

ARM 2001

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Outline

- Last year's goals
- Progress on some other fronts
- A Science Vision for ARM

What are our immediate priorities (1999)?

- **Data quality**
- **Data continuity**
- **Value-added products**
- **IOP planning**
- **ARM focussed science**
- **Science team involvement**

How have we addressed these priorities (2000)?

- **Reorganization of infrastructure**
- **Reorganization of science team**
- **Creation of data quality office**
- **New management of value-added product (VAP) process**

Reorganization -- 1-Year Expectations

- **Implementation of reconstituted STEC**
- **Implementation of Data Quality Office**
- **Implementation of new VAP structure**
- **Better tracking system for science team publications based on annual progress reports**
- **New system for programmatic evaluation of proposals**

STEC Reorganization

- **Science Team Representation**
 - **Ellingson (IRF)**
 - **Ferrare (Aerosol)**
 - **Mace (Clouds)**
 - **Randall (CPM)**
 - **Zhang (CRM – Data Integration)**
- **Working Group steering committees appointed**
- **Need to decide on term rotations**

STEC Reorganization (continued)

- **Working Group Vision Statements compiled in August; available on ARM web site**
- **ARM Science Vision not yet completed (more later)**

Data Quality Office

- **Up and running as of July 2000 with Randy Pepler in charge**
- **Focus on**
 - **Providing data quality (DQ) assessments to users**
 - **Providing DQ assessments to Site Operations**
 - **Improving documentation**
 - **Updating and improving SGP DQ checking**

Value-Added Products (VAPs)

- **Under management of Jimmy Voyles**
- **Appointed 4 “Translators” as interface between science working groups and computer developers**
 - **Chuck Long (IRF)**
 - **Mark Miller (Clouds)**
 - **Ric Cederwall (CPM)**
 - **Connor Flynn (Aerosol)**

Value-Added Products (VAPs)

- **Have developers in place to work with each translator**
- **Organized and restructured VAPs by**
 - **Priority**
 - **Working groups**
 - **Tracking system**

Reporting Scientific Progress

- **Requiring Principal Investigators to include publication information in yearly Progress Reports worked well**
 - *This will continue!*
- **Getting timely information to me worked poorly**

Reporting Scientific Progress

- I have to report on ARM scientific progress to
 - DOE management
 - Advisory and review committees (WAG, Jasons)
 - National and international committees (GEWEX SSG)
 - Scientific conferences (AMS, IUGG, AGU)
 - Seminars
- I need current results in clear figures

Programmatic Issues

- Significant programmatic changes are on hold due to Pat Crowley's retirement
- Wanda is filling in for Pat, but is really stretched by taking on this additional responsibility
- We have a huge task over the next few months due to the proposal cycle
- *Bear with us!*

New Direction for TWP

Contracting Nauru and PNG site maintenance to the Australian Bureau of Meteorology.

Benefits:

- Improved response time and decreased travel costs**
- Installation of 3rd ARCS at Darwin will provide an operational training facility and a new data stream**
- New research partners in BOM and CSIRO. Principal BOM contact is Peter May**

Credit to TWP Program Office (Bill Clements and his crew) and Doug Sisterson

New Direction for ARM Deployable Facility

- **New initiative to create an ARM facility for short term (months to a year) deployments**
- **Workshop report available on web**
- **Open discussion took place at the Science Team Meeting in Atlanta**

“Reanalysis” of ARM Data

- **New phase in ARM data processing**
- **Example: SGP CF solar radiation data**
 - Resolved the issue of diffuse radiation measurements
 - Have an agreed-upon approach to processing past data
 - Are processing the data from present back
 - Will issue a CD of uniformly processed radiation data (+ IR and cloud fraction data) by this summer

A Science Vision for ARM

- **Based on working group reports and STEC discussions last summer**
- ***My* interpretation at the moment**
- **Will be written up and available for discussion**
- **Will be discussed and refined at summer STEC meeting**

What are the driving science issues?

- **3D radiative transfer in cloudy atmospheres**
 - Can we do it?
 - How important are the effects in climate models?
- **Heating rates**
 - How well do model heating rate profiles agree with actual heating rate profiles?
 - How important are profile details to cloud models and cloud parameterizations?

What are the driving science issues?

- **Aerosols**
 - **Can we close the aerosol direct forcing problem? With what accuracy?**
 - **Can we relate aerosol chemistry to aerosol optical properties? At what level of chemical detail?**
 - **Can we quantify the indirect aerosol effect at the process level?**

What are the driving science issues?

- **Cloud properties**
 - **Can we retrieve cloud properties from ground-based remote sensing? At what accuracy?**
 - **What are the statistics of cloud properties? How do we describe them?**
 - **What is the connection between cloud properties and the large scale forcing? Can we describe this at the climate scale in physical process terms? Statistically?**

What are the driving science issues?

- **Cloud modeling**
 - **How well do CRM simulations match observations?**
 - **Can we use CRM simulations to “extend” our observational database? To what extent?**
 - **How do we translate our improved understanding of cloud processes into new, improved parameterizations?**
 - **What framework do we use to test parameterizations?**
 - **What are the criteria we use to decide “improvement”?**

How do we answer these questions?

- **Continue the basic proposal-driven ARM science and ARM data collection**
- **Develop links with other observational programs and sites to extend our database**
- **Carry out focused IOPs in conjunction with other agencies to explore problems that are beyond our own resources**

How do we answer these questions?

- **Develop strong links to cloud modeling programs and centers to increase ARM program leverage and data use**
- **Develop new research methodologies**
 - **For data analysis and cloud properties**
 - **For parameterization testing and development**

Some Specific Thoughts

- **New proposal cycle this year**
 - Letters of intent due in mid-April and proposals in May
 - Looking for new ideas and approaches
- **Exploring new data collection approaches**
 - Expanded aerosol sampling at the SGP
 - Improved Aerosonde in the Arctic
 - Improved SWS at the SGP

Observational Links

- **Joint experiments**
 - **SGP aerosol experiment with DOE TAP**
 - **NASA CRYSTAL**
- **GEWEX Cloud Profiling Working Group**
 - **Establish data standards and user access for ground based remote sensing sites**
- **NASA satellite programs**
 - **Terra instruments and science teams**
 - **CloudSat and Picasso-Cena**

Modeling Linkages

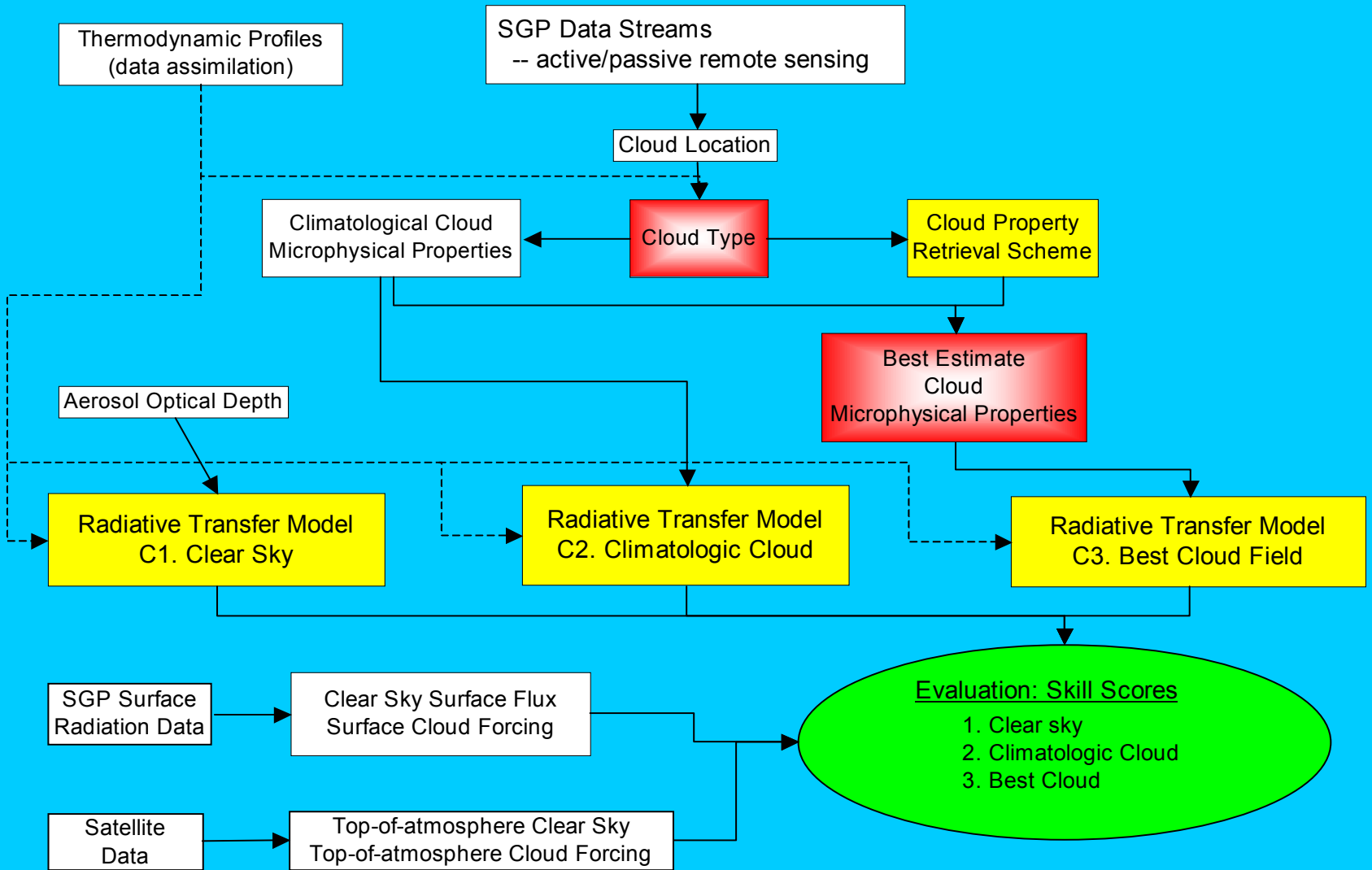
- **Continue strong ties to GCSS**
- **Increased emphasis on use of CRMs and SCM paradigm**
- **Shift primary focus from model comparison and technique development to cloud and parameterization issues**
 - **Fewer but focused SCM IOPs**
- **Get ARM Fellow program moving**

New Methodologies

- **Integrated cloud product**
 - **Produce continuous column description of cloud properties**
 - **Blend principal investigator science with integrated working group activity and distributed product generation**
- **Cloud parameterization testbeds?**

Paradigm for ARM-related Research on Cloud Properties

(Draft V 2.1)



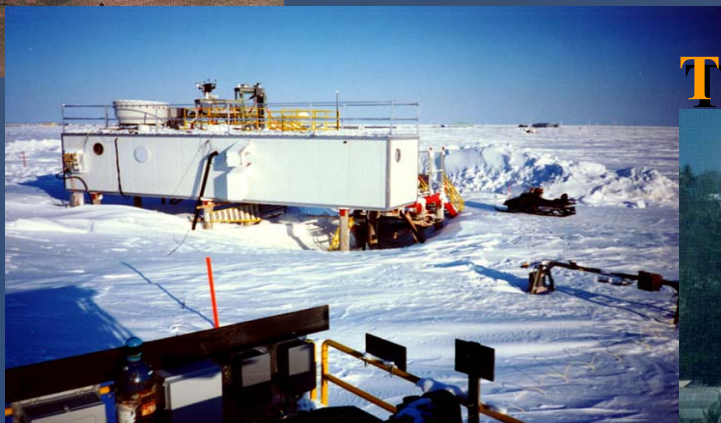
Summary

- **ARM is alive and healthy after a decade**
 - **Stable funding and solid management support**
- **We need tighter focus on our primary goal of improving cloud and radiation parameterization**
- **We need to expand our links to other programs to leverage our resources**
- **We need innovative ideas and approaches**

Southern Great Plains



North Slope of Alaska



Tropical Western Pacific

