Running the PCMDI Metrics (or PMs) package on RAIJIN

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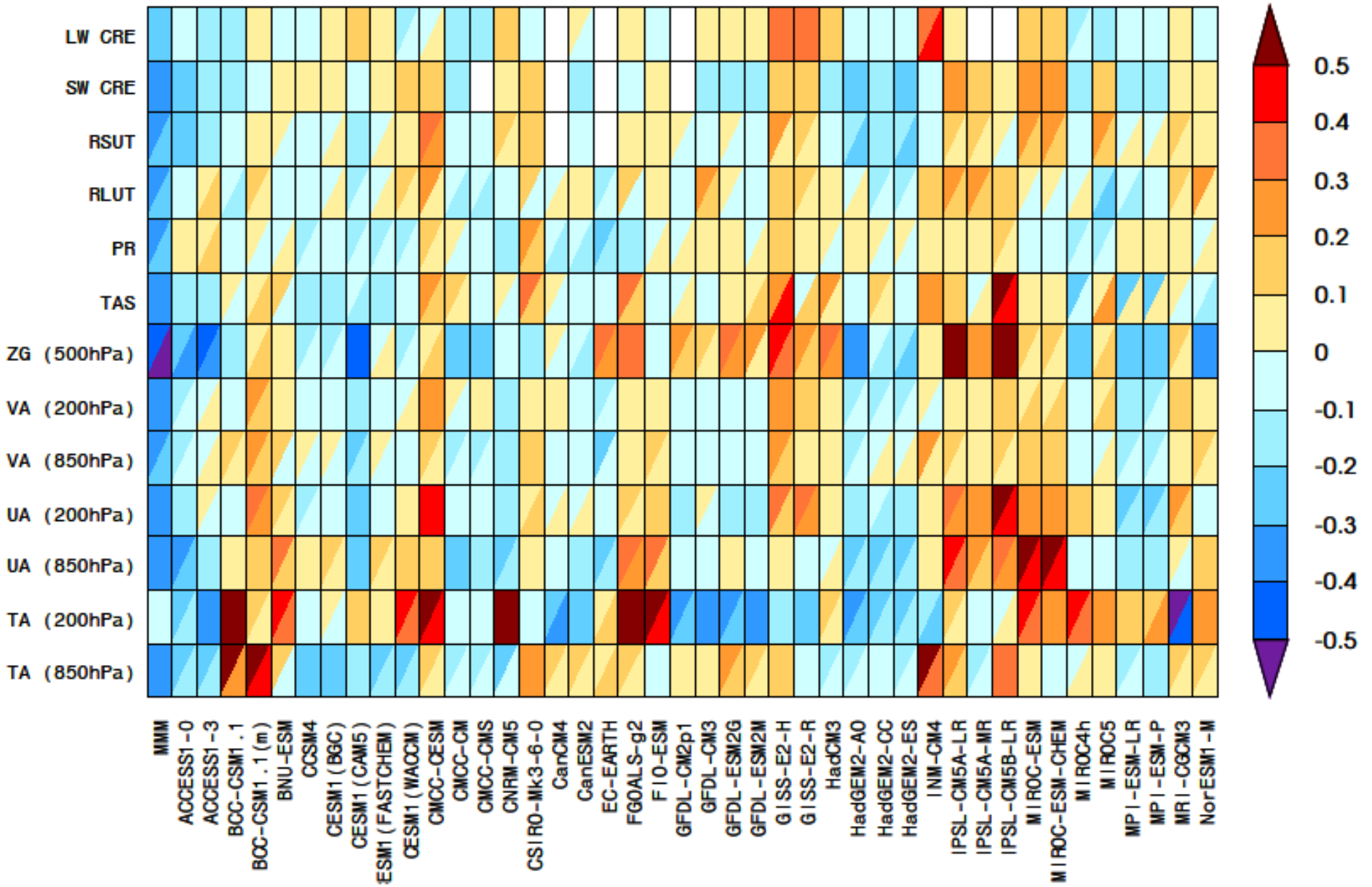
What does it do?

- Calculates standard metrics (RMSE, MAE, CORR, BIAS) from monthly mean climatologies (xy,xyt)
- Specify region (e.g. NH extreme latitudes, Tropics)
- Specify target grid (e.g. 2.5x2.5)
- Specify re-grid method (e.g. esmf)
- Copes with irregular grids (e.g. ACCESS ocean model output)
- Understands input/output masks

Figure 9.7, WG1AR5 chapter 9



STEPS

(tools under ~mac599/CMIP5/analysis/PCMDI_METRICs – mirrored at /short/p66/mac599/PCMDI_METRICS)

- 1. convert ACCESS *.pa-* files to netCDF (PMs_access.py)
- 2. generate model "-clim.nc" files for each parameter of interest (PMs_model_input.ncl). Analagous approach for reference (observational) sets.
- 3. Setup pcmdi_metrics_driver.py parameter file (-p PMs.py)
- 4. Convert output from 3. with (PMs_read.ncl)
- 5. Plot (PMs_plot.ncl)

PMs_access.py

- codes="1,208:2,205:3,236:5,216:30,201:30,202:30,207:30,204:16,222"
- vars="rsut,rlut,tas,pr,ua,va,zg,ta,psl”
- python PMs_access.py --iuser ars599 --ouser mac599 -t work_atm_temp --vars $vars --codes $codes --ybeg=1850 --yend=2005 --expt=hPIC2C --model=ACCESS1.4 --experiment=historical --rip r1i1p1
- (PMs_add_bnds.ncl)

PMs_{model,obs}_input.ncl

- **Models**: generally any CMIP5 or new ACCESS model can be read and written out.
- odir: [mod_data_path] /home/599/mac599/150113_metrics/test
- ofil: {var}_{model}_experiment_table_rip_01-12-clim.nc
- **Observations**:
- odir: /home/599/mac599/obs/atm/mo/{var}/{model}/ac
- ofil: {var}_pcmdi-metrics_table_{model}_{ybeg}01-{yend}12-clim.nc
- 3d variables (t,z,y,x) are kept in one file.

PMs.py (parameter file)

- source /short/p66/pjd599/PCMDI_METRICS/v1p0/bin/setup_runtime.sh
- python ./pcmdi_metrics_driver.py -p PMs.py
- case_id=20CRV2_CERES
- model_versions=['ACCESS1-0','ACCESS1-3','ACCESS1.4','ACCESS-ESM1.0']
- vars=['pr','tas','psl','rlut','rsut','ta_850','ta_200','ua_850','ua_200','va_850','va_200','zg_500']
- Outputs "json" and "txt" files in metrics_output_path/20CRV2_CERES
- e.g. pr_2.5x2.5_esmf_linear_metrics.json – all models specified are included, and multiple reference sets can be activated.

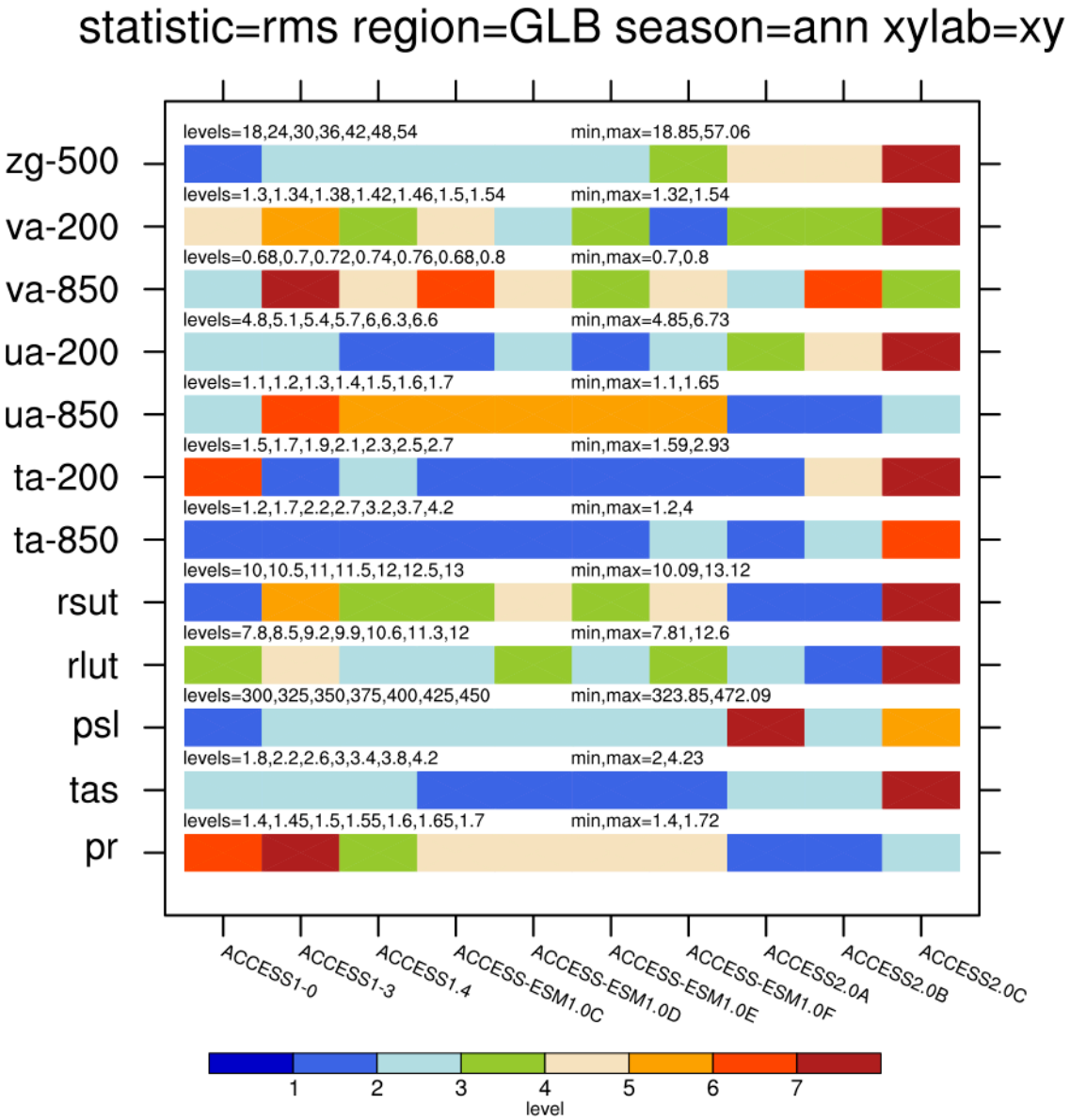
Reference set dictionary (.json)


```
"pr": {
"GPCP": {
        "CMIP_CMOR_TABLE": "Amon",
        "MD5sum": "144d2807b833ced066db4956014c9472",
        "RefName": "GPCP",
        "RefTrackingDate": "Thu Jan 16 16:11:15 2014",
        "filename": "pr_pcmdi-metrics_Amon_GPCP_198001-200512-clim.nc",
        "period": "198001-200512",
        "shape": "(12, 72, 144)"
      },
       "20CRV2": {
        "CMIP_CMOR_TABLE": "Amon",
        "MD5sum": "cd563e1c34f20b6aefc5c849cf4d153a",
        "RefName": "20CRV2",
        "RefTrackingDate": "Thu Jan 16 16:11:06 2014",
        "filename": "pr_pcmdi-metrics_Amon_20CRV2_198001-200512-clim.nc",
        "period": "198001-200512",
        "shape": "(12, 94, 192)"
      },
      "default": "20CRV2"
    },
    "tas": {
…
```

PMs_read.py

- PMs_read.txt input file. ncl PMs_read.ncl to execute.
- Header
- vars=pr,tas,psl,rlut,rsut,ta-850,ta-200,ua-850,ua-200,va-850,va-200,zg-500& reference_set=20CRV2_CERES& seasons=ann,djf,mam,jja,son& regions=GLB,NHEX,SHEX,TROPICS& types=bias,cor,mae,rms& xylabs=xy,xyt&
- ofil="/home/599/mac599/CMIP5/analysis/PCMDI_METRICS/metrics_output_path/"+reference_set+"/linear_metrics.nc”

PMs_plot.ncl

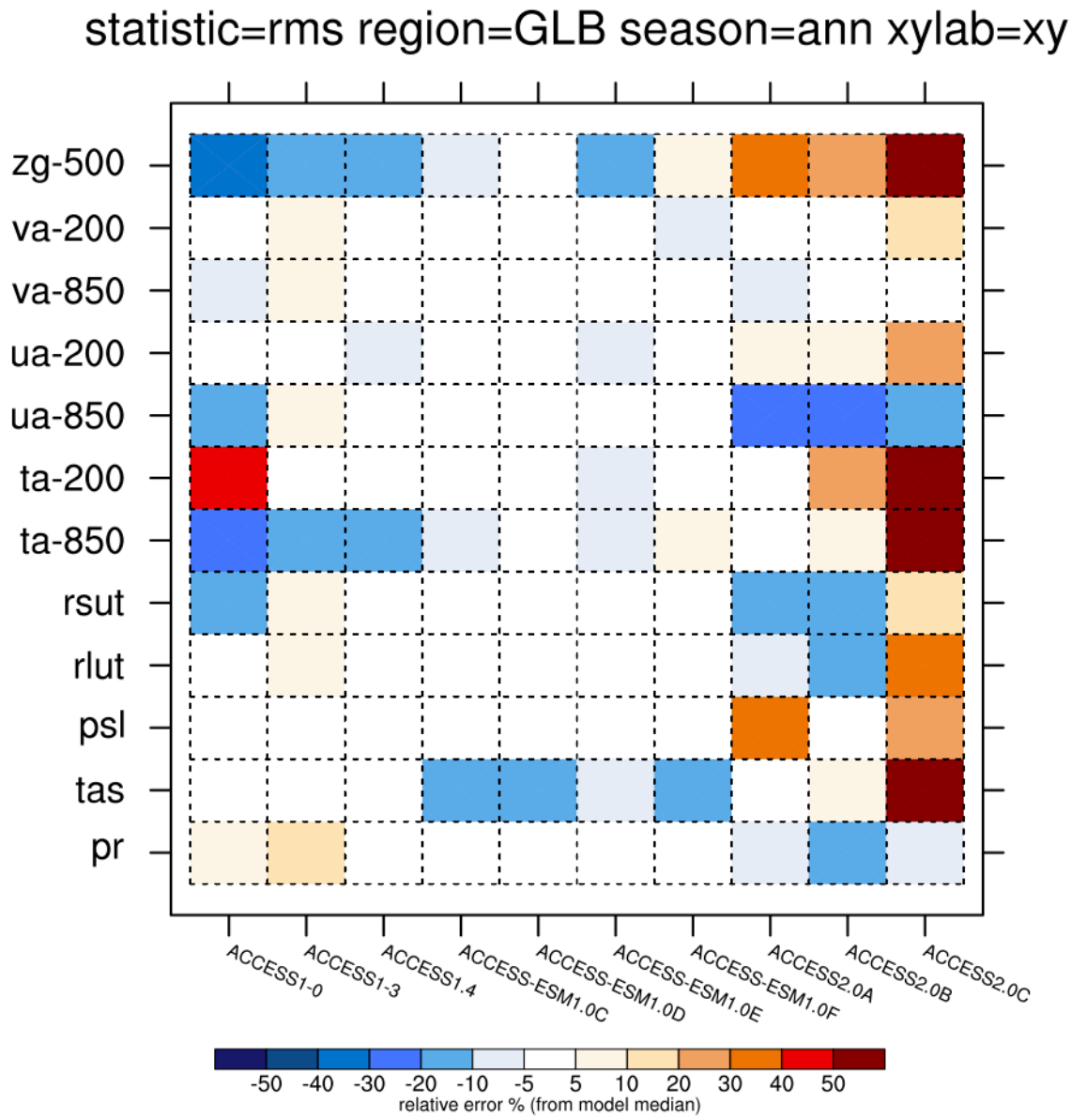


- reference_set=20CRV2_CERES&

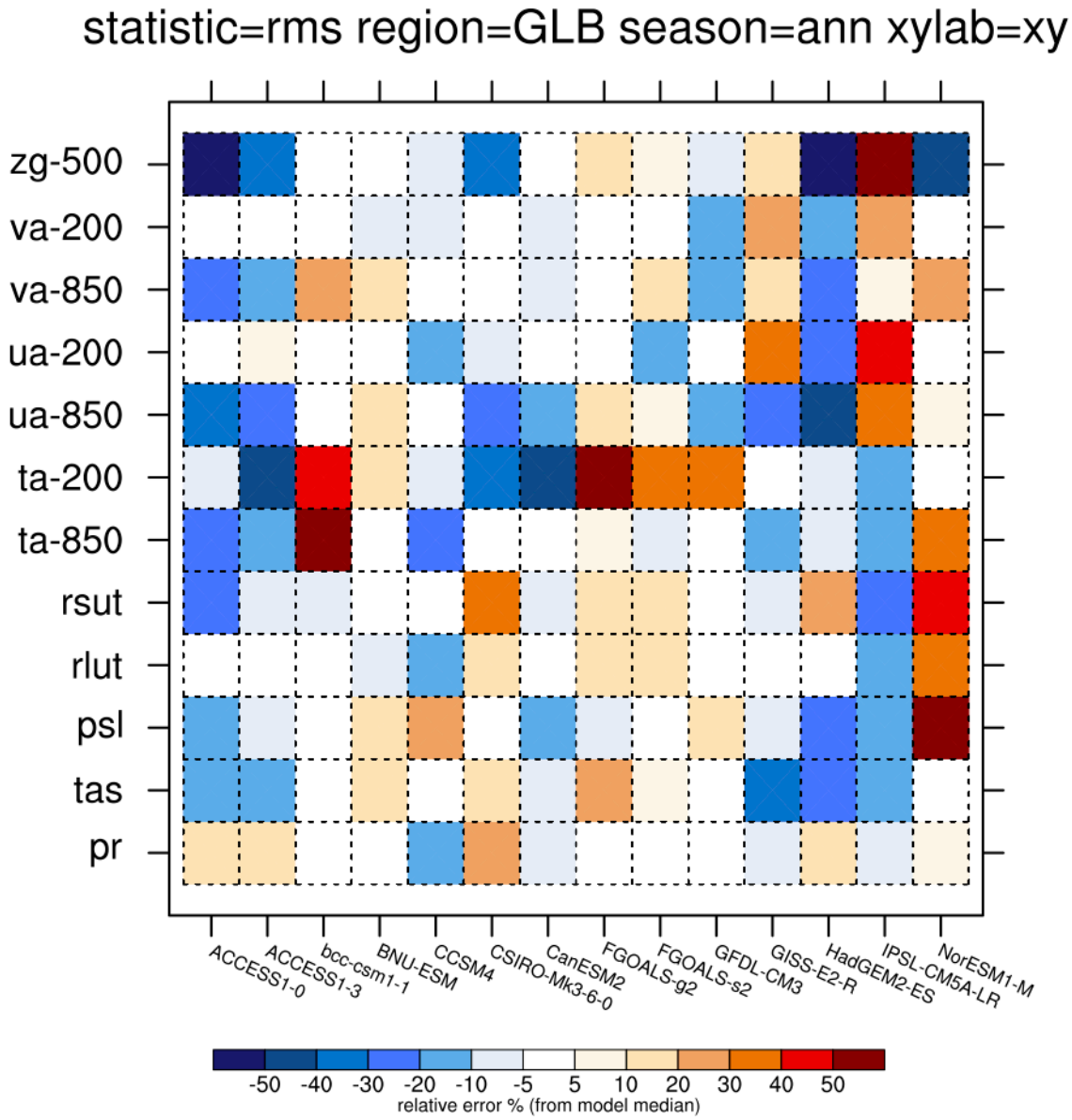
PMs_plot.ncl

N ACCESS models, N variables

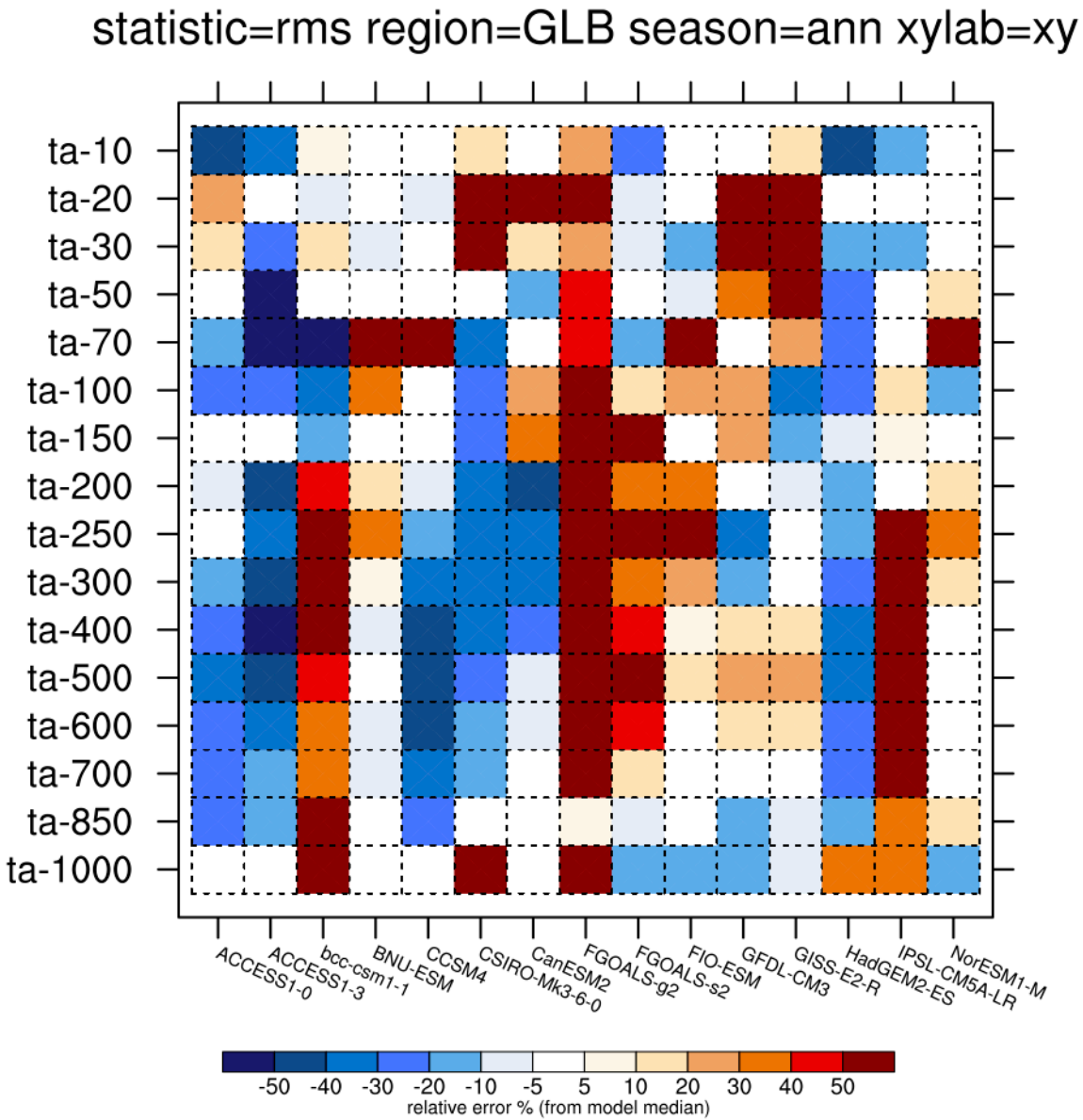
- reference_set=20 CRV2_CERES&
- delMedMod=True;use model median to normalise statistics (n/ n_{50}-1)*100



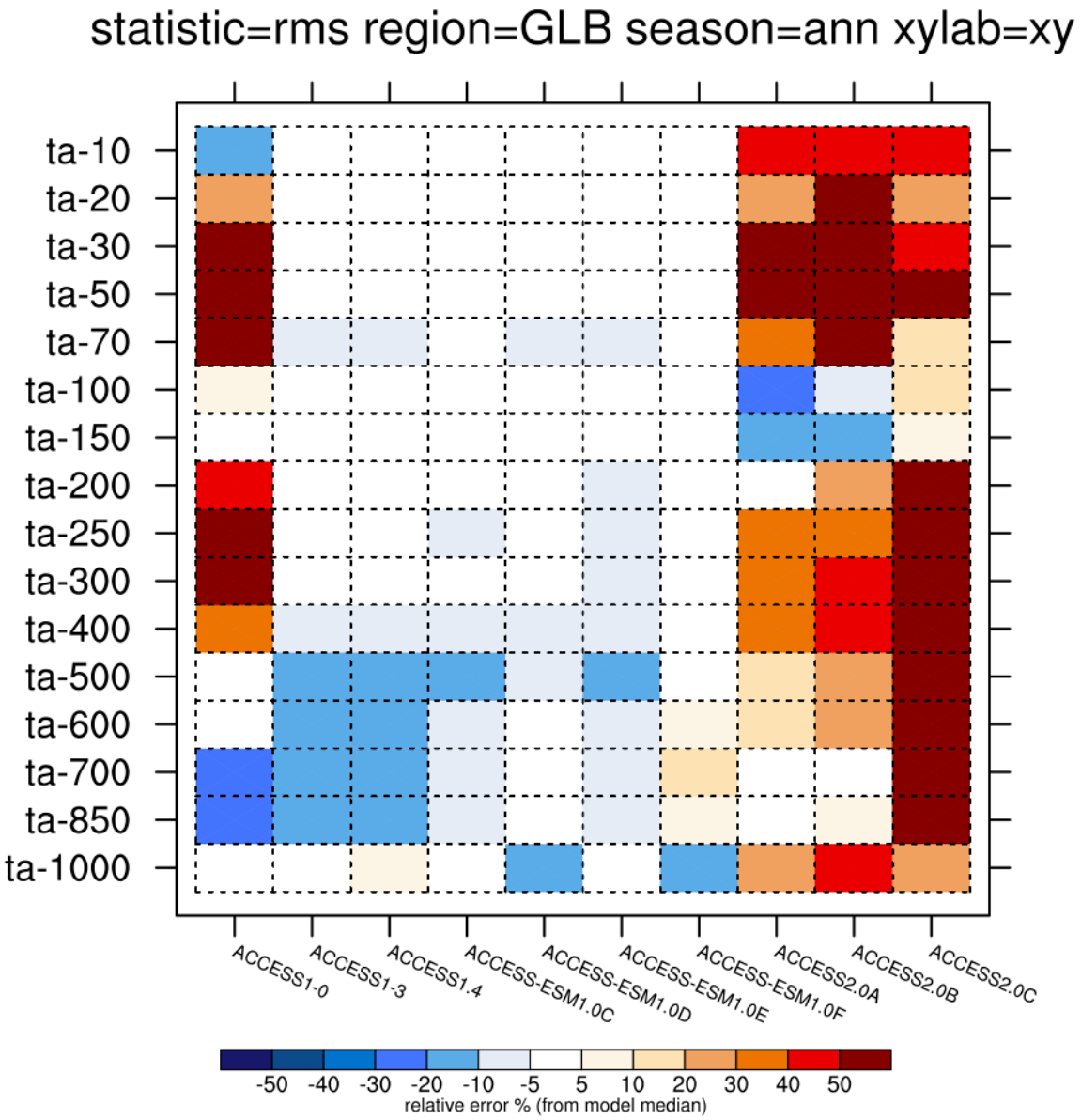
N CMIP5 models, N variables

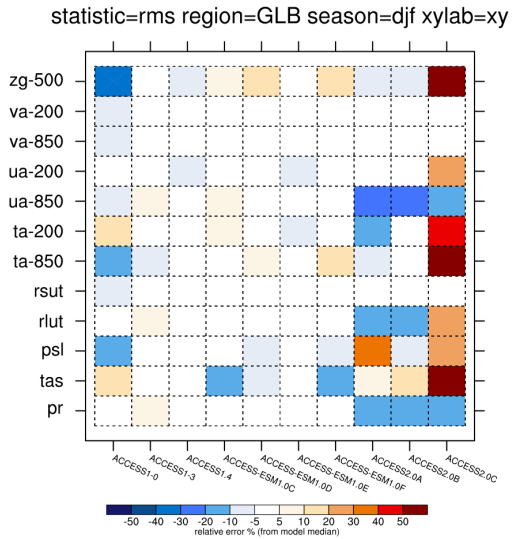


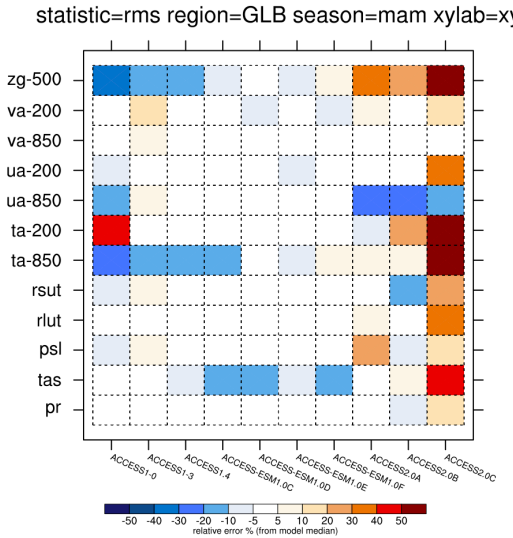
N CMIP5 models, 1 variable

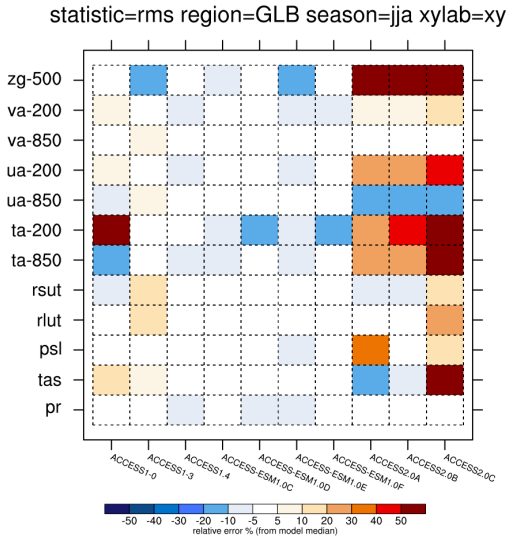


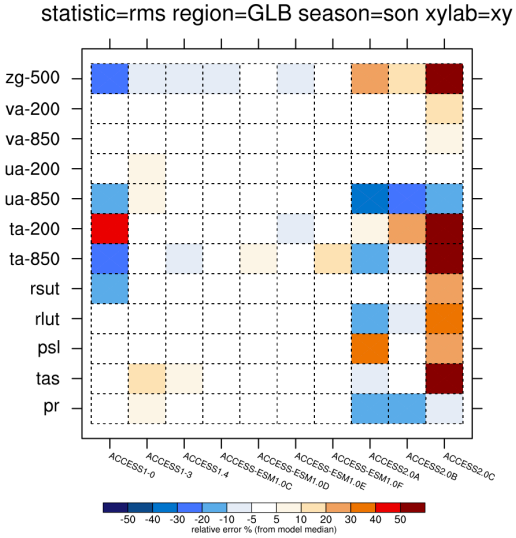
N ACCESS models, 1 variable

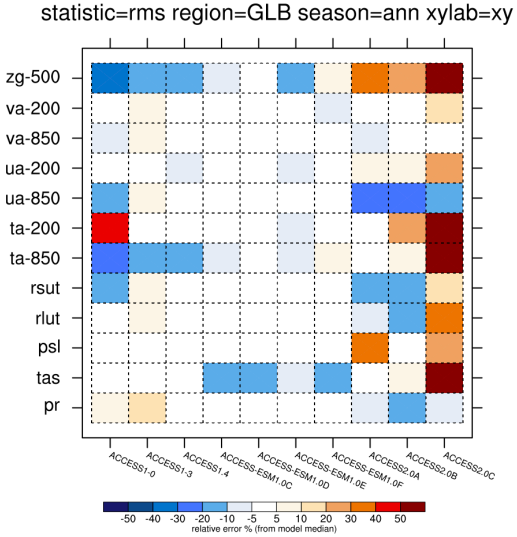












Decompose seasonally

Utilities/Other

- https://github.com/PCMDI/pcmdi_metrics

wget --no-check-certificate https://raw.githubusercontent.com/PCMDI/pcmdi_metrics/v1.0.0/install_metrics.bash

- https://github.com/PCMDI/pcmdi_metrics/wiki

List of things to do

- Incorporate fully into existing model and data flow
- Make available under CWSLAB
- Provide various extensions (plotting, metrics, model)
- Add further reference sets for more obscure variables (& link in with existing products under /g/data/ua4)
- Batch processing throughout
- Add other local and international models into the mix