

Giant Nuclei Impactor (GNI)

Sampling of giant aerosols ($r_d > 1 \mu\text{m}$)

Analysis in

Optical microscope (Jorgen Jensen, RAF)

Clear polycarbonate slides

92% RH => Size distribution of sea-salt particles

High-volume analysis => Good statistics

Electron microscope (Jim Anderson, ASU)

Black carbon tape on slides

Elemental composition => Dust, sea-salt, organics

Lower volume analysis => Focus on special cases

Giant Nuclei Impactor (GNI)

Sampling on individual flights:

	Clear slides	Carbon slides	Total
RF01	1	-	1
RF02	5	2	7
RF03	15	9	24
RF04	20	10	30
RF05	21	9	30
RF06	28	6	34
RF07	36	19	55

Good numbers, increasing, many more slides to be exposed.

Limited by flight time w/o seat-belt sign on.

Hundreds of un-exposed slides remaining. Keep exposing them!

Giant Nuclei Impactor (GNI)

Sampling needs:

Below cloud base; prefer 500 ft.

Higher in the mixed-layer, the particles are larger and impact splashing may be too severe.

Clear-air soundings; prefer slow ascent/descent.

Between cloud passes; prefer 3+ minutes in clear air.

Un-met sampling needs: High-wind conditions,
14+ m/s at 500 ft altitude.

3V-CPI microphysics probe

Current state:

2D-S Excellent

60,000 – 100,000 particles per second! (check)

CPI Freezes after a few seconds; can be reset.

Obtains some data on each cloud pass.

Still learning about processing.

Thanks to SPEC staff for assistance.

Flight with SPEC Lear

Intercomparison:

Does C-130 and Lear state parameters match?

Possibly do simple comparison of soundings.

(Has anyone done this?)

Later decide if wing-to-wing is needed.

Joint missions:

How many so far?

Is that adequate/practical/impractical?

Focus also on deeper clouds? (Science objectives?)

Adequate data to initialize models?

Sufficient sampling of cloud base / warm cloud conditions?

Do we have adequate measurement of variability in thermodynamics below cloud base?

Do we have sampling below clouds or only away from clouds?

Has initial cloud droplet concentration been determined? (Look at Thomas Chubb statistics of passes as a function of altitude)

Do we have enough passes in warm cloud to evaluate the amount of warm rain formation (and removal of droplets for further updrafts)?

Do we have sufficient passes in warm cloud to understand amount of entrainment at low altitude?

Do we have soundings that extend up above cloud top (needed for entrainment studies + dynamics in models)