Diagnostics Package for the E3SM MODEL
Chengzhu Zhang, Zeshawn Shaheen, Chris Golaz, Jerry Potter
Lawrence Livermore National Lab

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Objective
A comprehensive diagnostics package that:
- Developed in Python
- Fully implements the functionality of AMWG diagnostics package
- Delivers valuable diagnostics developed from E3SM to the community
- Maintains repo for most updated observational datasets, including remote sensing, reanalysis and in-situ datasets
- Is flexible for adding user-specified diagnostics
- Interacts effectively with the PCMDI’s metrics package PMP and the ARM diagnostics package through a unified framework: Community Diagnostics Package (CDP).

Current Diagnostics Sets

- **Latitude-Longitude Map**
- **Polar Projection**
- **Zonal Mean Contour**
- **Zonal Mean Line**
- **CloudTopHeight vs tau**
- **Summary Table**

Features

**Feature: Clean and simple design**

**Feature: Flexible configuration.**

*Run:* acme_diags_driver.py -p myparams.py [-d mydiags.cfg]

A python script: myparams.py
#required settings
reference_data_path = '/space1/obs_data_20140804/
test_data_path = '/space/golaz1/ACME_simulations/
test_name = '20160520_A_WCYCL1850.ne30

sets = ['lat_lon']
Backend = 'mpl'

#optional settings below
diff_title = 'Model - Obs'
result_dir = 'lat_lon_demo' #name of folder to store result
seasons = ['ANN', 'DJF']

# Multi-processing
multiprocessing = True
num_workers = 4
save_netcdf = True #default to False

**Feature: Flexible for derived variables:**
- Derived variables: variable(s) needing preprocessing before calculation. i.e. total precipitation rate [PRECT]
  - PRECT = PRECL + PRECC
  - Unit conversion: into mm/day
  - Name conversion: pr into PRECT
- Built-in derived variables list for E3SM output, adjustable for CMIP conventions.
- User expandable in configuration files

**Feature: Enhanced color maps and color bar intervals for built-in variables**

User’s Guide

Installation and Running:
- Two commands to install:
  - `wget https://raw.githubusercontent.com/ACME-Climate/acme_diags/master/conda/acme_diags_env.yml`
  - `conda env create -f acme_diags_env.yml`

- Edit scripts for configuration
- Multiple Uses:
  1. Model versus obs, model versus model, obs versus obs
  2. Run single or multiple sets of diagnostics
  3. Run all sets of E3SM diagnostics:
     - `acme_diags_driver.py -p myparam.py`

Documentation website:

Please contact zhang40@llnl.gov or shaheen2@llnl.gov for technical support

GitHub
Our github repo:https://github.com/ACME-Climate/acme_diags
Note: E3SM model is formerly known as ACME

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