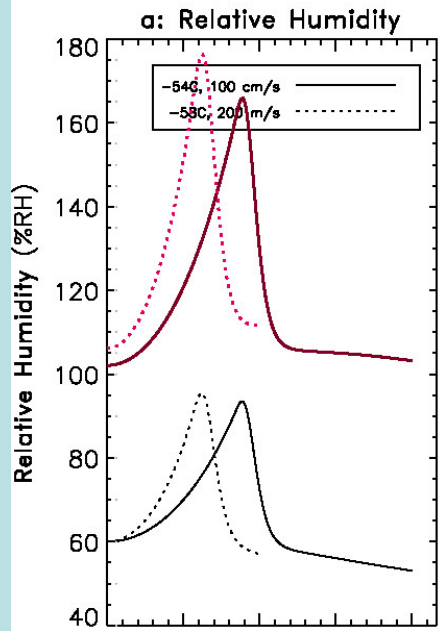


b: Extinction



Model Calculations

- Heymsfield and Miloshevich (1993) wave cloud model
- Set of partial differential equations involving the growth of haze droplets, droplets, and ice particles solved numerically
- Initially, non-equilibrium haze particle growth
- Homogeneous nucleation rates from Koop
- Ice particles grow by diffusion with a bulk density of 0.9 g/cm^3
- Initialized at 1 and 2 m/s vertical velocities, temperatures of -54 and -58C



Summary and Conclusions

- **Instrument/Model Intercomparison shows that:**
- --IWC instruments are accurate for IWCs from 0.001 to 0.01 g/m³
- --Extinction estimates are probably too large by a factor of two
- --Water vapor measurements are accurate to better than +/- 10% RH_i
- Large disparity between FSSP and CAS size distributions, especially in small sizes
- **Physical interpretations from wave cloud observations**
- --Strong heterogeneous mode resulting in concentrations of order 1/liter
- Koop formulation provides rates that agree reasonably well with the observations for temperatures of about -55C.