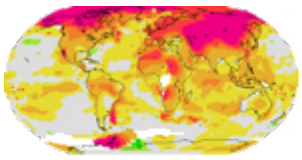

Correlate time series with a field

1980-2017 anomalies ERA5 T2m -124--66E 24-49N mean

Observations

Temperature
1850-now anomalies: ◯ HadCRUT4 median,
1880-now anomalies: GISS ◯ 250km, ◯ 1200km
1880-now anomalies: ◯ NOAA v5
1850-now anomalies: ◯ HadCRUT4 , ◯ HadCRUT4/HadSST4 filled-in by Cowtan and Way
1900-2018 anomalies: ◯ CMST

Land
1850-2010 anomalies: ◯ CRUTEM4
1880-now anomalies: GISS ◯ 250km, ◯ 1200km
1880-now anomalies: ◯ NCDC v3.2.1
1948-now: CPC GHCN/CAMS t2m analysis (land) ◯ 0.5°, ◯ 1.0°, ◯ 2.5°
1901-2017: CRU TS 4.03 (land) ◯ 0.5°, ◯ 1.0°, ◯ 2.5°, ◯ #/value
1750-now: ◯ Berkeley 1°
1900-2018 5° homogenised anomalies: ◯ CL-SAT 1.3
◯ 0.25° 1950-now: E-OBS v20.0e Tg (Europe)
1895-now: ◯ PRISM 4km, ◯ PRISM 0.25°, (Contiguous US only)
◯ 0.25° 1910-2016: ACORN-SAT v2 Tave (Australia)

Tmax
1901-2017: CRU TS 4.03 (land) ◯ 0.5°, ◯ 1.0°, ◯ 2.5°, ◯ #/value
1833-now: ◯ Berkeley 1°
1900-2018 5° homogenised anomalies: ◯ CL-SAT 1.3
◯ 0.25° 1950-now: E-OBS v20.0e Tx (Europe)
1895-now: ◯ PRISM 4km, ◯ PRISM 0.25°, (Contiguous US only)
◯ 0.25° 1910-2016: ACORN-SAT v2 Tmax (Australia)
HadEX2 1901-2010 2.5° monthly: ◯ TXx, ◯ TXn, ◯ TX10p, ◯ TX90p, annual: ◯ TXx, ◯ TXn, ◯ TX10p, ◯ TX90p

Tmin
1901-2017: CRU TS 4.03 (land) ◯ 0.5°, ◯ 1.0°, ◯ 2.5°, ◯ #/value
1833-now: ◯ Berkeley 1°
1900-2018 5° homogenised anomalies: ◯ CL-SAT 1.3
◯ 0.25° 1950-now: E-OBS v20.0e Tn (Europe)
1895-now: ◯ PRISM 4km, ◯ PRISM 0.25°, (Contiguous US only)
◯ 0.25° 1910-2016: ACORN-SAT v2 Tmin (Australia)
HadEX2 1901-2010 2.5° monthly: ◯ TNx, ◯ TNn, ◯ TN10p, ◯ TN90p, annual: ◯ TNx, ◯ TNn, ◯ TN10p, ◯ TN90p

Select a time series
Daily station data
Daily climate indices
Monthly station data
Monthly climate indices
Annual climate indices
View, upload your time series

Select a field
Daily fields
Monthly observations
Monthly reanalysis fields
Monthly and seasonal historical reconstructions
Monthly seasonal hindcasts
Monthly CMIP3+ scenario runs
Monthly CMIP5 scenario runs
Annual CMIP5 extremes
Monthly CMIP6 scenario runs
Monthly CORDEX scenario runs
Attribution runs
View, upload your field

Investigate this time series
View per month, season, half year or full year (Jan-Dec or Jul-Jun)
View last 1, 5, 10, N years
Correlate with other time series
Correlate with a field (correlation, regression, composite)
- only observations
- only reanalyses
- only seasonal forecasts
- only scenario runs
- only user-defined fields

Verify against another time series
Spectrum, autocorrelation function
Wavelet
Running mean/s.d./skew/curtosis
Trends in return times of extremes
Plot and fit distribution

Tmax-Tmin (DTR)	1901-2017: CRU TS 4.03 (land) ◯ 0.5°, ◯ 1.0°, ◯ 2.5°, ◯ #/value
SST	◯ 1870-now: HadISST1 1° reconstruction
	◯ 1854-now: NCDC v5 ERSST reconstruction, (◯ v4)
	1850-now: Hadley Centre 5° ◯ HadSST4.0.0.0, ◯ total uncertainty, ◯ #obs
	◯ 1850-now: Hadley Centre HadSST3.1.1.0 5°
	◯ 1800-now: 2° ICOADS v2.5 SST, ◯ number of obs
	◯ 1982-now: 1° NOAA ("Reynolds") OI v2 SST
	◯ 1982-now: 1/4° NOAA OI v2 SST, ◯ anomalies
	1980-now: TAO buoys ◯ SST, ◯ Air Temperature
Air Temperature	◯ 1880-2010: HadNMAT2, ◯ anomalies, ◯ large-scale uncertainties, (1856-2002 ◯ HadMAT1)
	◯ 1800-now: 2° ICOADS v2.5 Tair, ◯ number of obs
Lower Troposphere	◯ 1979-now: Spencer & Christy MSU anomalies v6.0 (◯ v5.6)
	1978-now: RSS MSU 4.0 ◯ TLT, ◯ anomalies (◯ 3.3, ◯ anomalies)
Precipitation	1901-2017: CRU TS 4.03 (land) ◯ 0.5°, ◯ 1.0°, ◯ 2.5°, ◯ #/value
	◯ 0.25° 1950-now: E-OBS v20.0e precip (Europe)
	◯ 1900-now anomalies: NCDC analysis (land)
	1891-2016: GPCC V2018 analysis (land) ◯ 2.5°, ◯ 1.0°, ◯ 0.5°, ◯ 0.25°, only observations: ◯ 2.5°, ◯ 1.0°, ◯ 0.5°, ◯ 0.25°, number of gauges ◯ 2.5°, ◯ 1.0°, ◯ 0.5°, ◯ 0.25°
	◯ 1986-now: 1° GPCC monitoring product + first guess (land); ◯ only observations, ◯ number of gauges
	1900-now: home-merged 1° GPCC V2018 + monitoring product V6 + first guess (land); ◯ 1°, ◯ 2.5°, only observations: ◯ 1°, ◯ 2.5°
	◯ 1979-now: GPCP v2.3 analysis, ◯ v2.2
	◯ 1979-now: CPC Merged Analysis of Precipitation, ◯ with model
	◯ 1998-now: CMORPH 0.25° precipitation
	1983-now: ◯ CAMSOPI, ◯ percentage
	1895-now: ◯ PRISM 4km, ◯ PRISM 0.25°, (Contiguous US only)
	◯ 0.1° 1900-2014: CenTrends v1 (Greater Horn of Africa), ◯ 0.25° 1900-now: extended with CHIRPS
	HadEX2 1901-2010 2.5° monthly: ◯ Rx1day, ◯ Rx5day, annual: ◯ Rx1day, ◯ Rx5day, ◯ R95p, ◯ R99p
OLR	◯ 1979-now: UMD/NCEI OLR
Sea-level Pressure	use reanalysis data
	◯ 1899-now: Trenberth's NH
	◯ 0.25° 1950-now: E-OBS v20.0e slp analysis (Europe)
	◯ 1800-now: 2° ICOADS v2.5 SLP (sea), ◯ number of obs
	5° ◯ 1850-2004: HadSLP 2.0, ◯ 1850-now: HadSLP 2r (interpolated)
Surface Solar Radiation	2002-2012 ◯ FRESCO v6 0.5° surface solar insolation, ◯ 1°
Cloud cover	1901-2017: CRU TS 4.03 (land) ● 0.5°, ◯ 1°, ◯ 2.5°, ◯ #/value

	1800-now: 2° ICOADS v2.5 cloud cover (sea), number of obs
	2002-2012 FRESCO v6 0.5° cloud fraction, 1°(1996-now: FRESCO+ 0.5° analysis SC-v5.2, 1°)
Cloud pressure	2002-now: FRESCO v6 0.5°, 1°(1996-now: FRESCO+ 0.5° analysis SC-v5.2, 1°)
Snow cover	1966-now Rutgers University Global Snow Lab
Permafrost	1901-2001: annual northern hemisphere 1° NSIDC freeze and thaw depths (pseudo-monthly: freeze thaw)
Sea ice concentration	1978-now: NSIDC Arctic, Antarctic (home-interpolated from v01, pre, nrt)
	1981-2013: GSFC Arctic, Antarctic bootstrap analysis v3
Sea ice cover	1870-now: HadISST1 1°
	1981-now: Reynolds OI v2
Ocean salinity:	1900-now UKMO EN4 analysis surface, 0-400m, 0-700m, 0-1000m, 0-2000m
Sea surface height	Copernicus 1/4° 1993-2018 sea-level anomalies, dynamic topography, u geostrophic current, v geostrophic current
	ESA CCI 1/4° 1993-2015
Heat content	NODC 1955-now: 0-700m, 2005-now: 0-2000m
	1950-now: UKMO EN4 analysis 0-400m, 0-700m, 0-1000m, 0-2000m
	1958-2004: SODA 0-750m
Ocean mean temperature	NODC 1955-now: 0-100m, 0-700m, 2005-now: 0-2000m
Gravity	2002-now: GRACE land ocean liquid water equivalent
Z20	1980-now: TAO buoys z20, heat content
	1960-now: POAMA/PEODAS reanalysis/analysis z20
Wind	u, v 1800-now: 2° ICOADS v2.5 (sea)
	u, v 1980-now: TAO buoys
Wind stress	taux, tauy 1800-1997: ICOADS v2.5 pseudostress
	taux, tauy 1980-now: TAO buoys
Wind speed	1800-1997: ICOADS v2.5 wind speed, wind speed cubed
Tropical cyclones	1851-2005: 5°×5° TS tracks, TC tracks, vmax, PDI, 0.5°×0.5° tropical storms within 160km, tropical cyclones within 160km (Kerry Emanuel)
	1°×1°, 0.2°×0.2° Tropical Cyclone Heat Potential (1994-2008, AOML)
Ozone concentration	1978-now: KNMI multi-sensor re-analysis + sciamachy
	1979-2007: TOMS analysis
Aerosol	1979-2005: TOMS aerosol index
	1981-2006: GACP aerosol optical depth, Angstrom coefficient (sea)
Emissions	1980-2007: EMEP SO_2 1°, 2.5°, 5°
	1980-2007: EMEP NO_x 1°, 2.5°, 5°
Vegetation index	1981-now 0.1°, 0.5° NOAA/NCEI CDR NDVI analysis, home-processed
	1981-2006: UMD GIMMS NDVI analysis
Drought	

index	CRU self-calibrating PDSI ◯ 1901-2017 0.5° Global 3.26early, ◯ 1750-2003 5° Europe, ◯ 1800-2003 1/6° Alps
	1850-2014 UCAR Palmer Drought Severity Index ◯ self-calibrating
	1901-2013: CSIC SPEI drought index ◯ 1, ◯ 3, ◯ 4, ◯ 6, ◯ 8, ◯ 12, ◯ 16, ◯ 24, ◯ 36, ◯ 48 months
Soil moisture	CLM 1979-2016 ERA-interim ◯ 10cm, ◯ 1m, ◯ rain, ◯ evapotranspiration, ◯ potential evaporation
	CLM 1979-2013 WFDEI ◯ 10cm, ◯ 1m, ◯ rain, ◯ evapotranspiration, ◯ potential evaporation
	FLDAS 0.1 ° 1982-2018 ◯ 0-10cm, ◯ 0-40cm
Runoff	◯ GRUN v1 ML reconstruction 1902-2014, ETHZ IAC
Humidity	1895-now: ◯ PRISM 4km, ◯ PRISM 0.25°, (Contiguous US only)
Vapour pressure	1901-2017: CRU TS 4.03 (land) ◯ 0.5°, ◯ 1.0°, ◯ 2.5°, ◯ #/value
Max vapour pressure deficit	1895-now: ◯ PRISM 4km, ◯ PRISM 0.25°, (Contiguous US only)

Reanalyses

show/hide **ERA-interim 1979-2019**

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb	zonal
slp/height	◯		◯	◯	◯	◯	◯	
temperature	◯	◯	◯	◯	◯	◯	◯	◯
min/max 2m temperature	◯	◯						
zonal wind(stress)	◯	◯	◯	◯	◯	◯	◯	◯
meridional wind(stress)	◯	◯	◯	◯	◯	◯	◯	
wind speed/vertical velocity		◯	◯	◯	◯	◯	◯	
latent/sensible heat flux / humidity	◯	◯	◯	◯	◯	◯	◯	
column water vapour / relative humidity	◯		◯	◯	◯	◯	◯	
P-E / surface humidity / evap / pot evap	◯	◯	◯	◯				
precipitation/ t2m+SST	◯	◯						
surface net solar/longwave radiation	◯	◯						
surface net turbulent/all heat flux	◯	◯						
sea ice / snow depth	◯	◯						

show/hide **ERA5 1979-"now"**
earlier data will become available later

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb	zonal

slp/height	○		○	○	○	○	○	
temperature		○	○	○	○	○	○	○
min/max 2m temperature	○	○						
zonal wind(stress)		○	○	○	○	○	○	○
meridional wind(stress)		○	○	○	○	○	○	
wind speed/vertical velocity		○	○	○	○	○	○	
latent/sensible heat flux / humidity	○	○	○	○	○	○	○	
column water vapour / relative humidity	○		○	○	○	○	○	
P-E / surface humidity / evap			○					
precipitation/ t2m+SST	○							
surface net solar/longwave radiation	○	○						
surface net turbulent/all heat flux	○	○						
sea ice / snow water equivalent	○	○						

show/hide **NASA MERRA-2 1980-"now"**

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb	zonal
slp/height	○		○	○	○	○	○	○
temperature	○	○	○	○	○	○	○	○
zonal wind(stress)	○	○	○	○	○	○	○	○
meridional wind(stress)	○	○	○	○	○	○	○	○
wind speed/vertical velocity		○	○	○	○	○	○	○
latent/sensible heat flux / humidity	○	○	○	○	○	○	○	○
P-E/relative humidity	○							
precipitation/ t2m+SST	○	○						
surface net solar/longwave radiation	○	○						

show/hide **NCEP CFSR 1979-2010**

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb
slp/height	○		○	○	○	○	○
temperature	○	○	○	○	○	○	○

min/max 2m temperature	○	○					
zonal wind(stress)	○	○	○	○	○	○	○
meridional wind(stress)	○	○	○	○	○	○	○
wind speed/vertical velocity		○	○	○	○	○	○
latent/sensible heat flux / humidity	○	○	○	○	○	○	○
P-E/relative humidity	○		○	○	○	○	○
precipitation	○						
surface net solar/longwave radiation	○	○					
TOA net solar/longwave radiation	○	○					

show/hide **JRA-55 1958-now** ℹ

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb
slp/height							
temperature							
min/max 2m temperature							
zonal wind(stress)							
meridional wind(stress)							
wind speed/vertical velocity							
latent/sensible heat flux / humidity	○	○					
surface downwelling solar/longwave radiation	○	○					
surface upwelling solar/longwave radiation	○	○					

show/hide **ETCCDI/ET-SCI extreme indices from GLDAS, list of abbreviations** ℹ

Annual

temperature	○ txx	○ txm	○ txn	○ tx90p	○ tx10p	○ txgt50p	○ txge35	○ txge30	○ su	○ id	
		○ tmm				○ tmge10	○ tmge5	○ tmlt5	○ tmlt10	○ tx3tn3	○ dtr
	○ tnx	○ tnm	○ tnn	○ tn90p	○ tn10p	○ tr	○ tnlt2	○ fd	○ tnltm2	○ tnltm20	
	○ gsl	○ gdd	○ wsdi	○ wsdi5	○ csdi	○ csdi5				○ txb3tnb3	
	○ hwn tx90	○ hwf tx90	○ hwd tx90	○ hwm tx90	○ hwa tx90		○ hwn ehf	○ hwf ehf	○ hwd ehf	○ hwm ehf	○ hwa ehf

	○ hwn tn90	○ hwf tn90	○ hwd tn90	○ hwm tn90	○ hwa tn90		○ cwf ecn	○ cwf ecm	○ cwf ecf	○ cwd ecf	○ cwa ecf
precipitation	○ sdii	○ r95p	○ r99p	○ r95ptot	○ r99ptot	○ Rx1day	○ Rx5day	○ Rx7day	○ r10mm	○ r20mm	○ r30mm
	○ cdd	○ cwd									○ prcptot

Monthly

temperature	○ txx	○ txm	○ txn	○ tx90p	○ tx10p	○ txgt50p	○ txge35	○ txge30	○ su	○ id	
		○ tmm				○ tmge10	○ tmge5	○ tmlt5	○ tmlt10		○ dtr
	○ tnx	○ tnm	○ tnn	○ tn90p	○ tn10p	○ tnlt2	○ fd	○ tnltm2	○ tnltm20	○ tr	
precipitation						○ Rx1day	○ Rx5day	○ Rx7day	○ r10mm	○ r20mm	○ r30mm
	○ cdd	○ cwd	○ spi12	○ spi48	○ spei12	○ spei48					○ prcptot

show/hide **NCEP/NCAR R1 1948-now.**

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb
slp/height	○		○	○	○	○	○
temperature	○	○	○	○	○	○	○
zonal wind(stress)	○	○	○	○	○	○	○
meridional wind(stress)	○	○	○	○	○	○	○
wind speed/vertical velocity	○		○	○	○	○	○
curl wind stress / horizontal divergence	○	○	○	○	○	○	○
stream function		○	○	○	○	○	○
vertical shear				○	○	○	○
latent heat flux/humidity	○		○	○	○		
soil moisture/P-E/relative humidity	○	○	○	○	○		
precipitation / sensible heat flux / OLR	○	○					○
surface net solar/longwave radiation	○	○					
net surface heat flux / 2-7 day variance height	○				○		○

show/hide **Twentieth Century Reanalysis V2c 1851-2011**

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb
slp/height	○		○	○	○	○	○
temperature							

	○	○	○	○	○	○	○
min/max 2m temperature	○	○					
zonal wind(stress)	○	○	○	○	○	○	○
meridional wind(stress)	○	○	○	○	○	○	○
wind speed		○					
latent heat flux / sensible heat flux / humidity	○	○	○	○	○		
soil moisture / evaporation / relative humidity	○	○	○	○	○		
precipitation / P-E	○	○					
surface net solar/longwave radiation	○	○					

show/hide **Twentieth Century Reanalysis V3 1836-2015**

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb
slp/height	○		○	○	○	○	○
temperature	○	○	○	○	○	○	○
min/max 2m temperature	○	○					
zonal wind		○	○	○	○	○	○
meridional wind		○	○	○	○	○	○
latent heat flux / sensible heat flux / humidity	○	○	○	○	○		
soil moisture / relative humidity	○	○					
precipitation / evapration / P-E / OLR	○	○	○				○
surface downward solar / upward longwave radiation	○	○					
ice / snow	○	○					

show/hide **ERA-20C 1900-2010**
Just a few fields for now

variable \ level	surface	2m/10m	850mb	700mb	500mb	300mb	200mb
slp/height	○				○		
temperature		○					
min/max 2m temperature	○	○					
zonal wind(stress)		○					

meridional wind(stress)		○
latent heat flux / sensible heat flux / humidity		
soil moisture / evaporation / relative humidity		○
precipitation / P-E	○	○
surface net solar/longwave radiation		

user-defined:

- ○ SST zonal mean HadISST1 (HadISST_sst_zonalmean)
- ○ SST/T2m anom zonal mean NOAA v5 (NOAAGlobalTemp_v5.0.0_gridded_zonalmean)
- ○ sic IPSL-CM5B-LR rcp45 ens0 (cmip5_sic_OImon_IPSL-CM5B-LR_rcp45.0)
- ○ tos CSIRO-Mk3-6-0 rcp26 ens0 (cmip5_tos_Omon_CSIRO-Mk3-6-0_rcp26.0)
- ○ tos GFDL-CM3 historical ens0 (cmip5_tos_Omon_GFDL-CM3_historical.0)
- ○ tos GFDL-ESM2G historical ens0 (cmip5_tos_Omon_GFDL-ESM2G_historical.0)
- ○ tos HadGEM2-ES historical ens0 (cmip5_tos_Omon_HadGEM2-ES_historical.0)
- ○ tos HadGEM2-ES rcp45 ens0 (cmip5_tos_Omon_HadGEM2-ES_rcp45.0)
- ○ tos HadGEM2-ES rcp45 ens1 (cmip5_tos_Omon_HadGEM2-ES_rcp45.1)
- ○ T2m zonal mean ERA5 (era5_t2m_zonalmean)
- ○ T2m zonal mean ERA-int+ (erai_t2m_extended_zonalmean)
- ○ evspsbl modmean30 rcp26_95-141E_-11-6N (evspsbl_Amon_modmean_rcp26_%%%_95-141E_-11-6N)
- ○ precipitation zonal mean GPCC+ (gpcc_10_combined_zonalmean)
- ○ tas mean modmean39 rcp85 (mean_cmip5_tas_Amon_modmean_rcp85)
- ○ precipitation zonal mean NCEP/NCAR (prate.sfc.mon.mean_zonalmean)
- ○ psl modmean32 rcp26_95-141E_-11-6N (psl_Amon_modmean_rcp26_%%%_95-141E_-11-6N)
- ○ 500mb humidity NCEP/NCAR_-30-90E_-20-20N (q500_-30-90E_-20-20N)
- ○ 700mb humidity NCEP/NCAR_-30-90E_-20-20N (q700_-30-90E_-20-20N)
- ○ SLP NCEP/NCAR_-30-90E_-20-20N (slp.mon.mean_-30-90E_-20-20N)
- ○ SLP NCEP/NCAR_-40--10E_-20--40N (slp.mon.mean_-40--10E_-20--40N)
- ○ snowcover zonal mean Rutgers (snow_rucl_zonalmean)
- ○ SST ICOADS v2.5 1yr high-pass (sst.mean_1yr_high-pass_box)

Plot options

Variable: ◉ correlation ○ covariance ○ significance
○ regression (○ error) ○ reverse ○ relative regression
○ composite (○ error)
extreme dependence measures ○ χ, ○ χbar, threshold 90 %

Demand at least % valid points

Map type: default projection

Region: 24 °N to 49 °N, -124 °E to -66 °E in a lat-lon plot

Contours: to mask out: p> 10 % ☐ logarithmic scale

Colours: blue-grey-red

Shading: ○ shading and contours ◉ shading ○ contours ○ grid boxes

Plot options: ☐ no color bar ☐ no title on plot, ☐ no grid ☐ no political boundaries
label distance × ° or ☐ no labels

Output to: ◉ browser ○ Google Earth (kml) ○ GIS (geotiff)

Units: ◉ convert to standard units ○ use original units

Options

Starting month: all of timeseries

Season: averaging over 1 month(s) of the timeseries same month(s) of the field,

Anomalies: subtract seasonal cycle

Lag: 0 months
(lag positive: mean 1980-2017 anomalies ERA5 T2m -124--66E 24-49N lagging field)

Years: 1980 – 2017

Only for: < field selected above <
< mean 1980-2017 anomalies ERA5 T2m -124--66E 24-49N <

Apply: logarithm, sqrt to mean 1980-2017 anomalies ERA5 T2m -124--66E 24-49N

Output: rank correlation

Detrend: detrend everything

Filters: take year-on-year differences
subtract mean of previous years

Running correlation: show/hide running correlation options

Fit: straight line, parabola,

Correlate