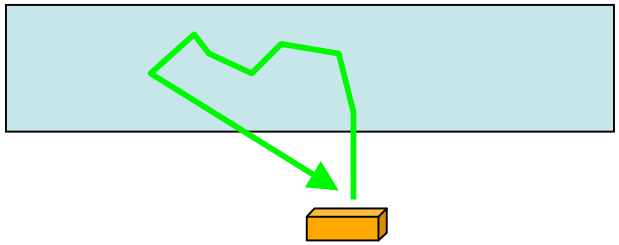
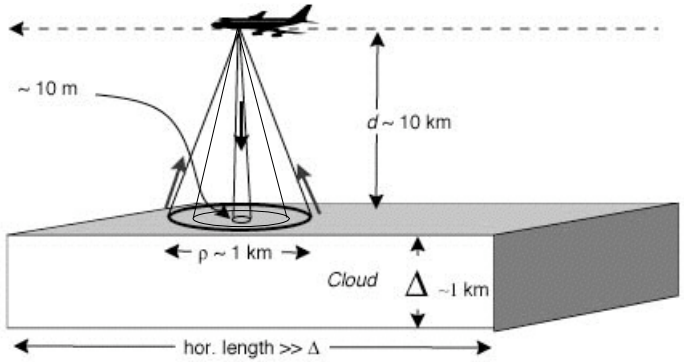
Proposed lidar cases

Outline:

- Basic idea
- Motivation
- Considerations
- Specific experiments
- Discussion



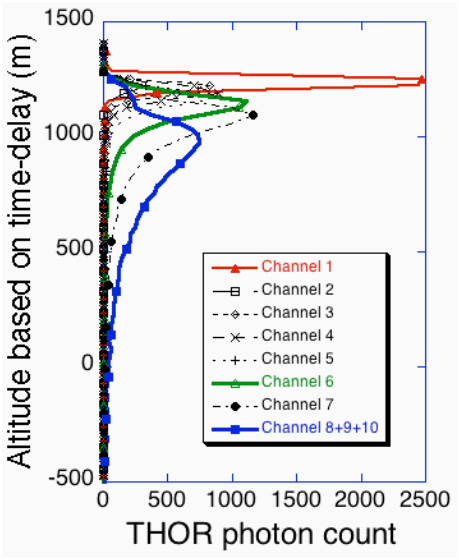
Basic idea

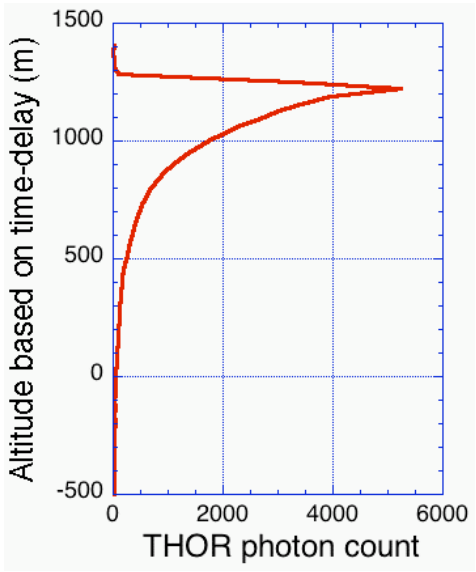


Radius

Travel time

$I(r_1,t_1)$	$I(r_2,t_1)$		
$I(r_1,t_2)$			





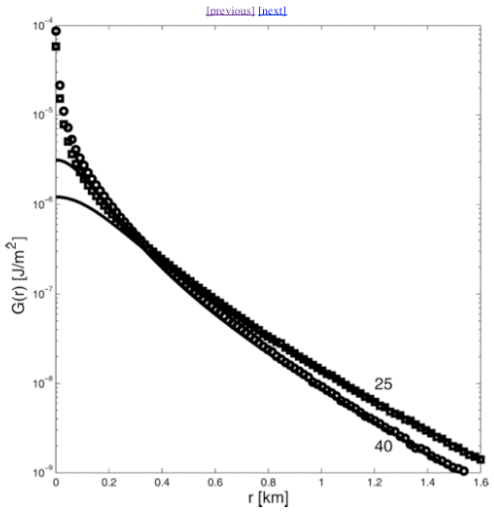
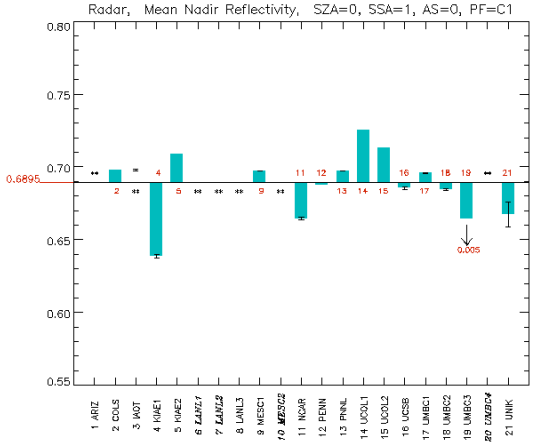
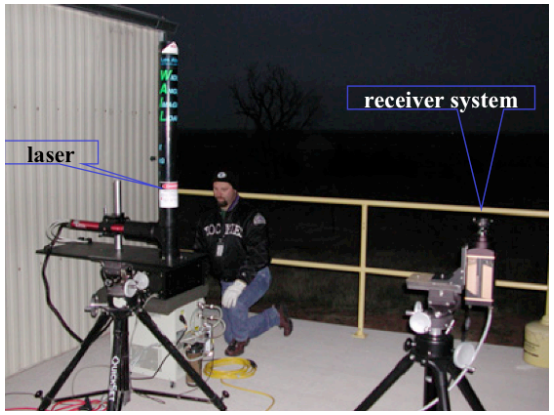


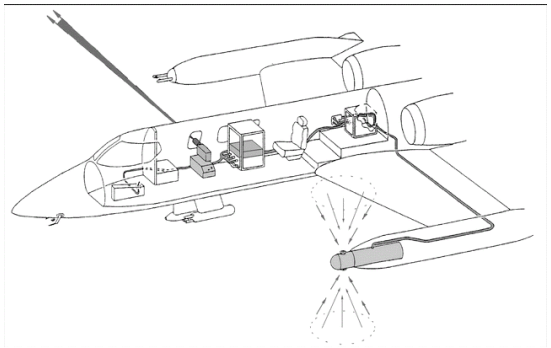
FIG. 6. Boundary flux $G(r)$ as a function of r for a 1-J pulse. Diffusion approximation predictions are shown by solid black lines while Monte Carlo results are depicted by symbols. The values at the curves are cloud optical thickness. Cloud geometrical thickness is 0.7 km and the scattering phase function is Deirmendjian Cloud C.1.

Motivation

- Codes supporting new instruments:
  - Time-dependence
  - Variable view
- General 3D codes:
  - Detailed testing
  - Analytic solution
  - Simplicity







Considerations

Simplicity

For Monte Carlo:

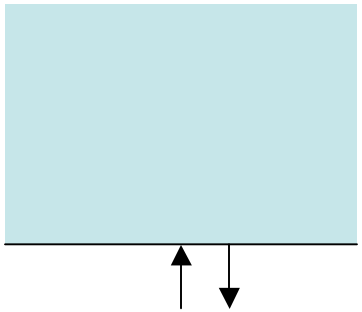
- Start at $x = y = 0$
- Keep track of pathlength
- Result a function of $r = (x^2+y^2)^{0.5}$

Balance two I3RC goals:

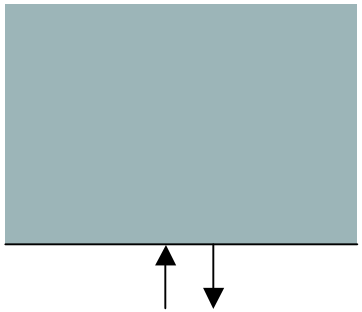
- Intercomparisons: limit number of cases
- Reference cases: one-step increments in complexity

Up to 8 lidar experiments may be considered

1a-b

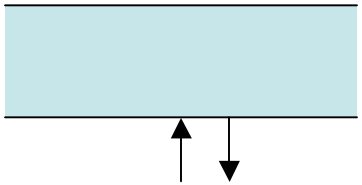


Semi-infinite cloud

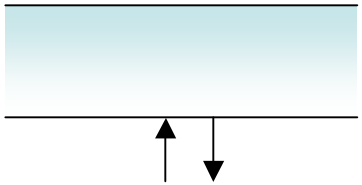


Absorption

2a-b

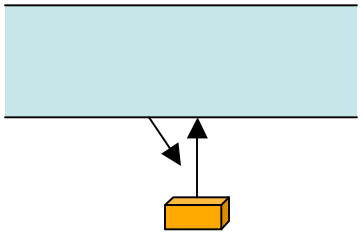


Finite cloud
Mie phase fn?

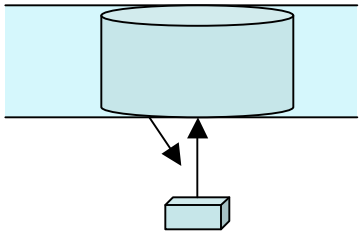


Vertical structure

3a-b

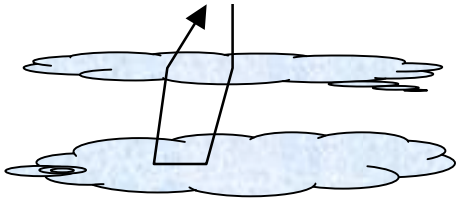


Instrument close

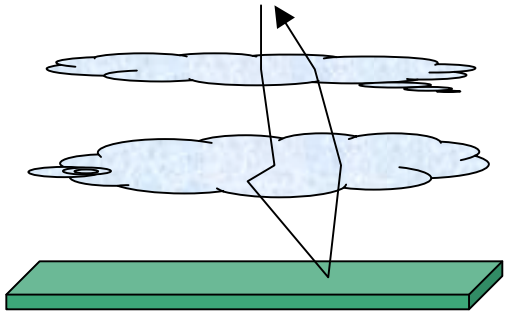


Horizontal structure

4a-b



Ci overlap
3D clouds



Reflecting surface

Discusssion

Ideas for topics:

- Remove/add/modify experiments?
  (e.g., polarization, 3D cloud model)
- 2-tier approach?
  (core + optional experiments)