Evaluation of JULES for the community

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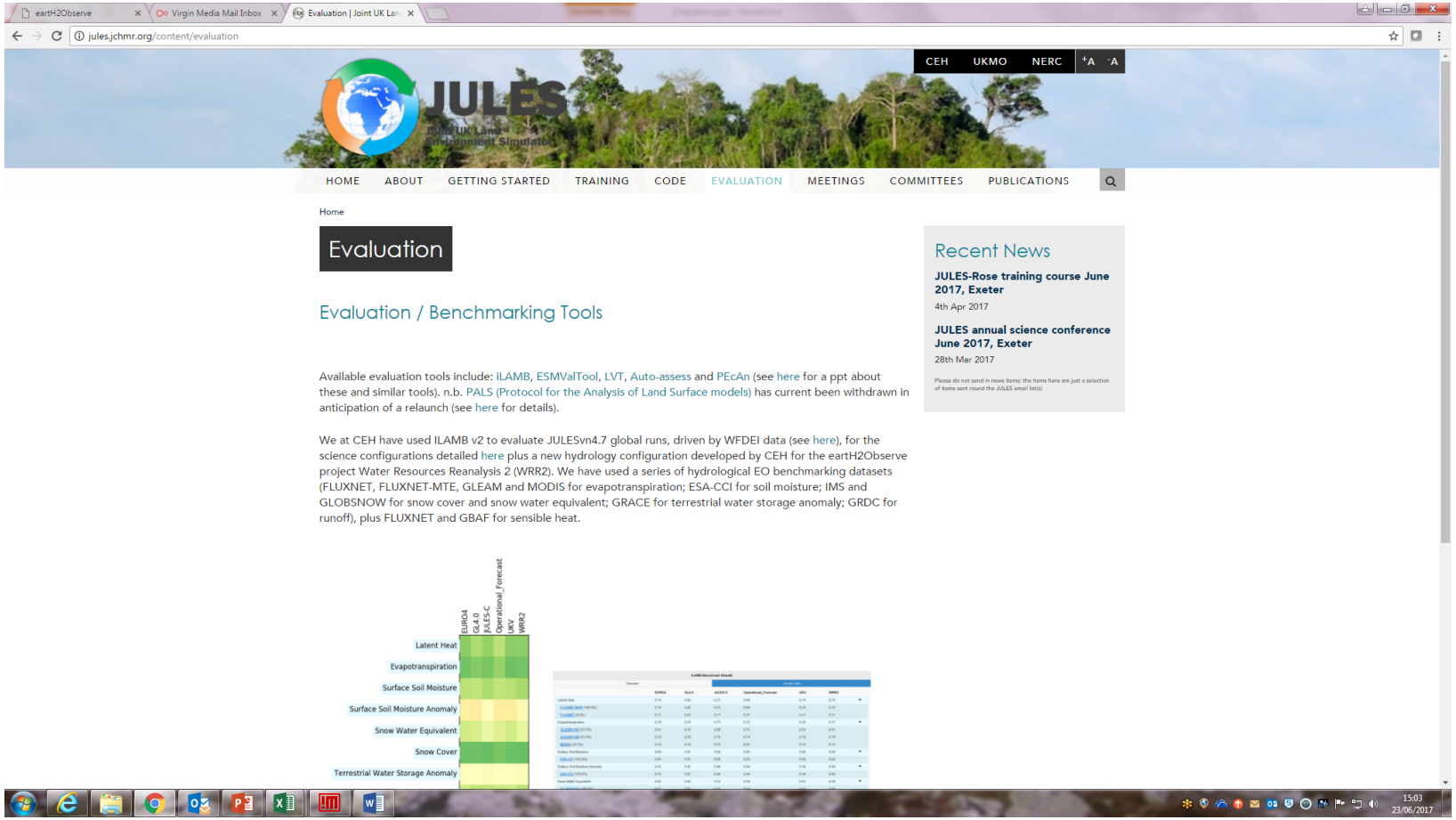
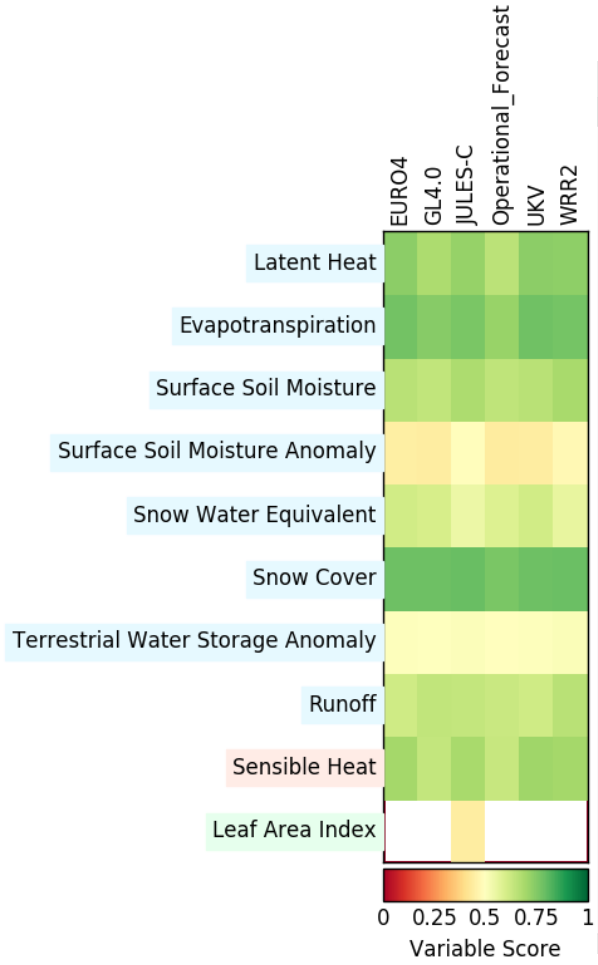
New pages on the JULES website



Land (2): Multi-parameter JULES evaluation

Martinez-de la Torre, Blyth

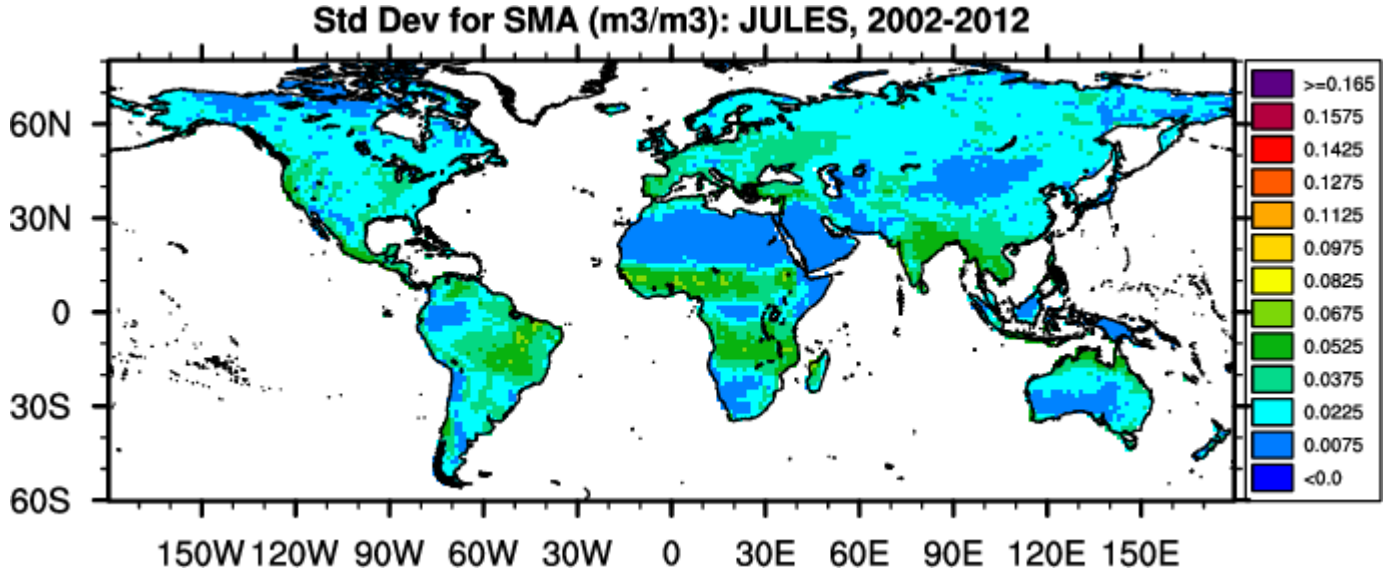


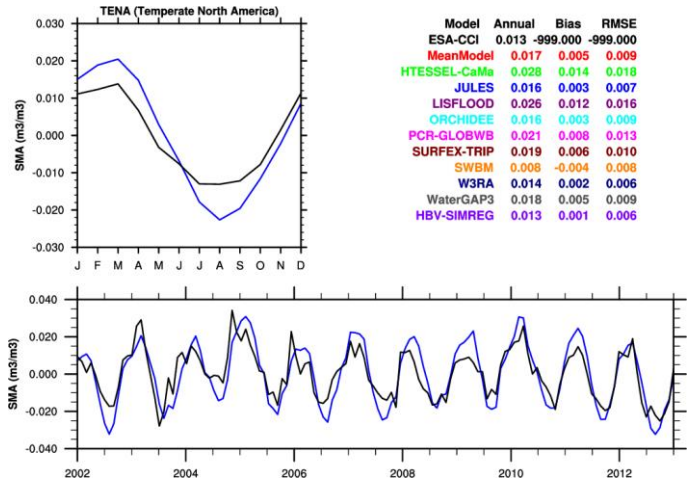
ILAMB Benchmark Results

Overview | Results Table

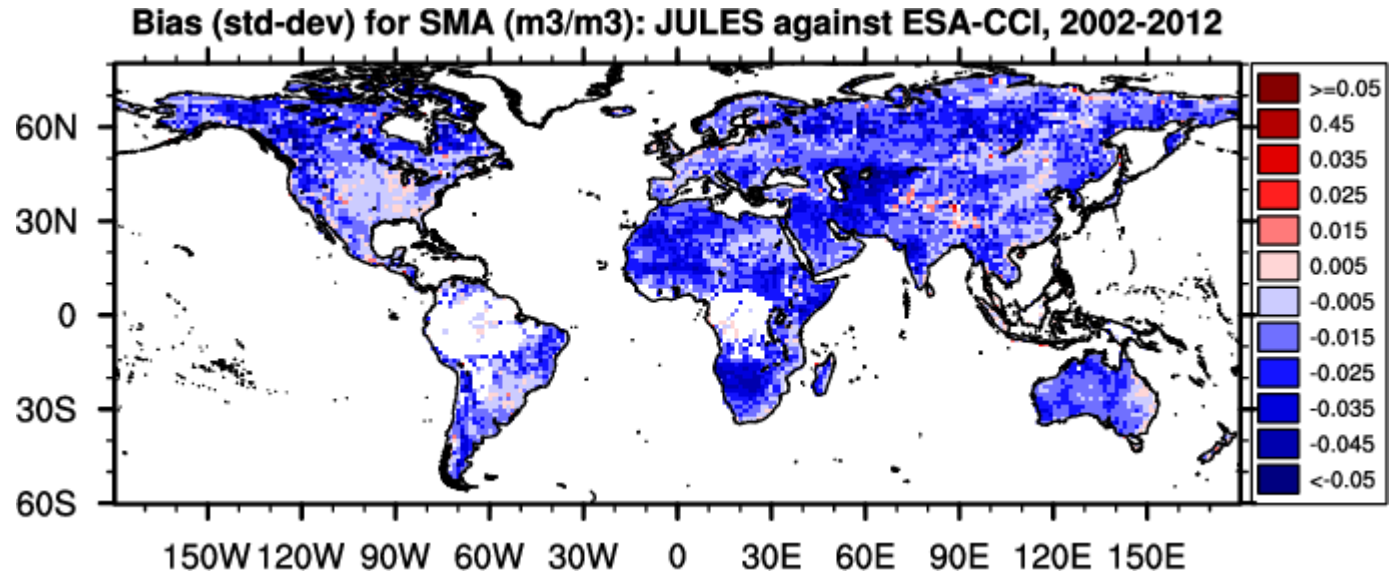
	EURO4	GL4.0	JULES-C	Operational_Forecast	UKV	WRR2
Latent Heat	0.74	0.68	0.72	0.66	0.74	0.74
FLUXNET-MTE (100.0%)	0.74	0.68	0.72	0.66	0.74	0.74
FLUXNET (0.0%)	0.71	0.63	0.71	0.57	0.71	0.71
Evapotranspiration	0.78	0.75	0.77	0.72	0.78	0.77
GLEAM-V3A (33.3%)	0.81	0.78	0.80	0.75	0.81	0.81
GLEAM-V3B (33.3%)	0.79	0.76	0.78	0.74	0.79	0.79
MODIS (33.3%)	0.74	0.70	0.73	0.67	0.74	0.73
Surface Soil Moisture	0.66	0.65	0.69	0.65	0.66	0.69
ESA-CCI (100.0%)	0.66	0.65	0.69	0.65	0.66	0.69
Surface Soil Moisture Anomaly	0.45	0.45	0.49	0.44	0.44	0.48
ESA-CCI (100.0%)	0.45	0.45	0.49	0.44	0.44	0.48
Snow Water Equivalent	0.62	0.60	0.55	0.59	0.61	0.56
GLOBSNOW (100.0%)	0.62	0.60	0.55	0.59	0.61	0.56
Snow Cover	0.79	0.79	0.80	0.77	0.79	0.79
IMS (100.0%)	0.79	0.79	0.80	0.77	0.79	0.79
Terrestrial Water Storage Anomaly	0.50	0.50	0.51	0.50	0.50	0.51
GRACE (100.0%)	0.50	0.50	0.51	0.50	0.50	0.51
Runoff	0.62	0.64	0.64	0.63	0.62	0.66
GRDC-OBS (100.0%)	0.62	0.64	0.64	0.63	0.62	0.66
Sensible Heat	0.70	0.64	0.69	0.63	0.71	0.70
GBAF (100.0%)	0.70	0.64	0.69	0.63	0.71	0.70
FLUXNET (0.0%)	0.74	0.69	0.71	0.66	0.74	0.72
Leaf Area Index	nan	nan	0.44	nan	nan	nan
AVHRR (50.0%)	nan	nan	0.44	nan	nan	nan
MODIS (50.0%)	nan	nan	0.45	nan	nan	nan

- Evaluation of JULESvn4.7 global runs with ILAMB v2.
- EO benchmarking datasets include: FLUXNET, FLUXNET-MTE, GLEAM and MODIS (evapotranspiration); ESA-CCI (soil moisture); IMS and GLOBSNOW (snow cover and snow water equivalent); GRACE (terrestrial water storage anomaly); GRDC (runoff); FLUXNET and GBAF (sensible heat).

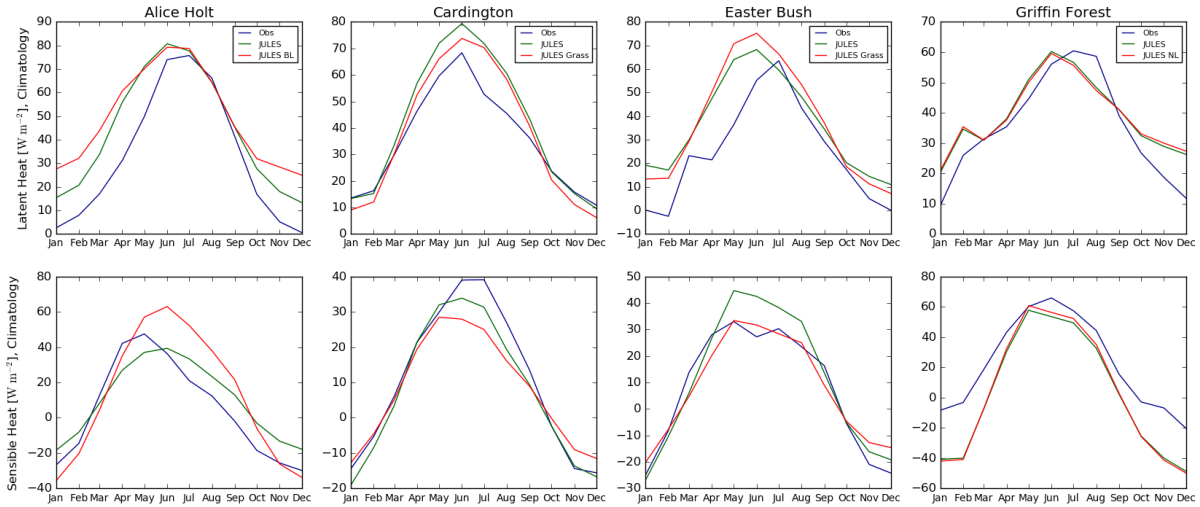


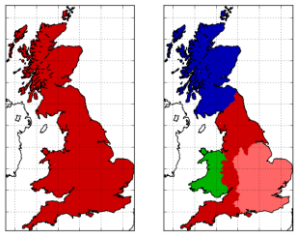


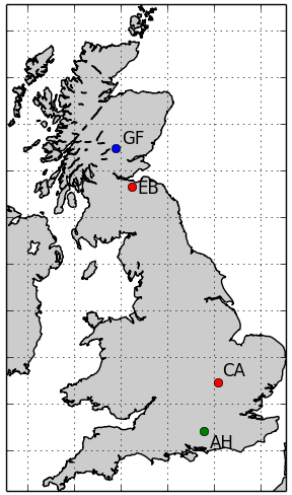
Model	Annual	Bias	RMSE
ESA-CCI	0.013	-999.000	-999.000
MeanModel	0.017	0.005	0.009
HTESSEL-CaMa	0.028	0.014	0.018
JULES	0.016	0.003	0.007
LISFLOOD	0.026	0.012	0.016
ORCHIDEE	0.016	0.003	0.009
PCR-GLOBWB	0.021	0.008	0.013
SURFEX-TRIP	0.019	0.006	0.010
SWBM	0.008	-0.004	0.008
W3RA	0.014	0.002	0.006
WaterGAP3	0.018	0.005	0.009
HBV-SIMREG	0.013	0.001	0.006

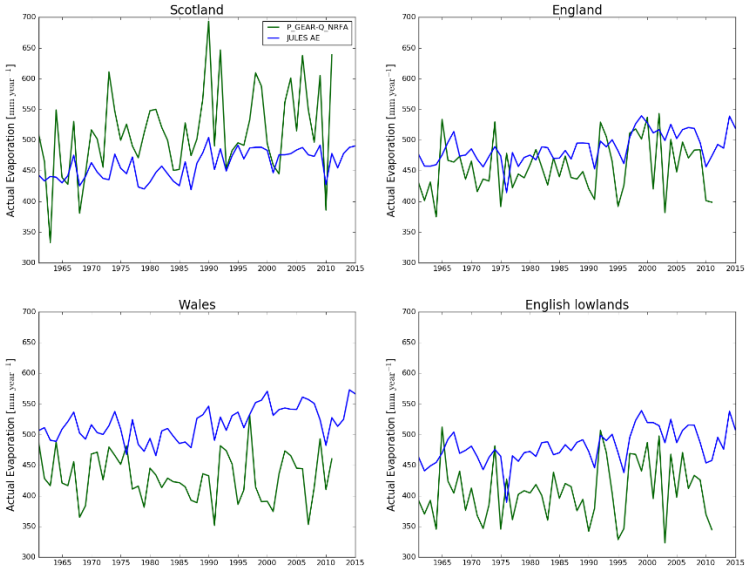


For the UK we have developed a set of data for evaluating the Evaporation: monthly flux data and annual river flow





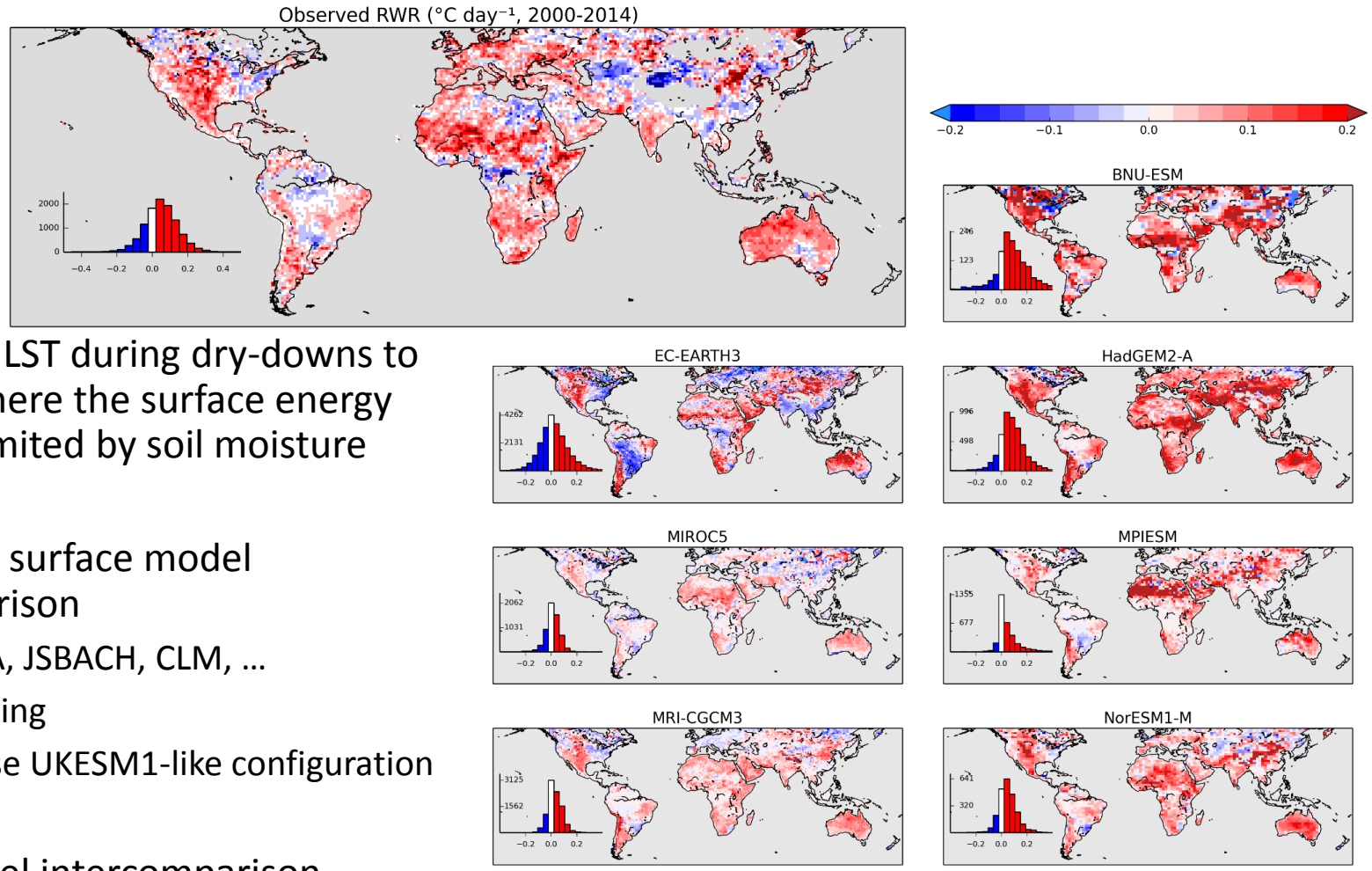




To be published……..

Land (1): Exploiting new metrics

Harris



- Use MODIS LST during dry-downs to evaluate where the surface energy budget is limited by soil moisture

- Offline land surface model intercomparison
  - JULES, ISBA, JSBACH, CLM, …
  - WFDEI forcing
  - JULES to use UKESM1-like configuration

- CMIP5 model intercomparison
  - AMIP simulations
  - Include HadGEM2-A, HadGEM3-A (GA5), UKESM1
  - Requires 3 hourly surface diagnostics

Harris, et al (2017), *J. Hydromet.*, **18**, 1453–1470, https://doi.org/10.1175/JHM-D-16-0227.1