# **Overview of the LASSO 2017 Large-Eddy Simulations** of Continental Shallow Convection at the Southern Great Plains

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#### What is LASSO?

The Large-Eddy Simulation (LES) ARM Symbiotic Simulation and Observation (LASSO) workflow generates routine LES simulations of shallow convection over the Southern Great Plains (SGP) region in Oklahoma to augment routine observations. The simulations are coupled with ARM observations, diagnostics, and skill scores to form a library of data bundles, which is linked to a web interface for ease of access and to quicken scientific discovery.



# **Getting LASSO Data Bundles**

LASSO data bundles are freely available from the US DOE Atmospheric Radiation Measurement (ARM) data archive.

The Bundle Browser is a specially designed web interface for querying the LASSO library and downloading bundles of interest.

Results can be intercompared between simulations,



The Bundle Browser: http://archive.arm.gov/lassobrowser

simulation-specific plots and diagnostics can be viewed, and bundles queued for downloading.

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To be included in LASSO e-mail updates, sign up for the LASSO Information e-mail list at http://eepurl.com/bCS8s5

### FOR MORE INFORMATION

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## **Data Bundle Contents**

LASSO data bundles are designed for use by a wide range of All cases include multiple simulations as an ensemble of plauresearchers who are either new to modeling or highly familiar sible conditions leading to shallow convection for that date. with models.





# LES Results for Different Large-Scale Forcings

Box-and-whisker plots comparing observations with LES results using a selection of large-scale forcings for 31 cases from 2017.



# LASSO – MODEL & OBS DATA FOR OBSERVATIONALISTS • THEORETICIANS • MODELERS



#### **LES Ensembles**

Large-scale Forcing Source	<b>Horizontal Spatial Scales</b>
ARM Variational Analysis	300 km
ECMWF Analyses	16, 114, and 413 km
Multiscale Data Assimilation (MSDA) w/ ARM observations	75, 150, and 300 km
None (static background)	N/A

Selected cases and configurations from 2015 and 2016 include different grid spacings and domain sizes as part of the pilot phase testing.

# ARV

#### **Available Cases**

The LASSO pilot phase ended last summer, generating sets of simulations for two shallow convective seasons at SGP. LASSO is transitioning into routine operations and data bundles for a third shallow convection season will be released this summer.

#### Periods

Shallow convection typically occurs in spring and summer. LASSO has generated simulations for these periods:

- 5 days from May–July 2015
- 12 days from May-August 2016
- 31 days from April-September 2017 (available soon)

# LASSO's Future

The LASSO team is in the process of exploring the next weather regime to pursue with LASSO in addition to shallow convection at SGP.

The primary decision factors include 1) science drivers, 2) how the LES would add value to ARM's observations, and 3) feasibility.

Example scenarios under consideration include:

- Mixed-phase clouds in the Arctic
- Maritime clouds at the Azores
- Deep convection or clear-air turbulence at SGP

Which would you choose and why? Send your feedback to William Gustafson and Andrew Vogelmann at lasso@arm.gov.



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