



**Earth Systems and
Climate Change
Hub**

National Environmental Science Programme



AMIP Simulations with ACCESS-CM2

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Model configuration & evaluation

- Model outline
- Setup for CMIP6
- Completed runs
- Evaluation – selected results

Model outline:

- UM10.6, GA7.1 atmosphere and JULES land surface scheme
- UKCA GLOMAP-mode scheme for tropospheric aerosols
- Easy Aerosols for stratospheric aerosols
- Extended AMIP run with prescribed SSTs and SICs
- Historical, Sept 1950 to Dec 2014 from HadGEM Sept 1988 initial conditions
- CMIP6 forcings
- Expanded outputs (CMIP6 namelist)

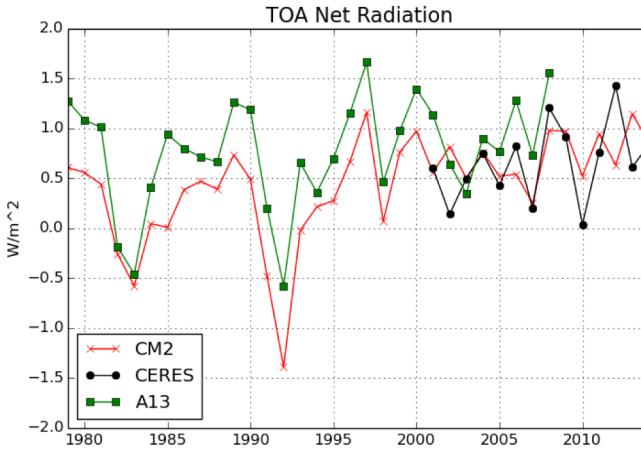
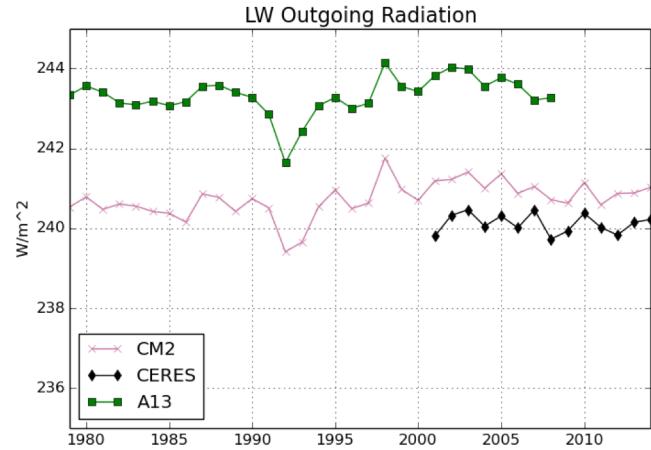
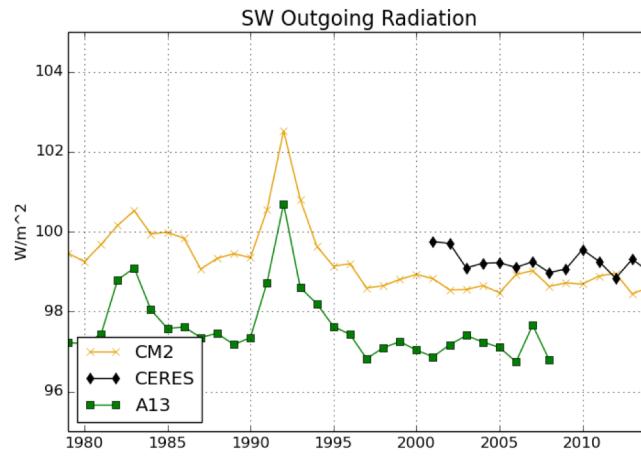
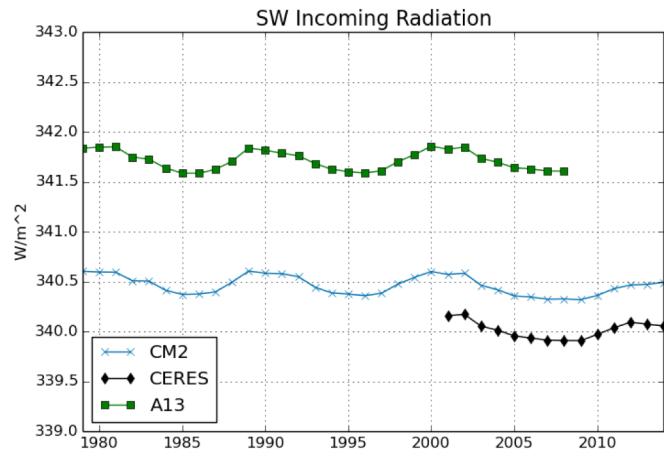
CMIP6 AMIP historical forcings:

- Monthly prescribed SSTs and SICs
- Annual GHG MMRs
- Volcanic aerosol optical depth and properties
- Aerosol chemistry emissions
- Solar forcing
- Ozone, 3D time varying field
- Land cover change – pending
- Refer report *CMIP6 AMIP suite setup*

ACCESS-CM2 JULES CMIP6 ‘AMIP’ simulations:

- AS896 -
 - extended AMIP run: 1951 – 2014
 - all outputs deleted except monthly subset converted to netCDF
- AV842 -
 - Perturbed initial conditions version of as896
 - Full CMIP6 namelist, all data retained
- AW439 -
 - Perturbed initial conditions version of as896
 - 1978 start, reduced STASH outputs

Annual TOA Radiation, W/m²

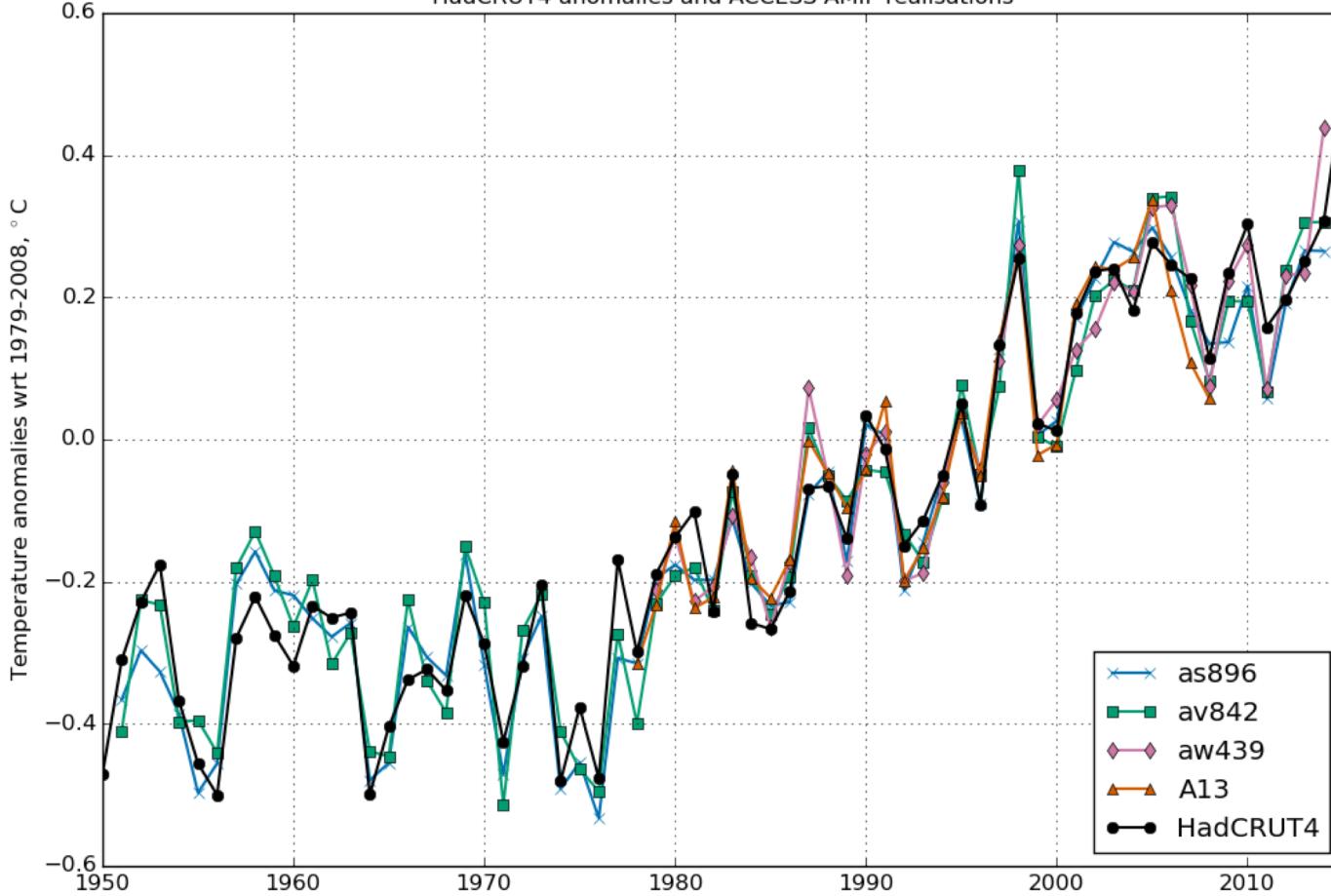


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Global annual-mean SAT anomalies

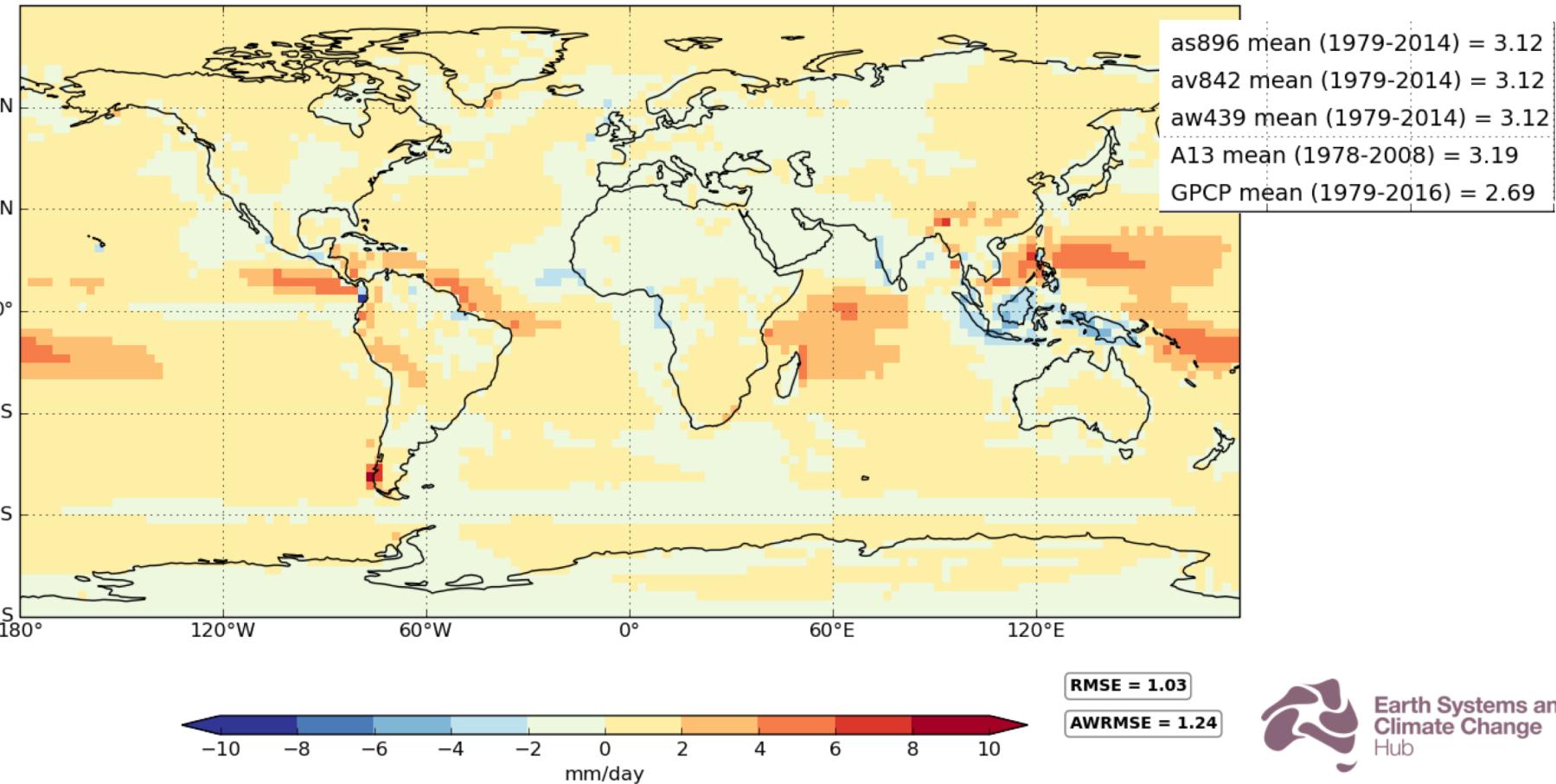
HadCRUT4 anomalies and ACCESS AMIP realisations



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Global-mean Precip. bias, as896 - GPCP, 1979-2014



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Area weighted RMSE

FIELD	VARIABLE NAME	AS896	A13
tas	surface air temperature - global mean	1.06	1.21
pr	precipitation - global mean:	1.24	1.26
psl	sea level pressure - global mean	2.03	2.11
ua	zonal wind speed at 850 hPa	1.14	1.26
va	meridional wind speed at 850 hPa	0.55	0.70

Biases calculated from ERA Interim
ACCESS-CM2 AS896 1979–2014 means
ACCESS A13 1979–2008 means

Summary:

- ACCESS-CM2 AMIP simulations show improvement over ACCESS 1.3:
 - Across global and seasonal means;
 - Across a range of key metrics including tas, pr, psl, ua, va, hur;
 - Many other results e.g. zonal means, atmospheric circulation etc.
 - Refer report *ACCESS-CM2 Model evaluation: CMIP6 AMIP runs*
- JULES land use cover change pending
- CABLE CMIP AMIP runs pending



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FOR MORE INFORMATION

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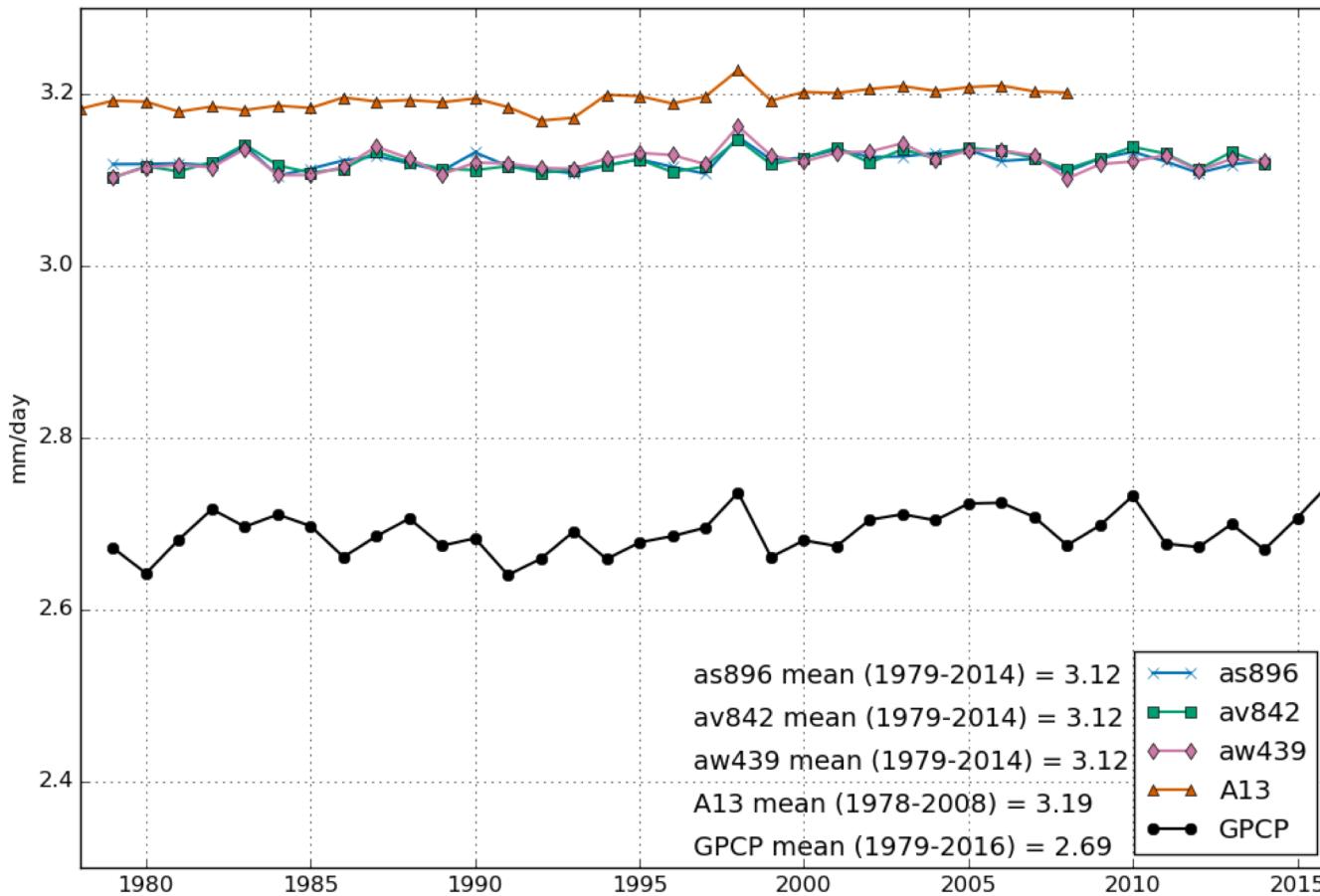
UNSW
SYDNEY



FIELD	VARIABLE NAME	AS896	A13
tas	surface air temperature - global mean:	1.06	1.21
	seasonal means: DJF	1.44	1.50
	MAM	1.36	1.36
	JJA	1.33	1.44
	SON	1.17	1.27
pr	precipitation - global mean:	1.24	1.26
	seasonal means: DJF	1.35	1.57
	MAM	1.37	1.40
	JJA	1.71	2.02
	SON	1.41	1.46
psl	sea level pressure - global mean:	2.03	2.11
	seasonal means: DJF	2.14	2.54
	MAM	2.33	2.70
	JJA	2.71	2.90
	SON	2.00	2.12

Global annual-mean precipitation

ACCESS AMIP realisations



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CMIP6 forcings:

- SSTs and SICs – monthly ancillary files based on PCMDI AMIP protocol processed to be compatible with the UM
- Annual GHG MMRs:
- CO₂, CH₄, N₂O, CFC12-eq, HFC134a-eq
 - 'CFC-12-eq'. This equivalent concentration summarizes the gases: CFC-12, CFC-11, CFC-113, CFC-114, CFC-115, HCFC-22, HCFC-141b, HCFC-142b, CH₃CCl₃, CCl₄, CH₃Cl, CH₂Cl₂, CHCl₃, CH₃Br, Halon-1211, Halon-1301, Halon-2402.
 - 'HFC-134a-eq'. This equivalent concentration summarizes the gases: HFC-134a, HFC-23, HFC-32, HFC-125, HFC-143a, HFC-152a, HFC-227ea, HFC-236fa, HFC-245fa, HFC-365mfc, HFC-43-10mee, NF₃, SF₆, SO₂F₂, CF₄, C₂F₆, C₃F₈, C₄F₁₀, C₅F₁₂, C₆F₁₄, C₇F₁₆, C₈F₁₈, c-C₄F₈.
- Solar forcing
 - TSI value of $1361.0 \pm 0.5 \text{ W m}^{-2}$.
 - spectral file with monthly data

CMIP6 forcings:

- **Volcanic aerosols**

- provides the optical properties of stratospheric aerosols (from explosive volcanic eruptions). The forcing data consists of six netcdf ancillary files containing the aerosol optical properties in the solar (SW) and terrestrial (LW) spectrum

- **Aerosol chemistry emissions**

- SO2, DMS, Monoterpenes, BC_biofuel, BC_fossil, OC_biofuel, OC_fossil, BC_biomass

- Ozone, 3D time varying field

- Land cover change - pending