GCSS overview and some questions

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Thanks to Norm, Jon and Phil for putting this workshop together.

GCSS mission

- Aim: To improve the representation of cloud processes in climate and NWP models

- Objectives:

  - To develop the scientific basis for the parameterization of cloud processes with due regard to physical and morphological identity among cloud system types

  - To coordinate the acquisition and assimilation of observations and the use of cloud-resolving models in the derivation of cloud system realizations for use in the development of parameterization schemes in large-scale models

  - To promote the evaluation and intercomparison of parameterization schemes for cloud processes

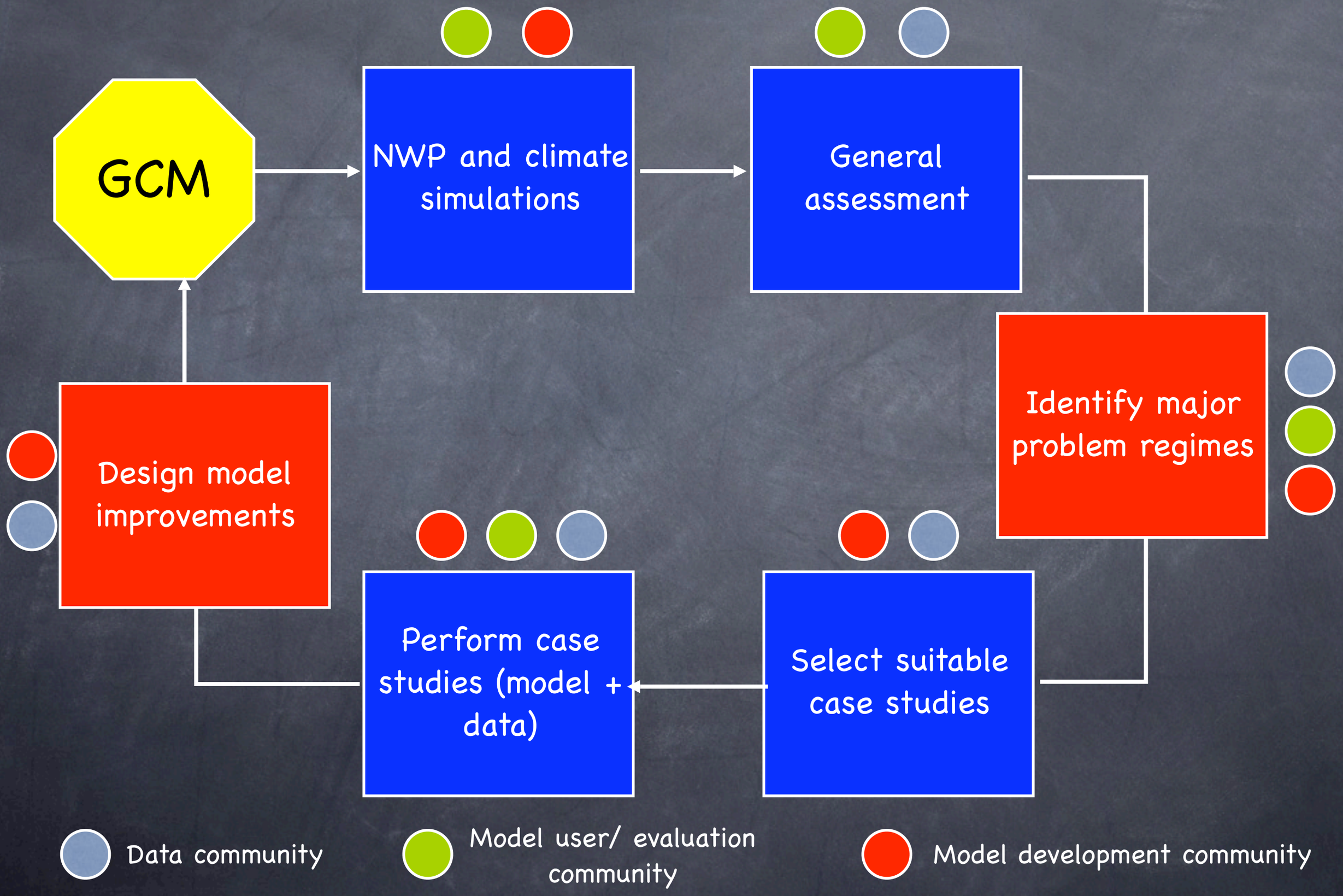
The GCSS paradigm

- Perform well chosen process studies using a variety of data sets and modeling approaches, in particular use CSRMs and LES as "interpreters" from observations to parametrizations.

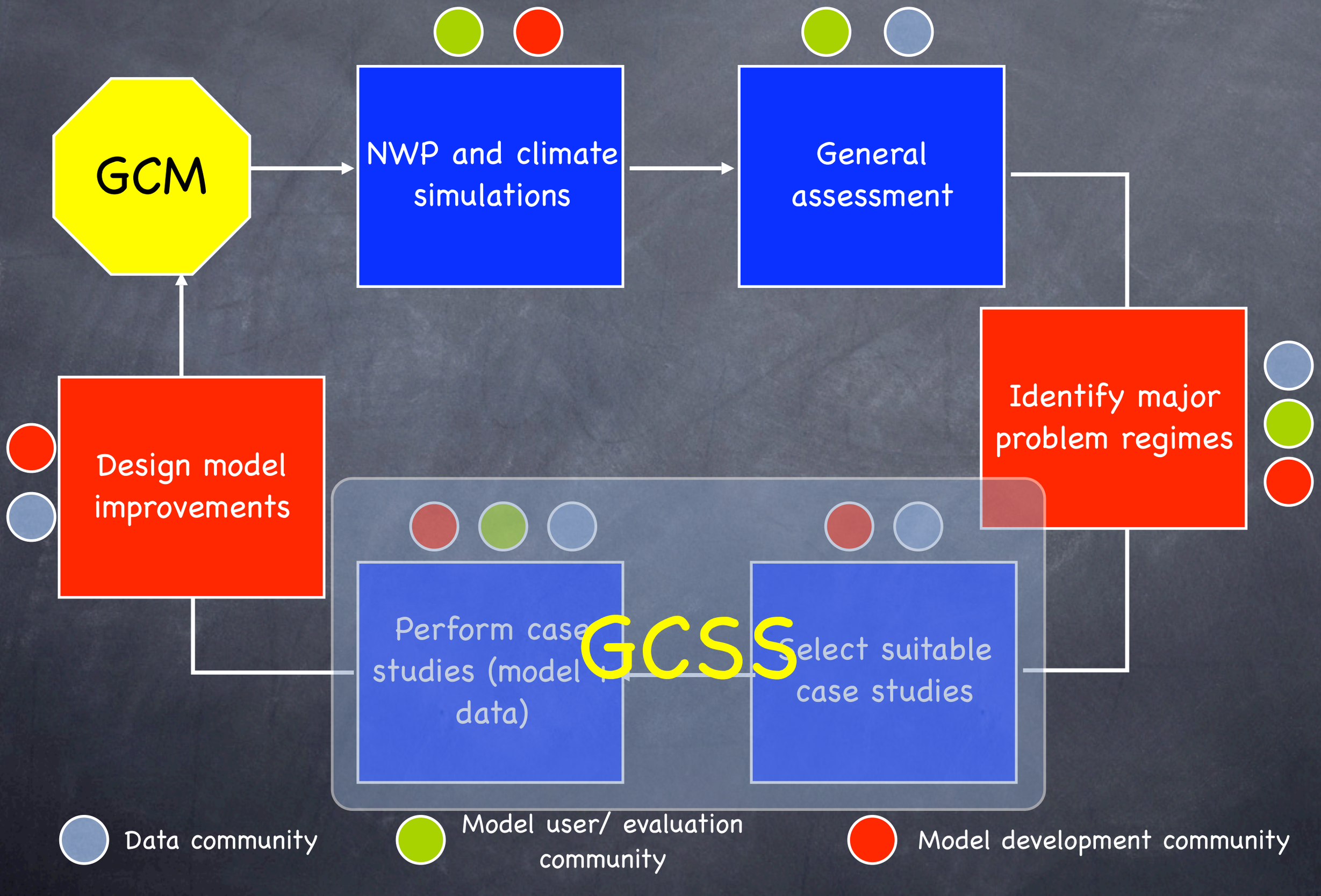
- Requires realistic CSRMs

- Relevant for this workshop -> How good are they?

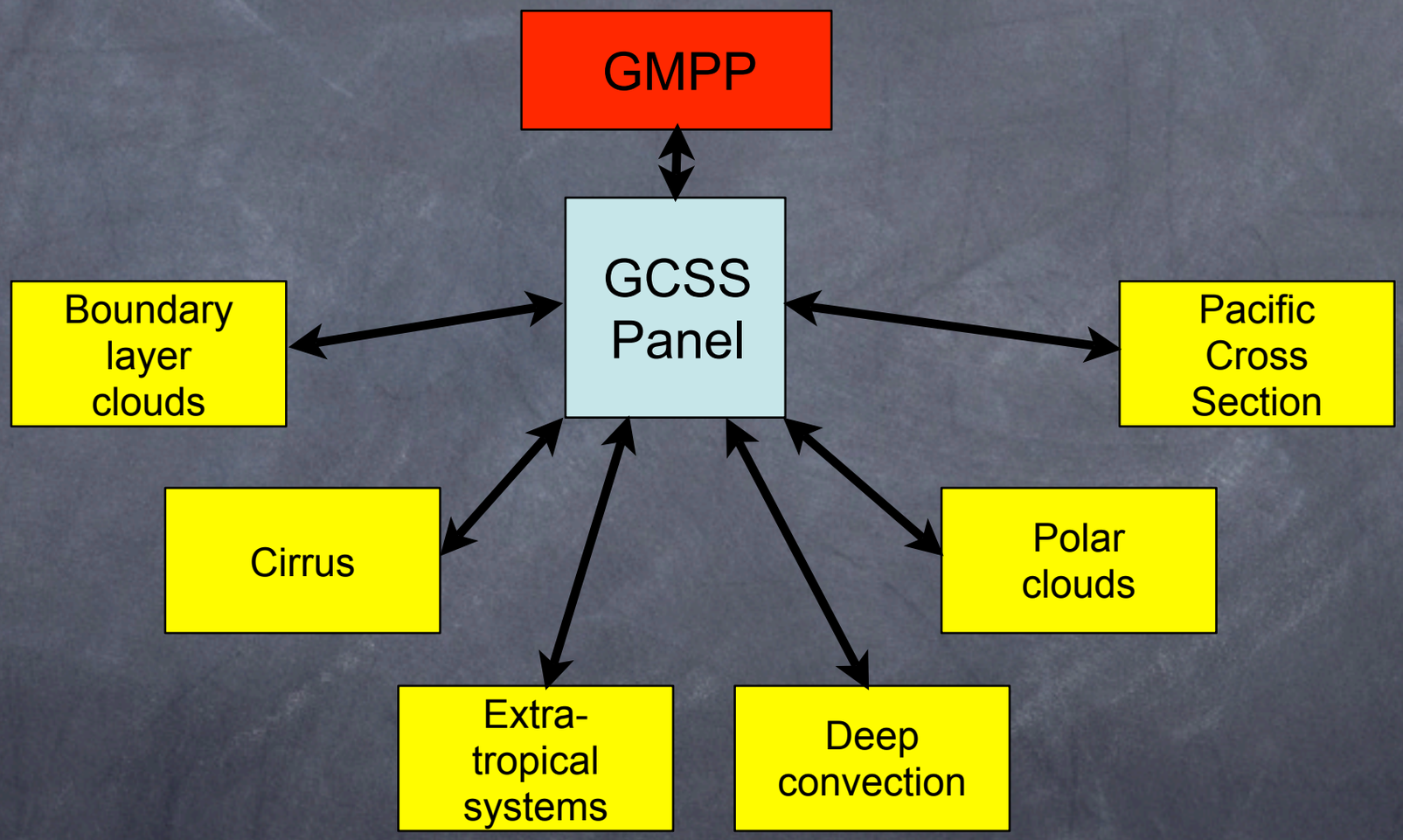
The model development process



The model development process



GCSS Structure



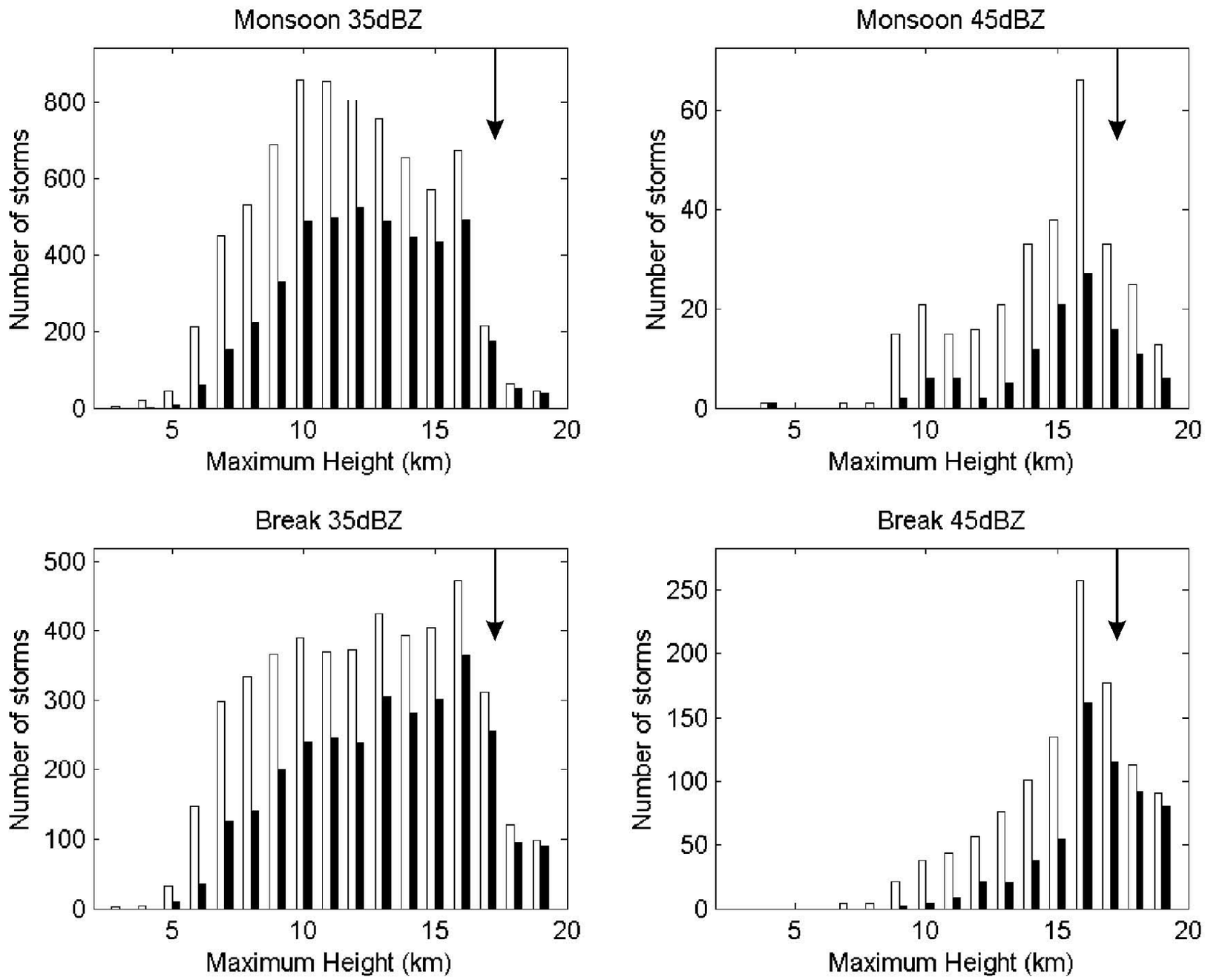
Deep Convection group

- Has studied numerous deep convective cases over the last 10 or so years.
- Current case: Transition of tropical convection (TTC)
  - Parametrization of convection in the tropics is important for NWP and climate
  - NWP models show a lack of temporal variability compared to observations
  - Suppressed period of convection, especially congestus, can be difficult to parametrize
- Use a combination of NWP, SCM and CRM to study TOGA-COARE sub-periods

A few questions on convection and the TTL

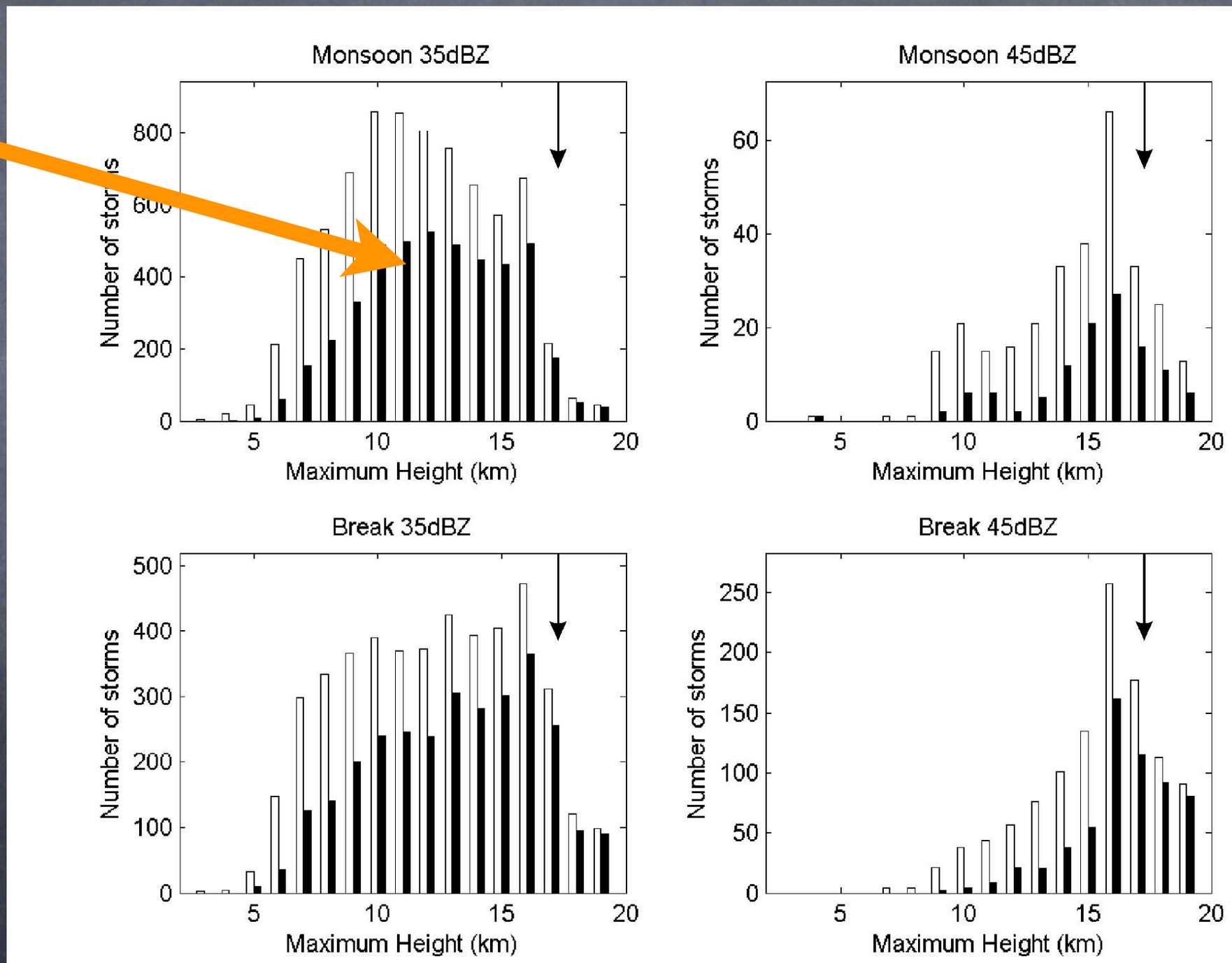
- Do we have the right tools?
  - Models
  - Data sets
- Have we exploited the existing tools as best we can?
- Most important for GCSS: How well do CRMs and GCMs represent convection/TTL interactions and how would we know?
- Are we looking at the right things? (e.g., mass flux?)

Darwin cells



Darwin cells

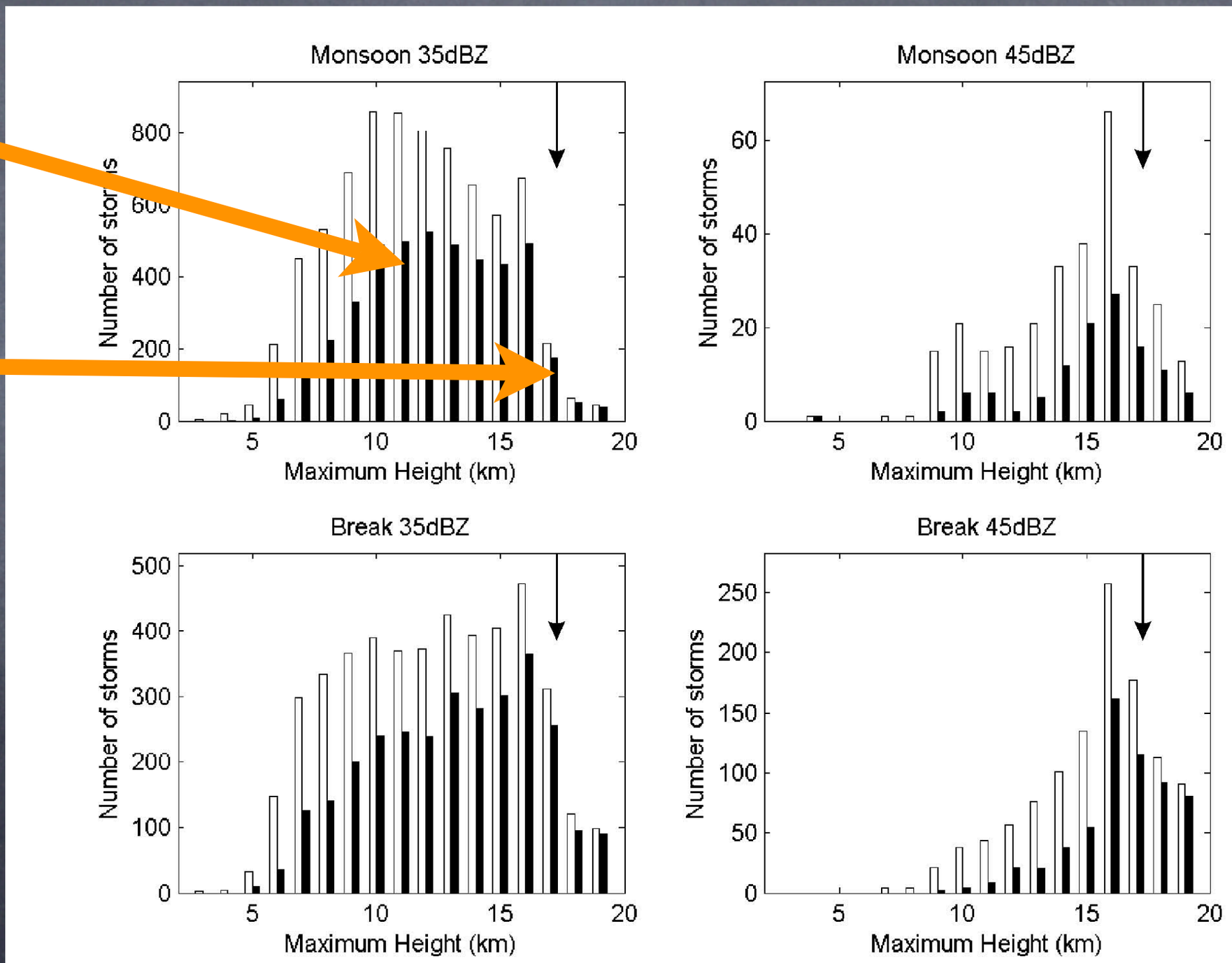
Most of the massflux



Darwin cells

Most of the massflux

TTL interaction

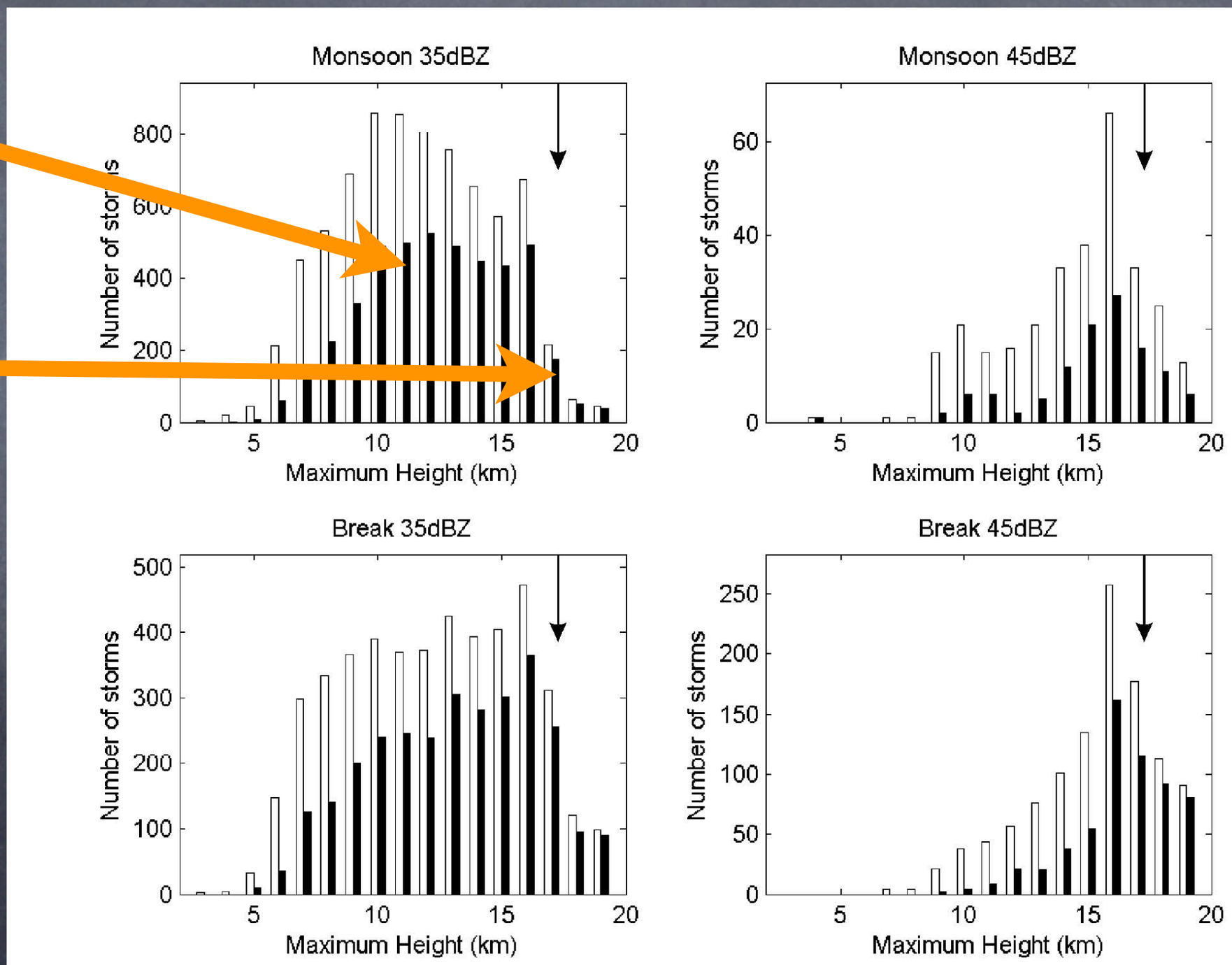


Darwin cells

Most of the massflux

TTL interaction

Can CRMs produce distributions like this?



Darwin cells

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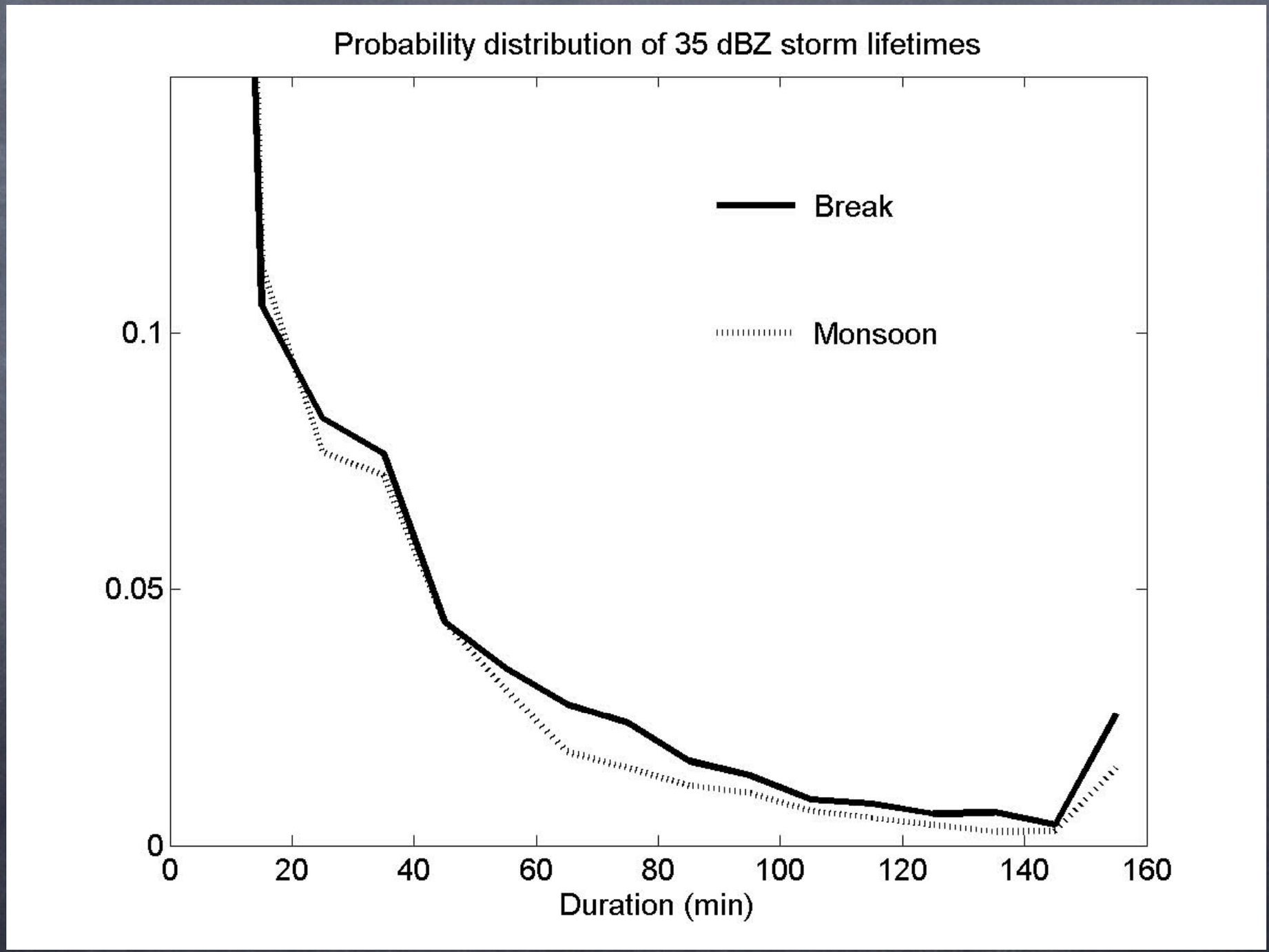
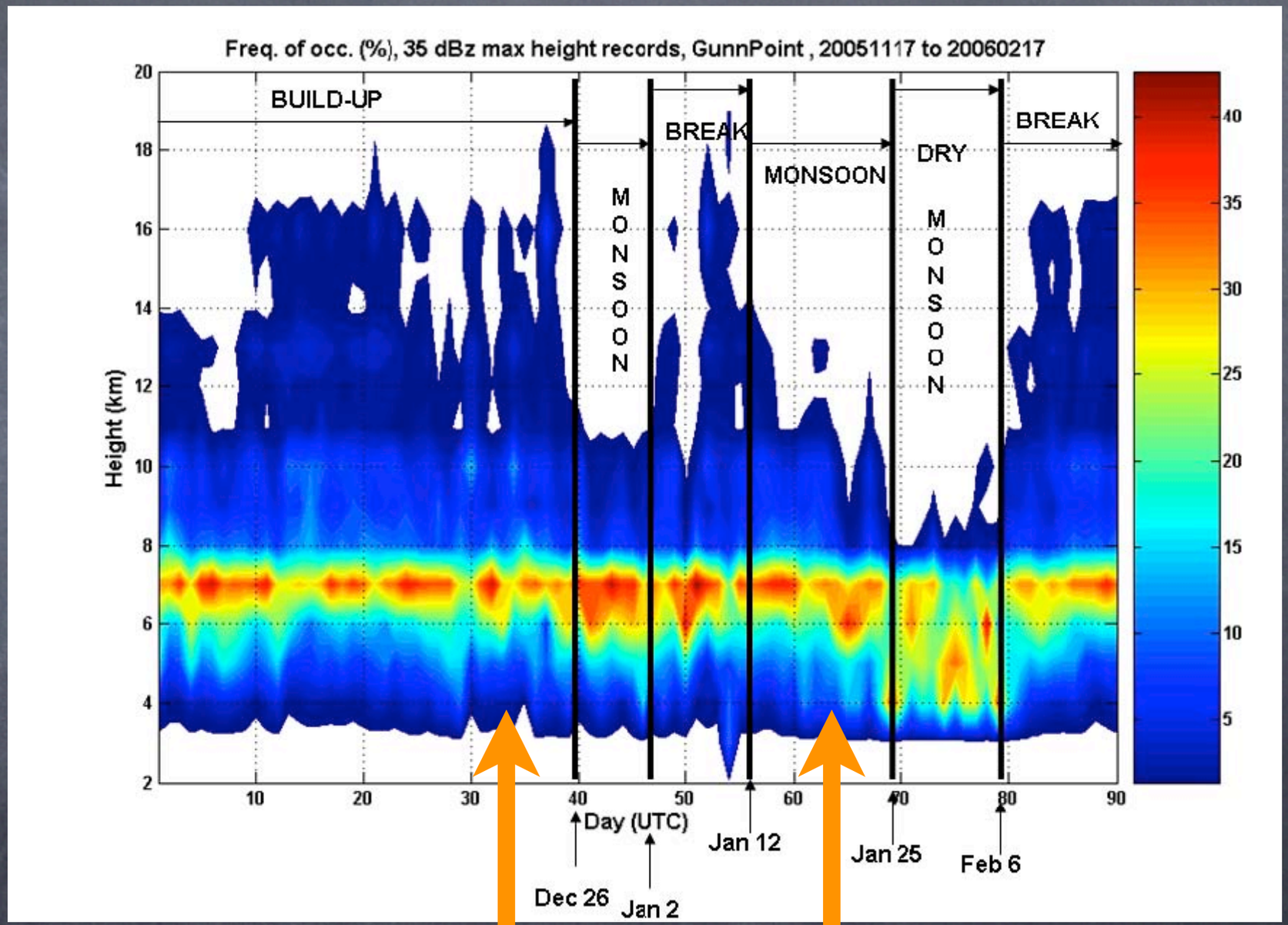


Darwin cells

Are we looking in the right spots and at the right times?



Continental Oceanic

Bottom line

- Use of CRMs in TTL studies likely requires new ways of evaluating them.
- Case studies vs longer term simulations - we have long-term forcing data
- Data sets and other tools - see TWP-ICE talk
- A joint GCSS/SPARC/IGAC initiative will need to address evaluation at an early stage.