Wish List

General:

(testing and developing stochastic methods...)

- data on fluctuations in the cloud field.
- how do the statistics vary in time?
- representative sample of the cloud spectrum. (size of observation area? surface inhomegeneities?)
- number of clouds.
- spatial distribution (especially in the horizontal).
- cloud sizes (mass fluxes at one height?)
- cloud lifetimes (linked to other properties?)

Initiation:

(stochastic, non-equilibrium closures...)

- statistical description of subcloud layer. (matched to some idea of the convection).
- fluxes at boundary layer top?
- clouds triggered by large-amplitude tail of the boundary-layer fluctuations. (characterised how?)

Wish List

Above all, to have data that is

statistical.

In particular...

Including the Fluctuations

(1) <u>By "dressing" the output of a standard convection scheme.</u>

$$T(X) \rightarrow T(X) + R(X)$$
$$T(X) \rightarrow R(X)\, T(X)$$
$$T(X) \rightarrow T(X+R)$$

(X is model state; T is the scheme's tendencies and R is chosen randomly)

A pdf for the stochastic term R can be obtained from real data.

(2) <u>By making the scheme itself stochastic.</u>

So calling the scheme twice with the same X gives different T.

Eg, use multiple plumes with some properties (eg, radius) chosen randomly from pdf. Again, the pdf needs support from data.

Stochastic Parameterizations

Are becoming increasing fashionable.

The pdf of a convective response to a steady forcing is **broad**.
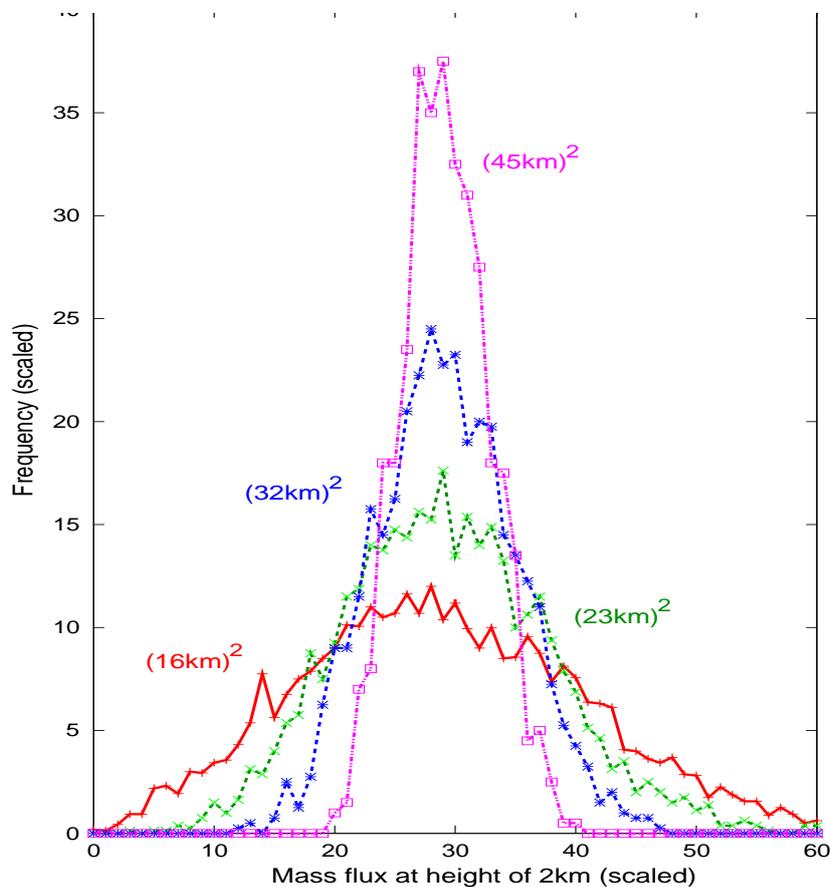
The fluctuations are not just noise but an important part of the physical system.
(eg, Palmer, 2001)

A Provocative Quote

From David Raymond (1997)...

"There have been many observation-al studies of moist convection and many attempts to parameterize con-vection....

However, there have been few of the former which have succeeded in aid-ing the latter."

"Critical Observations of Convection - State of the Art and a Proposal". In: The Physics and Parameter-ization of Moist Atmopsheric Convection. R. K. Smith (ed.) 483-498.

Stochastic Aspects of Convection

Or...

In an Ideal World what Data would be Useful for the Development of Stochastic Representations of Convection in Numerical Models?

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CSIP Planning Workshop
14th October 2003