

# LASSO\* Data bundles & CMDV-CM4 related data developments

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**LASSO Webpage:** <https://www.arm.gov/capabilities/modeling>

**LASSO e-mail list sign up:** <http://eepurl.com/bCS8s5>

\*LES ARM Symbiotic Simulation and Observation

# LASSO ARM/ASR PI Meeting presentations

- **LASSO Breakout Session** (Potomac), Today 4-6 p.m.
- **Posters presentations Tuesday A1 (3:30-5:00 p.m.)**
  - ▶ #168, Oue et al. ARSCL simulator
  - ▶ #171, Li et al., Multiscale Data Assimilation Forcing for LASSO
  - ▶ #172, Krishna et al.: LASSO Bundle Browser Using NoSQL Technologies
  - ▶ #173, Gustafson et al., LASSO Overview
  - ▶ #174, Vogelmann et al., LASSO Data Bundles

- Goal is to use routine LES – constrained and evaluated by ARM observations – to help bridge the model-observation gap
  - ▶ Intended to build a library of simulations w/ observations for research
- It is a 2-year pilot project due to transition to operations this year
  - ▶ Focused initially on shallow convection at the SGP
  - ▶ To be applied to other phenomena and ARM sites
- A “data bundle” is a package of observations and simulations (aka, a “data structure”) aimed at providing the best description of the atmosphere

# What's in a data bundle?

- Case descriptors
  - ▶ Cloud type, weather state, inversion strength, etc.
- Model evaluation metrics
  - ▶ Model-observation diagnostics
  - ▶ Model skill scores
- Model input and output fields
  - ▶ 3-D model fields, profile statistics, and model-based budget terms
  - ▶ Forcings and initial conditions

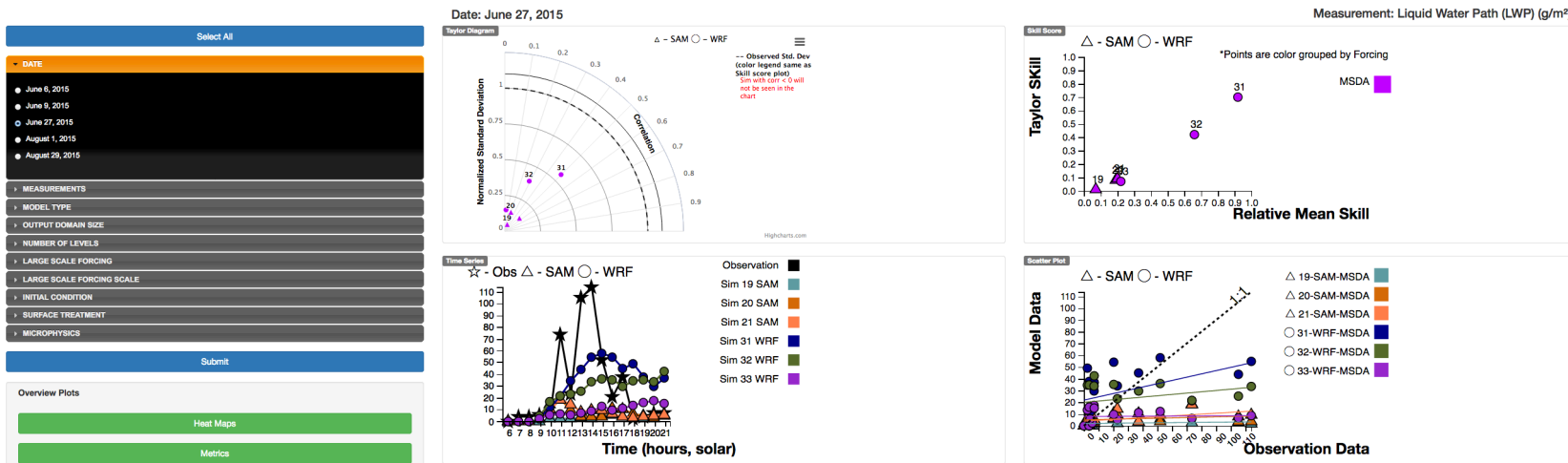
# The LASSO Bundle Browser

■ Enables interactive queries to find the cases of interest

DATA DISCOVERY  
LASSO BUNDLE BROWSER - VISUALIZATION & ACCESS

<http://www.archive.arm.gov/lassobrowser>

Introduction  
Welcome to the LASSO Bundle Browser that is designed to assist users with identifying LASSO large-eddy simulations (LES) of interest for their research. The plots and associated data table update dynamically based on user search criteria, and links within the table enable direct access to order the data bundles of the displayed simulations. More information on LASSO and the data bundles can be found at the [LASSO home page](#) and on the [Alpha 1 Release web page](#).  
Note that this is an initial evaluation version of the browser that specifically queries and displays observed and simulated cloud properties for the five days worth of simulations released in the LASSO Alpha 1 release. There are 192 simulations between the five days that differ in terms of the LES model, forcing dataset, domain size, and model physics.



Skill Scores on June 27, 2015

Measurement Skill

1D Cloud Skill

2D Cloud Mask Skill

Total Cloud Skill

0

0

0

0

1

1

1

1

Slide orange sliders to adjust min and max skill ranges

Simulation ID	Measurement Skill (Liquid Water Path (LWP))	1D Cloud Skill	2D Cloud Mask Skill	Total Cloud Skill
19 (Diagnostic) (Data)	0.02	0.01	0.08	0.03
20 (Diagnostic) (Data)	0.12	0.19	0.23	0.21
21 (Diagnostic) (Data)	0.14	0.26	0.28	0.27
31 (Diagnostic) (Data)	0.8	0.68	0.29	0.44
32 (Diagnostic) (Data)	0.53	0.53	0.28	0.39
33 (Diagnostic) (Data)	0.12	0.19	0.19	0.19

Showing 1 to 6 of 6 entries

# What observations are used?

- LASSO's focus is on developing the workflow so must focus on robust, shovel-ready (or nearly so) data products
  - ▶ Alpha 1: Focused on central facility cloud and environmental observations
  - ▶ Alpha 2: Extends focus to surrounding facilities to capture regional variability
- Climate Model Development and Validation (CMDV) Project:  
Coupling Mechanistically the Convective Motions and Cloud Macrophysics in a Climate Model (CM4) [CMDV-CM4: PI David Romps]
  - ▶ Goal: Dramatically improve the representation of shallow clouds in the DOE's ACME model by taking advantage of the newest ARM observations, the latest developments in cloud modeling, theory and parameterization, and state-of-the-art techniques for diagnosis and validation.
  - ▶ Appropriate research-level products developed will be adopted into the LASSO workflow