Dear Mike,

Below are the detailed data tasks we would like you to do for the CAPT project. This is a follow-on to the write-up you did on the ARM/CAPT data previously.

In general, model data will be modified to facilitate comparison with ARM (not visa versa) The goal is to create new model data fields which upon opening with a software package such as CDAT can immediately be compared to the ARM data (e.g. plots that show time series of differences, or calculations such as correlation coefficients and root mean square errors) The task to do this are listed below. Note the ARM data here is the continuous forcing data, which consists of time series of scalars and vertical profiles on fixed pressure surfaces.

ARM	CAM3, (AM2 to be done after the completion of this task)
ARM data (the 3-yr continuous forcing data, as a starting point), Shaocheng will perform processing as requested	**CAM3 timestep and hourly outputs, for each 72-hr forecast:**
Variable names, units, meta data, combining continuous forcing	Time interpolation, time axis
Levels will be consistent	
	Horizontal averaging for 4 grid points to a SGP average
	Standard vertical axes so that they are the same in the ARM and new model data
	Create one output/forecast file
	Missing data (e.g. to handle missing data when an ARM fixed pressure level is beneath the surface)
	Standardized variable names and units for variables in common between ARM and model
	Provide a standardized name for the output file accounting for the fact that the name will need to identify the model run (e.g. control CAM3, AM2, or CAM3 with modified convection) and maybe something about the period integrated (e.g. June/July 1997 IOP, or March 2000 IOP)
	Calculations of variables in the ARM data (e.g. RH, Q1, Q2) which are not in the CAM3 data but can be derived from the CAM3 data
	Chunking a series of 12-36 hour forecasts
	Pass through all variables not in ARM (Williamson budget analysis)

Step 1:
Identify variables in ARM and models for comparison (please consult with Steve Klein or Shaocheng Xie, and Jim Boyle if questions arise)

Define common names and units (coordinate with Shaocheng Xie)

Step 2: Select one 72-hr forecast output, as the starting point, and transform all the model data into the ARM vertical levels (for the variables that this applies to) and SGP site. This step involves time interpolation, vertical interpolation, changing units and names of variables if necessary, giving a value of 1E20 for those ARM pressure levels that are below the surface.

Step 3: Derive some required diagnostic variables (not model standard output) from the model data (e.g., Q1, Q2, others??? - coordinate with Steve, Shaocheng or Jim Boyle) and recalculate some variables (e.g., RH) in the same way as used in the ARM data for better comparison (Shaocheng can provide the formulas used for the ARM data).

Step 4: Horizontal averaging for 4 model grid points to a SGP average (using the predefined weights for the 4 grids, coordinate with Shaocheng)

Step 5: Create netCDF output files for the four model grid points and the SGP average for the forecast with the experiment name.

Step 6: Repeat steps 1-4 for the remaining 72-hr forecasts.

Step 7: Concatenate the data from hours 12 to 36 of each of the forecasts that start at the same time of day (e.g. 00Z) for a given model experiment.

Step 8: Document and share the codes (written in CDAT) within the CAPT team as this procedure will need to be applied for multiple model experiments.

If there are questions for any of the steps, please consult with Shaocheng Xie, Steve Klein, Jim Boyle or Jerry Potter at any time. For references, two IDL files (one for CAM3 h0 files and one for h1 files) that were used to process the model data for a frontal case during March 2000 IOP are available from Shaocheng Xie. The IDL codes can be used as references for steps 2-5. We are hopeful that these tasks can be completed in 3 weeks full time work.