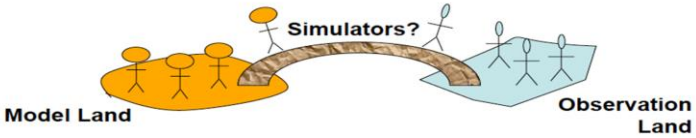
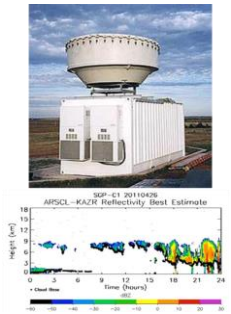
ARM Cloud Radar Simulator for GCMs – Current Status

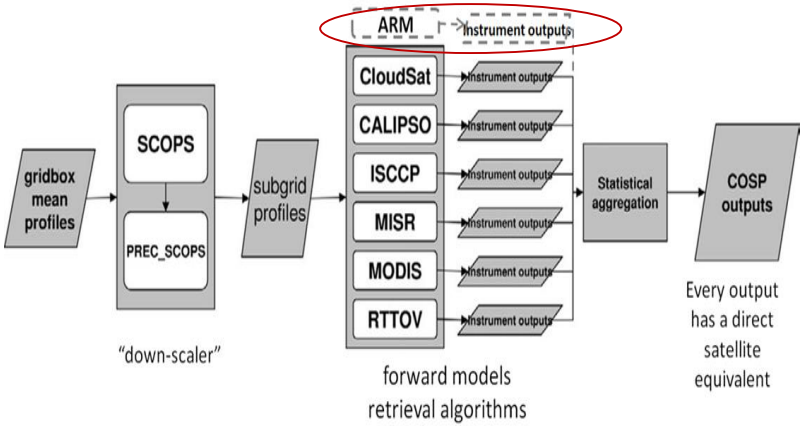
Yuying Zhang
Shaocheng Xie

- The ARM Cloud Radar Simulator was created to bridge the gap between detailed ARM cloud observations and GCM clouds





- It is based on the COSP CloudSat radar simulator with modification to mimic the way how cloud mask was generated from ARM cloud radar observations
- It has been merged into COSP v2 for climate model applications
- A BAMS article has been submitted



- It is a community effort with strong support from ARM, the ARM/ASR Radar Group, the COSP Project Management Committee

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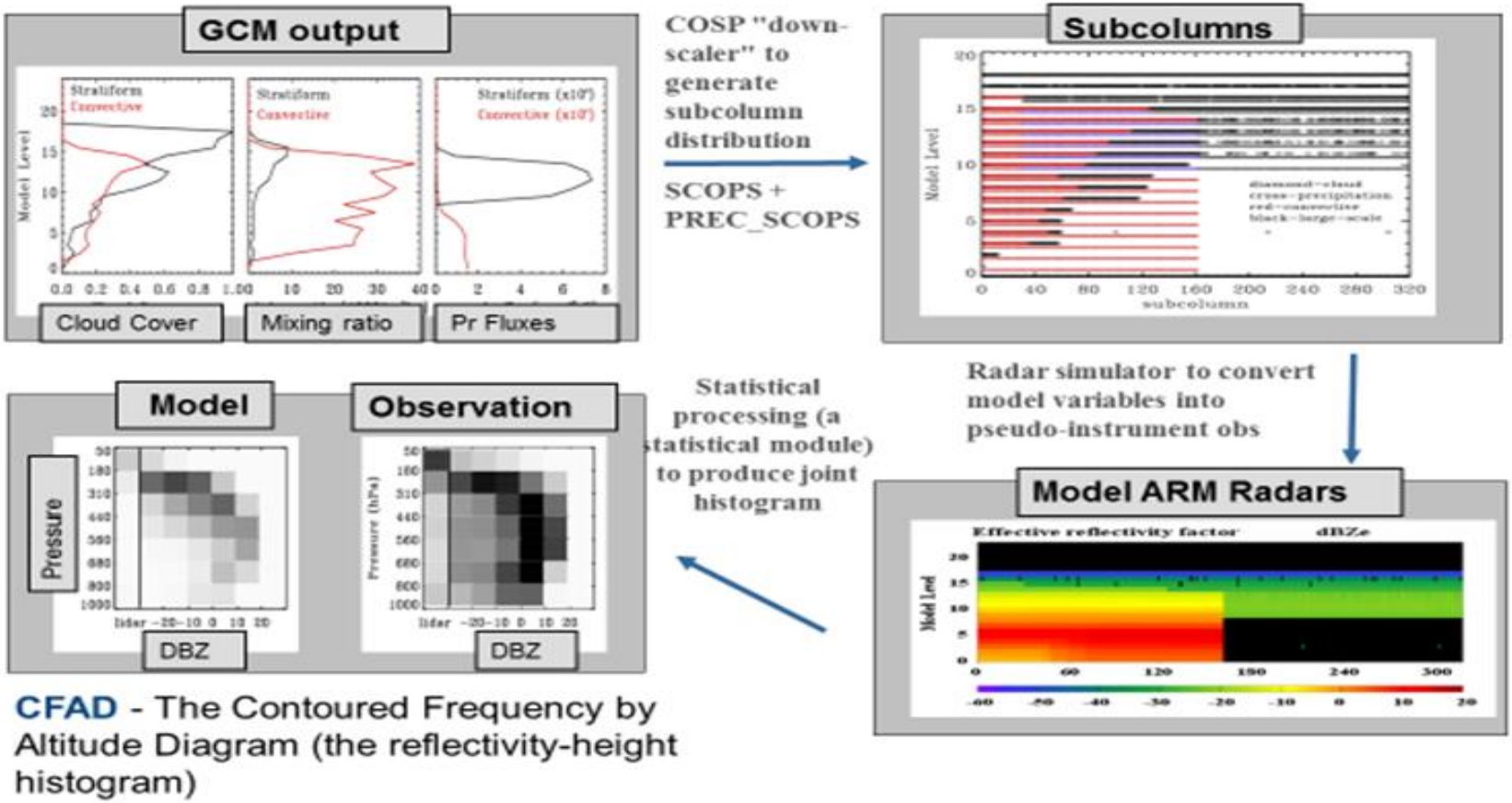
How Will the Simulator Work?

Yuying Zhang
Shaocheng Xie

A Flowchart – ARM Radar Simulator



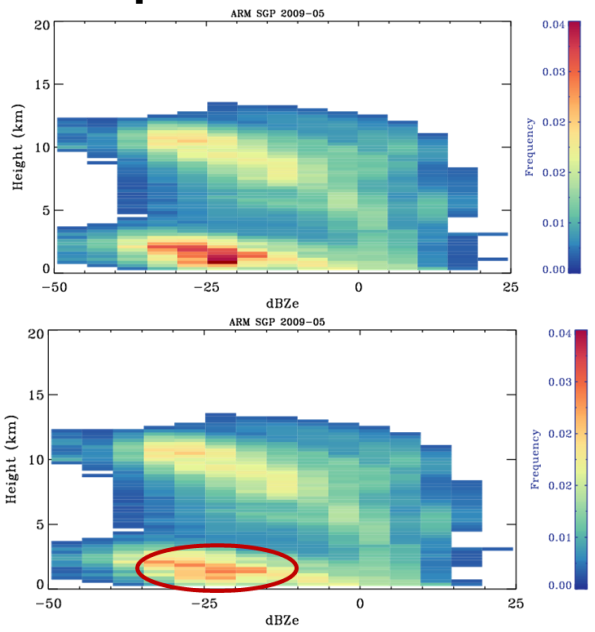
CFAD - The Contoured Frequency by Altitude Diagram (the reflectivity-height histogram)

ARM Radar Reflectivity-Height Histogram (CFAD) for GCMs

Yuying Zhang
Shaocheng Xie

- Data source: ARM Value-added product (ARSCL)
- Define height, time intervals (100m vertical resolution and hourly radar CFAD)
- Produce radar profiles at defined vertical resolution with original time resolution and hourly radar CFADs
- Generate the radar histogram (CFAD) data by considering uncertainty caused by Clutter
  - Qc-flag = 1 - MMCR reflectivity with clutter removed, but also lose some cloud information
  - Qc-flag = 1 or 2 - MMCR reflectivity may be contaminated by clutter

Impact of Clutter



ARM CFAD Data

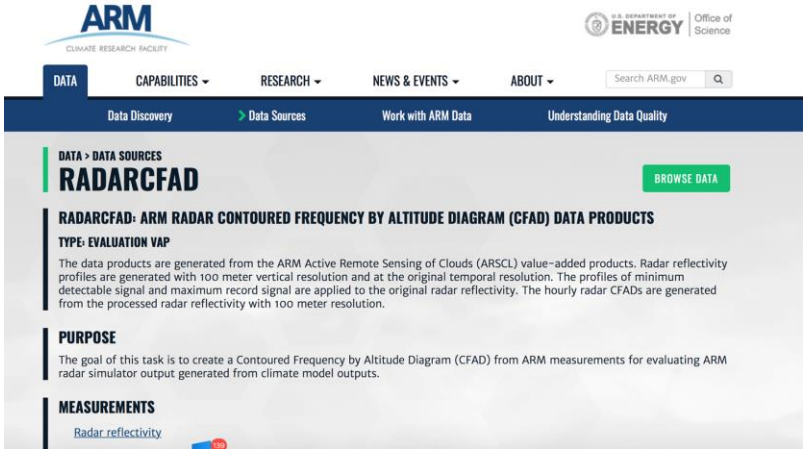
ARM Site	Lamont, OK Southern Great Plains (SGP)	Barrow, North Slope of Alaska (NSA)	Manus Island, Tropical Western Pacific (TWPC1)	Nauru Island, Tropical Western Pacific (TWPC2)	Darwin, Australia, Tropical Western Pacific (TWPC3)
Available Period	2006~2010 2011~2013	2012~2013	2006~2010 2011~2013	2006~2008	2006~2008 2011~2013

Ongoing Activities

Yuying Zhang
Shaocheng Xie

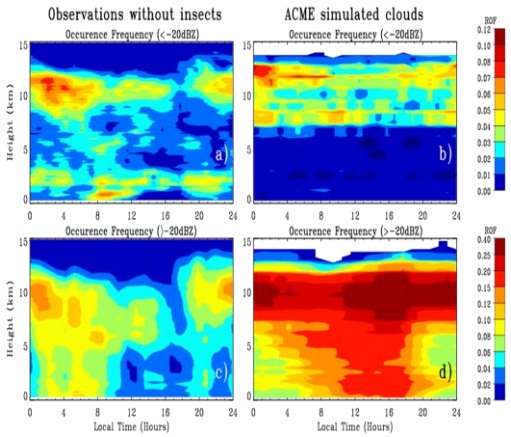
- A homepage for the ARM radar simulator is created for code release, data distribution, technical report and user guide
- A technical report is being prepared for providing guidance to the user community on use of the ARM radar simulator
- Extend the long-term ARM simulator-oriented radar data (CFAD) to the most recent years and for AMF sites

ARM Homepage for the Radar Simulator

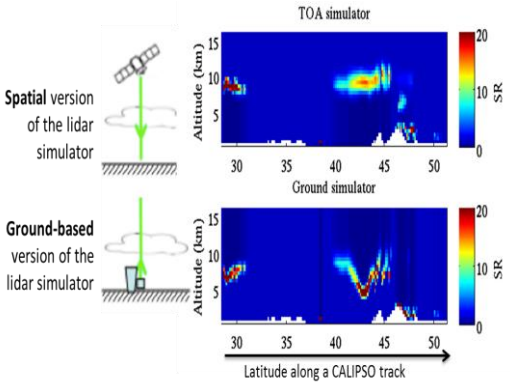


- Develop a diurnal cycle metrics package for easy use and release along with the ARM simulator
- Explore the possibility of an ARM lidar simulator to address the difficulty the ARM cloud radars have in detecting small cloud particles

Diurnal Cycle of Clouds ARM vs. ACME



An ARM Lidar Simulator?



Courtesy of Marjolaine Chiriaco of LATMOS-IPSL

ARM
CLIMATE RESEARCH FACILITY

We are looking for users to test the ARM radar simulator

- U.K. Met Office
- Japan modeling center (MIROC)

Contact: Yuying Zhang zhang24@llnl.gov
or Shaocheng Xie xie2@llnl.gov