

AR6 WGI Report – List of corrigenda to be implemented

The corrigenda listed below will be implemented in the Supp. Material during copy-editing.

CHAPTER 3 SUPPLEMENTARY MATERIAL

Document (Chapter, Annex, Supp. Mat...)	Section	Page :Line (based on the final pdf FGD version)	Detailed info on correction to make
Chapter 3 SM	3.SM.1	All Table	“Link to ESMValTool ” replace with “ https://github.com/ESMValGroup/ESMValTool-AR6-OriginalCode-FinalFigures »
Chapter 3 SM	3.SM.1	3	In Table 3.SM.1: Row 1, Column 1: “Figure number / Table number / Chapter section (for calculations)” replace with “Figure number”
Chapter 3 SM	3.SM.1	3	In Table 3.SM.1: Row 8, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	4	In Table 3.SM.1: Row 3, Column 5: Add “Open Government Licence”
Chapter 3 SM	3.SM.1	4	In Table 3.SM.1: Row 8, Column 5: Add “Open Government Licence”
Chapter 3 SM	3.SM.1	5	In Table 3.SM.1: Row 5, Column 5: Add “Open Government Licence”
Chapter 3 SM	3.SM.1	5	In Table 3.SM.1: Row 7, Column 5: Add “Open Government Licence”
Chapter 3 SM	3.SM.1	5	In Table 3.SM.1: Row 9, Column 5: Add “Open Government Licence”
Chapter 3 SM	3.SM.1	6	In Table 3.SM.1: Row 4, Column 5: Add “Creative Commons Attribution Noncommercial License”
Chapter 3 SM	3.SM.1	6	In Table 3.SM.1: Row 8, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	6	In Table 3.SM.1: Row 10, Column 8: “(Huffman et al., 1997, 2009, Adler et al., 2003, 2016) “ replace with “(Adler et al., 2018) “
Chapter 3 SM	3.SM.1	7	In Table 3.SM.1: Row 3, Column 8: “(Huffman et al., 1997, 2009, Adler et al., 2003, 2016) “ replace with “(Adler et al., 2018) “
Chapter 3 SM	3.SM.1	7	In Table 3.SM.1: Row 4, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	7	In Table 3.SM.1: Row 7, Column 8: “(Huffman et al., 1997, 2009, Adler et al., 2003, 2016) “ replace with “(Adler et al., 2018) “
Chapter 3 SM	3.SM.1	7	In Table 3.SM.1: Row 8, Column 5: Add “Open Database Licence”
Chapter 3 SM	3.SM.1	7	In Table 3.SM.1: Row 11, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	8	In Table 3.SM.1: Row 8, Column 8: “(Huffman et al., 1997, 2009, Adler et al., 2003, 2016) “ replace with “(Adler et al., 2018) “
Chapter 3 SM	3.SM.1	9	In Table 3.SM.1: Row 6, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	9	In Table 3.SM.1: Row 5, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	10	In Table 3.SM.1: Row 7, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	10	In Table 3.SM.1: Row 9, Column 5: Add “Creative Commons Attribution 4.0 International

Chapter 3 SM	3.SM.1	10	In Table 3.SM.1: Row 11, Column 5: Add “Creative Commons Attribution 4.0 International”
Chapter 3 SM	3.SM.1	11	In Table 3.SM.1: Row 4, Column 8: Add “(Rodell et al., 2004)”
Chapter 3 SM	3.SM.1	13	In Table 3.SM.2: Row 5, Column 5: Add “Open Government Licence”
Chapter 3 SM	3.SM.1	13	In Table 3.SM.1: Row 9, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	14	In Table 3.SM.1: Row 2, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	16	In Table 3.SM.2: Row 9, Column 5: Add “Open Government Licence”
Chapter 3 SM	3.SM.1	17	In Table 3.SM.2: Row 1, Column 8: Add “See Chapter 2”
Chapter 3 SM	3.SM.1	17	In Table 3.SM.1: Row 5, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	17	In Table 3.SM.1: Row 9, Column 8: “(Huffman et al., 1997, 2009, Adler et al., 2003, 2016) “ replace with “(Adler et al., 2018) “
Chapter 3 SM	3.SM.1	18	In Table 3.SM.1: Row 13, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	19	In Table 3.SM.1: Row 3, Column 8: “(Huffman et al., 1997, 2009, Adler et al., 2003, 2016) “ replace with “(Adler et al., 2018) “
Chapter 3 SM	3.SM.1	20	In Table 3.SM.2: Row 3, Column 5: Add “Open Government Licence”
Chapter 3 SM	3.SM.1	20	In Table 3.SM.2: Row 2, Column 7: Delete “On DMS”
Chapter 3 SM	3.SM.1	20	In Table 3.SM.1: Row 8, Column 5: Add “ https://apps.ecmwf.int/datasets/licences/copernicus/ ”
Chapter 3 SM	3.SM.1	21	In Table 3.SM.1: Row 4, Column 2: Add “HadCRUT4”
Chapter 3 SM	3.SM.1	21	In Table 3.SM.1: Row 4, Column 3: Add “Input dataset”
Chapter 3 SM	3.SM.1	21	In Table 3.SM.1: Row 4, Column 4: Add “HadCRUT.4.6.0.0.median.nc”
Chapter 3 SM	3.SM.1	21	In Table 3.SM.1: Row 4, Column 7: Add “ https://crudata.uea.ac.uk/cru/data/temperature/#datdow ”
Chapter 3 SM	3.SM.1	21	In Table 3.SM.1: Row 4, Column 8: Add “(Morice et al., 2012)”
Chapter 3 SM	3.SM.1	21	In Table 3.SM.1: Row 5, Column 2: Add “FAQ 3.1, Figure 1 Code”
Chapter 3 SM	3.SM.1	21	In Table 3.SM.1: Row 5, Column 3: Add “Code”
Chapter 3 SM	3.SM.1	21	In Table 3.SM.1: Row 5, Column 7: Add “ https://github.com/ESMValGroup/ESMValTool-AR6-OriginalCode-FinalFigures ”
Chapter 3 SM			Update the Data Table with omitted data citations for climate model data.

Chapter 3: Human influence on the climate system - Supplementary Material

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Date: August 2021

This document is subject to copy-editing, corrigenda and trickle backs.

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ACCEPTED VERSION
SUBJECT TO FINAL EDITING

1 **3.SM.1 Data Table**

2

3

4 **[START TABLE 3.SM.1 HERE]**

5

6 **Table 3.SM.1:** Input Data Table. Input datasets and code used to create chapter figures

7

Figure number / Table number / Chapter section (for calculations)	Dataset / Code name	Type	Filename / Specificities	License type	Dataset / Code citation	Dataset / Code URL	Related publications
Figure 3.1	-	-	-	-	-	-	-
Figure 3.2	Cleator2020 (land-based reconstructions of surface temperature anomalies)	Input dataset	LGM_reconstruction.csv	Creative Commons Attribution 4.0 International	http://dx.doi.org/10.17864/1947.244	https://researchdata.reading.ac.uk/244/1/LGM_reconstruction.csv	(Cleator et al., 2020)
	Tierney2019 (land-based reconstructions of surface temperature anomalies)	Input dataset	Tierney2020_ProxyData_5x5_deltaSST.nc	Creative Commons Attribution 4.0 International		https://doi.pangaea.de/10.1594/PANGAEA.920596	(Tierney et al., 2020)
	PAGES2k temperature reconstruction	Input dataset	BHM.txt, CPS.txt, DA.txt, M08.txt, OIE.txt, PAI.txt, PCR.txt		doi.org/10.6084/m9.figshare.c.4507043.v2	https://figshare.com/collections/Global_mean_temperature_reconstructions_over_the_Common_Era/4507043	(PAGES 2k Consortium, 2019)
	Mid-Piacenzian Warm Period	Input dataset	Data_for_1a_1c_3a in supplementary information		doi: 10.5194/cp-16-2095-2020	https://doi.org/10.5194/cp-16-2095-2020	(Haywood et al., 2020)
	Figure 3.2c Code	Code				https://github.com/aschurer/IPCC_Fig3.2c	
Figure 3.3	ERA5 Reanalysis Monthly Means	Input dataset	era5_2m_temperature_*_monthly.nc		doi:10.24381/cds.68d2bb30	https://cds.climate.copernicus.eu/cdsapp#!/dataset/rean	(Hersbach et al., 2020)

						alysis-era5-land-monthly-means	
	Figure 3.3 Code	Code				Link to ESMValTool	(Bock et al., 2020)
Figure 3.4	HadCRUT5	Input dataset	HadCRUT.5.0.1.0.analysis.anomalies.ensemble_mean.nc			https://crudata.uea.ac.uk/cru/data/temperature/#datdow	(Morice et al., 2021)
	NOAAGlobalTemp v5	Input dataset	temp.ano.merg5.asc			https://www.ncei.noaa.gov/pub/data/cmb/ersst/v5/2020.grl.dat/interim.2020/	(Vose et al., 2021)
	BerkeleyEarth	Input dataset	Land_and_Ocean_LatLong1_H4.nc				(Rohde and Hausfather, 2020)
	Kadow	Input dataset	HadCRUT.5.0.1.0.anomalies.Kadow				(Kadow et al., 2020)
	Figure 3.4 Code	Code				Link to ESMValTool	(Bock et al., 2020)
Figure 3.5	HadCRUT5	Input dataset	HadCRUT.5.0.1.0.analysis.anomalies.ensemble_mean.nc			https://crudata.uea.ac.uk/cru/data/temperature/#datdow	(Morice et al., 2021)
	NOAAGlobalTemp v5	Input dataset	temp.ano.merg5.asc			https://www.ncei.noaa.gov/pub/data/cmb/ersst/v5/2020.grl.dat/interim.2020/	(Vose et al., 2021)
	BerkeleyEarth	Input dataset	Land_and_Ocean_LatLong1_H4.nc				(Rohde and Hausfather, 2020)
	Kadow	Input dataset	HadCRUT.5.0.1.0.anomalies.Kadow				(Kadow et al., 2020)
	Figure 3.5 Code	Code				Link to ESMValTool	
Figure 3.6	HadCRUT5	Input dataset	HadCRUT.5.0.1.0.analysis.anomalies.ensemble_mean.nc			https://crudata.uea.ac.uk/cru/data/temperature/#datdow	(Morice et al., 2021)

	BerkeleyEarth	Input dataset	Land_and_Ocean_LatLong1_H4.nc				(Rohde and Hausfather, 2020)
	NOAAGlobalTemp v5	Input dataset	temp.ano.merg5.asc			https://www.ncei.noaa.gov/pub/data/cmb/ersst/v5/2020.grl.dat/interim.2020/	(Vose et al., 2021)
	Kadow	Input dataset	HadCRUT.5.0.1.0.anomalies.Kadow				(Kadow et al., 2020)
	Figure 3.6 Code	Code				Link to ESMValTool	
Figure 3.7	HadCRUT4	Input dataset	HadCRUT.4.6.0.0.median.nc			https://crudata.uea.ac.uk/cru/data/temperature/#datdow	(Morice et al., 2012)
	Figure 3.7 Code	Code				Link to ESMValTool	(Gillett et al., 2021)(Gillett et al., 2021)
Figure 3.8	HadCRUT4	Input dataset	HadCRUT.4.6.0.0.median.nc			https://crudata.uea.ac.uk/cru/data/temperature/#datdow	(Morice et al., 2012)
	Figure 3.8 Code	Code				Link to ESMValTool	
Figure 3.9	HadCRUT5	Input dataset	HadCRUT.5.0.1.0.analysis.anomalies.ensemble_mean.nc			https://crudata.uea.ac.uk/cru/data/temperature/#datdow	(Morice et al., 2021)
	Figure 3.9 Code	Code				Link to ESMValTool	
Figure 3.10	RICH-obs 1.7	Input dataset	rich17obs_mean_gridded_2019.0.1979-2014_fixed2_invertlat.nc		doi:10.1175/JCLI-4050.1 doi:10.1175/JCLI-D-11-00668.1	https://img.univie.ac.at/forschung/meteorologie/produkte/raobcoreric/	(Haimberger, 2007; Haimberger et al., 2012)
	RICH-obs 1.5.1	Input dataset	OBS_rich_atmos_rio*_Amon_ta_190001-201912.nc		doi:10.1175/JCLI-4050.1 doi:10.1175/JCLI-D-11-00668.1	https://img.univie.ac.at/forschung/meteorologie/produkte/raobcoreric/	(Haimberger, 2007; Haimberger et al., 2012)

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Figure 3.10	RAOB CORE 1.7	Input dataset	raobcore17_gridded_2019.0.1979-2014_fixed2.nc doi:10.1175/JCLI-4050.1 doi:10.1175/JCLI-D-11-00668.1 https://img.univie.ac.at/forschung/meteorologie/produkte/raobcorerich/ (Haimberger, 2007; Haimberger et al., 2012)
	ERA5/5.1 Reanalysis Monthly Means	Input dataset	ta_monthly_era5.1_regridded_masked_1979-2014_updated_fixed.nc doi:10.24381/cds.68d2bb30 https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-land-monthly-means (Hersbach et al., 2020)
	Figure 3.10 Code	Code	Link to ESMValTool Mitchell et al. (2020)
Figure 3.11	Reconstructions	Input dataset	map_delta_06ka_ALL_grid_2x2.nc https://doi.org/10.1007/s00382-010-0904-1 https://static-content.springer.com/esm/art%3A10.1007%2Fs00382-010-0904-1/MediaObjects/382_2010_904_MOESM2_ESM.zip (Bartlein et al., 2011)
	PMIP4	Input dataset	https://doi.org/10.5194/cp-2019-168 https://doi.org/10.5194/cp-2019-168 Brierley et al. (2020)
	Figure 3.11 Code	Code	https://github.com/chrisbrierley/PMI_P4-midHolocene Brierley et al. (2020)
Figure 3.12	RSS	Input dataset	tpw_v07r01_198801_202010.nc4.nc http://www.remss.com/measurements/atmospheric-water-vapor/ (Wentz, 2013)
	ERA5.1 Reanalysis	Input dataset	era5_total_column_water_vapour_*_monthly.nc doi:10.24381/cds.f17050d7 https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels-monthly-means (Hersbach et al., 2020; Simmons et al., 2020)
	Figure 3.12 Code	Code	Link to ESMValTool Santer et al. (2007)
Figure 3.13	Global Precipitation Climatology Project	Input dataset	pr_GPCP-SG_L3_v2.3_197901-201710.nc https://esgf-node.llnl.gov/search (Huffman et al., 1997, 2009, Adler

	(GPCP) v2.3					ch/obs4mips/	et al., 2003, 2016)
	Figure 3.13 Code	Code				Link to ESMValTool	
Figure 3.14	Global Precipitation Climatology Project (GPCP) v2.3	Input dataset	pr_GPCP-SG_L3_v2.3_197901- 201710.nc			https://esgf-node.llnl.gov/search/obs4mips/	(Huffman et al., 1997, 2009, Adler et al., 2003, 2016)
	ERA5 Reanalysis	Input dataset	era5_total_precipitation_*_monthly.nc			https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-land-monthly-means	(Hersbach et al., 2020)
	Figure 3.14 Code	Code				Link to ESMValTool	
Figure 3.15	Global Historical Climatology Network (GHCN) station data	Input dataset	precip.mon.total.nc			https://www.esrl.noaa.gov/psd/data/gridded/data.ghcngridded.html	(Zhang et al., 2007)
	Global Precipitation Climatology Project (GPCP) v2.3	Input dataset	pr_GPCP-SG_L3_v2.3_197901- 201710.nc			https://esgf-node.llnl.gov/search/obs4mips/	(Huffman et al., 1997, 2009, Adler et al., 2003, 2016)
	Climate Research Unit (CRU)	Input dataset	cru_ts4.02.1901.2017.pr.dat.nc.gz			https://crudata.uea.ac.uk/cru/data/hrg/cru_ts_4.02/crusts.1811131722.v4.02/	(Harris et al., 2014)
	Figure 3.15 code	Code				Link to ESMValTool	
Figure 3.16	ERA-Interim	Input dataset	ERA-Interim_u10_monthly_*.nc, ERA-Interim_msl_monthly_*.nc			http://apps.ecmwf.int/datasets/data/interim-full-modas/	(Dee et al., 2011)
	ERA5	Input dataset	era5_10m_u_component_of_wind_* _monthly.nc, era5_mean_sea_level_pressure_*_mo nthly.nc		doi: 10.24381/cds.f17050d7	https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels-monthly-means	(Hersbach et al., 2020)
	JRA-55	Input dataset	uas_Amon_reanalysis_JRA-55_*.nc,			https://earthsyst	(Kobayashi et al.,

Figure 3.17			psl_Amon_reanalysis_JRA-55_*.nc			emcog.org/doc/list/ana4mips/	2015)
	MERRA-2	Input dataset	uas_Amon_reanalysis_MERRA2_*.nc, psl_Amon_reanalysis_MERRA2_*.nc			https://earthsystemcsm.cesm.ucar.edu/doc/list/ana4mips/	(Gelaro et al., 2017)
	ERA-20C	Input dataset	msl_1900-2010.nc			https://www.ecmwif.int/en/forecasts/datasets/reanalysis-datasets/era-20c	(Poli et al., 2016)
	HadSLP2	Input dataset	hadslp2.asc, HadSLP2r_lowvar_200501-201212.nc			https://www.metoffice.gov.uk/hadobs/hadslp2/data/download.html	(Allan and Ansell, 2006)
	20CRv3	Input dataset	PRMSL_*_mnmean_mem*.nc			https://portal.nersc.gov/archive/home/projects/incte11/www/20C_Reanalysis_version_3/everymember_anal_netcdf/mnmean/PRMSL/	(Slivinski et al., 2019)
	CERA-20C	Input dataset	msl.1901-2010.ens*.nc			https://www.ecmwf.int/en/forecasts/datasets/reanalysis-datasets/cera-20c	(Laloyaux et al., 2018)
	Figure 3.16 code	Code				Link to ESMValTool	
	GPCP	Input dataset	pr_GPCP-SG_L3_v2.3_197901-201710.nc			https://esgf-node.llnl.gov/search/obs4mips/	(Huffman et al., 1997, 2009, Adler et al., 2003, 2016)
	GPCC	Input dataset	full_data_monthly_v2018_05.nc			https://www.dwd.de/EN/ourservices	(Schneider et al., 2017)

					/gpcc/gpcc.html	
CRU-TS	Input dataset	cru_ts4.02.1901.2017.pre.dat.nc			https://crudata.uea.ac.uk/cru/data/hrg/cru_ts_4.02/cruts.1811131722.v4.02/	(Harris et al., 2020)
CMAP	Input dataset	precip.mon.mean.nc			https://psl.noaa.gov/data/gridded/data.cmap.html	(Xie and Arkin, 1997)
20CRv3	Input dataset	UGRD200.*.mnmean_mem*.nc, UGRD850.*.mnmean_mem*.nc			https://portal.nersc.gov/archive/home/projects/incte11/www/20C_Reanalysis_version_3/everymember_anal_netcdf/mnmean/UGRD200 , https://portal.nersc.gov/archive/home/projects/incte11/www/20C_Reanalysis_version_3/everymember_anal_netcdf/mnmean/UGRD850	(Slivinski et al., 2019)
ERA-20C	Input dataset	u_1900-2010.nc			https://www.ecmwf.int/en/forecasts/datasets/reanalysis-datasets/era-20c	(Poli et al., 2016)
ERA5	Input dataset	era5_u_component_of_wind_*_monthly.nc, era5_v_component_of_wind_*_mont		doi: 10.24381/cds.f17050d7	https://cds.climate.copernicus.eu	(Hersbach et al., 2020)

			hly.nc			/cdsapp#!/dataset/reanalysis-era5-pressure-levels-monthly-means	
JRA-55	Input dataset	ua_Amon_reanalysis_JRA-55_*.nc				https://earthsystemcog.org/doc/1st/ana4mips/	(Kobayashi et al., 2015)
MERRA2	Input dataset	ua_Amon_reanalysis_MERRA2_*.nc				https://earthsystemcog.org/doc/list/ana4mips/	(Gelaro et al., 2017)
Figure 3.17 Code	Code					Link to ESMValTool	
Figure 3.18	ERA5 Reanalysis Hourly	Input dataset	era5_orography_*_hourly.nc		doi:10.24381/cds.adbb2d47	https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels	(Hersbach et al., 2020)
	Figure 3.18 Code	Code				Link to ESMValTool	
Figure 3.19	ERA5	Input dataset	era5_u_component_of_wind_*_monthly.nc		doi:10.24381/cds.6860a573	https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-pressure-levels-monthly-means	(Hersbach et al., 2020; Simmons et al., 2020)
	Figure 3.19 Code	Code				Link to ESMValTool	
Figure 3.20	UHH Sea Ice Area Product	Input dataset	SeaIceArea_NorthernHemisphere_monthly_UHH_v2019_fv0.01.nc SeaIceArea_SouthernHemisphere_monthly_UHH_v2019_fv0.01.nc		doi :10.25592/uhhfdm.8559	https://www.fdr.uni-hamburg.de/record/8559#.YG5C5ehKg2w	
	Figure 3.20 Code	Code				Link to ESMValTool	
Figure 3.21	UHH Sea Ice Area Product	Input dataset	SeaIceArea_NorthernHemisphere_monthly_UHH_v2019_fv0.01.nc SeaIceArea_SouthernHemisphere_		doi :10.25592/uhhfdm.8559	https://www.fdr.uni-hamburg.de/record	

			monthly__UHH__v2019_fv0.01.nc			d/8559#.YG5C5e hKg2w	
	Figure 3.21 Code	Code				Link to ESMValTool	
Figure 3.22	Mudryk2020	Input dataset	SCE_timeseries.nc		doi: 10.18164/cc13328 7-1a07-4588- b3b8- 40d714edd90e	http://data.ec.gc.ca/data/climate/scientific/knowledge/climate-research-publication-based-data/northern-hemisphere-blended-snow-extent-and-snow-mass-time-series/SCE_timeseries.nc	(Mudryk et al., 2020)
	GLDAS2.0	Input dataset	GLDAS_NOAH10_M.A*.020.nc4		doi: 10.5067/QN80TO 7ZHFJZ	https://hydro1.gesdisc.eosdis.nasa.gov/data/GLDAS/GLDAS_NOAH10_M.2.0/	
	BR2011	Input dataset	Brown and Robinson 2011 SCE Series.xls		doi : 10.5194/tc-5-219-2011	http://www.the-cryosphere.net/5/219/2011/tc-5-219-2011-supplement.zip .	(Brown and Robinson, 2011)
	NOAA_CDR	Input dataset	moncov.nam.txt moncov.eurasia.txt		doi: 10.7289/V5N014 G9	https://climate.rutgers.edu/snowcover/table_area.php?ui_set=2	(Robinson et al., 2012)
	Figure 3.22 Code	Code				Link to ESMValTool	
Figure 3.23	WOA18	Input dataset	woa18_decav_t00_01.nc, woa18_decav_s00_01.nc			https://www.nodc.noaa.gov/OC5/woa18/woa18data.html	(Locarnini et al., 2018; Zweng et al., 2019)
	Figure 3.23 Code	Code				Link to ESMValTool	

Figure 3.24	HadISST1.1	Input dataset	HadISST_sst.nc			http://www.metoffice.gov.uk/hadobs/hadisst/data/download.html	(Rayner et al., 2003)
	Figure 3.24 Code	Code				Link to ESMValTool	
Figure 3.25	WOA18	Input dataset	woa18_decav81B0_t00_01.nc woa18_decav81B0_s00_01.nc			https://www.nodc.noaa.gov/OC5/woa18/woa18data.html	(Locarnini et al., 2018; Zweng et al., 2019)
	Figure 3.25 Code	Code				Link to ESMValTool	
Figure 3.26		Input dataset					
	Figure 3.26	Code				Link to ESMValTool	
Figure 3.27		Input dataset					
	Figure 3.27	Code				Link to ESMValTool	
Figure 3.28		Input dataset					
	Figure 3.28	Code				Link to ESMValTool	
Figure 3.29	Figure 3.29	Code				On DMS	
Figure 3.30	RAPID	Input dataset	moc_vertical.nc		doi: 10.5285/aa57e879-4cca-28b6-e053-6c86abc02de5	https://rapid.ac.uk/rapidmoc/rapid_data/datadl.php	
		Input dataset	Figure_AR6_DAMIP_AMOC_26N_1000m.json			https://github.com/mattofficeuk/AR6/tree/master/JSON_data	
	Figure 3.30	Code				Link to ESMValTool	
Figure 3.31	NOAA-ESRL-CO2-Globl	Input dataset				https://www.esrl.noaa.gov/gmd/ccgg/trends/gl_data.html	

	Scripps CO2 MLO	Input dataset	monthly_in_situ_co2_mlo.csv		doi:10.3334/CDI AC/atg.035	https://scrippsc02.ucsd.edu/data/atm/ospheric_co2/mlo.html	
	HadCRUT5	Input dataset	HadCRUT.5.0.1.0.analysis.anomalies.ensemble_mean.nc			https://crudata.uea.ac.uk/cru/data/temperature/#datdow	(Morice et al., 2021)
	GCP	Input dataset			https://doi.org/10.18160/GCP-2019	https://icos-cp.eu/GCP/2019	(Friedlingstein et al., 2019)
	Figure 3.31 Code	Code				Link to ESMValTool	
Figure 3.32	JMA-TRANSCOM	Input dataset					(Maki et al., 2010)
	NOAA-ESRL-CO2	Input dataset			https://doi.org/10.15138/wkgj-f215	https://www.esrl.noaa.gov/gmd/dv/data/	(Dlugokencky and Tans, 2020)
	Figure 3.32 Code	Code				Link to ESMValTool	
Figure 3.33	JRA-55	Input dataset	jra55.mon.PSL.195801-201712.nc			https://jra.kishou.go.jp/JRA-55/index_en.html	(Kobayashi et al., 2015)
	ERA5	Input dataset	era5_mean_sea_level_pressure_*_monthly.nc		doi: 10.24381/cds.f17050d7	https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels-monthly-means	(Hersbach et al., 2020)
	20CRv3	Input dataset	prmsl.mon.mean.nc			https://psl.noaa.gov/data/gridded/data.20thC_ReanV3.monolevel.html	(Slivinski et al., 2019)
	Figure 3.33 Code	Code	recipe_ipccwg1ar6ch3_modes.yml			Link to ESMValTool	
Figure 3.34	JRA-55	Input dataset	jra55.mon.PSL.195801-201712.nc			https://jra.kishou.go.jp/JRA-55/index_en.html	(Kobayashi et al., 2015)

						55/index_en.htm 1	
	ERA5	Input dataset	era5_mean_sea_level_pressure_*_mo nthly.nc		doi: 10.24381/cds. f17050d7	https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels-monthly-means	(Hersbach et al., 2020)
	Figure 3.34 Code	Code	recipe_ipccwg1ar6ch3_modes.yml			Link to ESMValTool	
Figure 3.35	SAM index	Input dataset	abram2014sam.txt			ftp://ftp.ncdc.noaa.gov/pub/data/paleo/contributions_by_author/abram2014/abram2014sam.txt	(Abram et al., 2014)
	SAM index	Input dataset	Reconstructions_Annual_LC.txt			https://www1.ncdc.noaa.gov/pub/data/paleo/reconstructions/datwyler2017/	(Dätwyler et al., 2018)
	Figure 3.35 Code	Code	recipe_ar6ch3_sam_millennium.yml			Link to ESMValTool	
Figure 3.36	ERSSTv5	Input dataset	sst.mnmean.nc			https://www.esrl.noaa.gov/psd/data/gridded/data.noaa.ersst.v5.html	(Huang et al., 2017)
	HadISST1.1	Input dataset	HadISST_sst.nc			http://www.metoffice.gov.uk/hadobs/hadisst/data/download.html	(Rayner et al., 2003)
	Figure 3.36 Code	Code	recipe_ar6ch3_enso_cmip5+6.yml			Link to ESMValTool	
Figure 3.37	ERSSTv5	Input dataset	sst.mnmean.nc			https://www.esrl.noaa.gov/psd/d	(Huang et al., 2017))

					ata/gridded/data.noaa.ersst.v5.htm	
	HadISST1.1	Input dataset	HadISST_sst.nc		http://www.metoffice.gov.uk/hadobs/hadisst/data/download.html	(Rayner et al., 2003)
	Figure 3.37 Code	Code	recipe_ar6ch3_enso_cmip5+6.yml		Link to ESMValTool	
Figure 3.38	ERSSTv5	Input dataset	sst.mnmean.nc		https://www.esrl.noaa.gov/psd/data/gridded/data.noaa.ersst.v5.html	(Huang et al., 2017)
	BerkeleyEarth	Input dataset	Complete_TAVG_LatLong1.nc		http://berkeleyearth.org/data-new/	(Rohde et al., 2013)
	GISTEMP	Input dataset	gistemp250_GHCNv4.nc		https://data.giss.nasa.gov/gistemp/	(Lenssen et al., 2019)
	GPCC	Input dataset	full_data_monthly_v2018_05.nc		https://www.dwd.de/EN/ourervices/gpcc/gpcc.html	(Schneider and Deser, 2018)
	GPCP	Input dataset	precip.mon.mean.nc		https://psl.noaa.gov/data/gridded/data.gpcp.html	(Huffman et al., 1997, 2009, Adler et al., 2003, 2016)
	CRU-TS	Input dataset	cru_ts4.02.1901.2017.pre.dat.nc		https://crudata.uea.ac.uk/cru/data/hrg/cru_ts_4.02/crusts.1811131722.v4.02/	(Harris et al., 2020)
	Figure 3.38 Code	Code			Link to ESMValTool	
Figure 3.39	ERSSTv5	Input dataset	sst.mnmean.nc		https://www.esrl.noaa.gov/psd/data.gridded/data.	(Huang et al., 2017)

					noaa.ersst.v5.htm l	
	HadISST1.1	Input dataset	HadISST_sst.nc		http://www.metof fice.gov.uk/hadob s/hadisst/data/dow nload.html	(Rayner et al., 2003)
	COBE-SST2	Input dataset	sst.mon.mean.nc		https://psl.noaa.go v/data/gridded/dat a.cobe2.html	(Hirahara et al., 2014)
	Figure 3.39 Code	Code			Link to ESMValTool	
Figure 3.40	ERSSTv5	Input dataset	sst.mnmean.nc		https://www.esrl. noaa.gov/psd/d ata/gridded/data. noaa.ersst.v5.htm	(Huang et al., 2017)
	HadISST1.1	Input dataset	HadISST_sst.nc		<a href="http://www.metof
fice.gov.uk/hadob
s/hadisst/data/dow
nload.html">http://www.metof fice.gov.uk/hadob s/hadisst/data/dow nload.html	(Rayner et al., 2003)
	COBE-SST2	Input dataset	sst.mon.mean.nc		<a href="https://psl.noaa.gov/data/gridded/dat
a.cobe2.html">https://psl.noaa.go v/data/gridded/dat a.cobe2.html	(Hirahara et al., 2014)
	Figure 3.40 Code	Code			Link to ESMValTool	
Figure 3.41	HadCRUT5	Input dataset	HadCRUT.5.0.1.0.analysis.anomalies.ensemble_mean.nc		https://crudata.u ea.ac.uk/cru/dat a/temperature/# datdow	(Morice et al., 2021)
	Global Historical Climatology Network (GHCN) station data	Input dataset	precip.mon.total.nc		https://www.esrl.n oaa.gov/psd/data/ gridded/data.ghcn gridded.html	(Zhang et al., 2007)
	HadISST	Input dataset	HadISST_ice.nc.gz		<a href="http://www.met
office.gov.uk/hadob
s/hadisst/data/down
load.html">http://www.met office.gov.uk/hadob s/hadisst/data/down load.html	(Rayner et al., 2003)

	OHC assessment from Chapter 2					
	Figure 3.41 Code	Code			Link to ESMValTool	
Figure 3.42	AIRS RetStd-v5	Input dataset	hus_AIRS_L3_RetStd-v5_*.nc			(Susskind et al., 2006; Tian et al., 2013)
	CERES-EBAF	Input dataset			https://ceres.larc.nasa.gov/data/	(Loeb et al., 2012)
	ERA5	Input dataset	era5_*_*_monthly.nc	doi: 10.24381/cds.68d2bb30	https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-land-monthly-means	(Hersbach et al., 2020)
	ERA-Interim	Input dataset	ERA-Interim_*_monthly_*.nc hfds		http://apps.ecmwf.int/datasets/data/interim-full-modas/	(Dee et al., 2011)
	ESACCI-SST	Input dataset			ftp://anon-ftp.ceda.ac.uk/n_eodc/esacci/sst/data/lt/Analysis/L4/v01.1/	(Merchant et al., 2014)
	Global Historical Climatology Network (GHCN) station data	Input dataset	precip.mon.total.nc		https://www.esrl.noaa.gov/psd/data/gridded/data.ghcngridded.html	(Zhang et al., 2007)
	Global Precipitation Climatology Project (GPCP) v2.3	Input dataset	pr_GPCP-SG_L3_v2.3_197901-201710.nc		https://esgf-node.llnl.gov/search/obs4mips/	(Huffman et al., 1997, 2009, Adler et al., 2003, 2016)
	HadISST	Input dataset	HadISST_ice.nc.gz, HadISST_sst.nc.gz		http://www.metoffice.gov.uk/hadobs/hadisst/data/download.html	(Rayner et al., 2003)
	JRA-55	Input dataset	jra55.mon.PSL.195801-201712.nc		https://jra.kishou.go.jp/JRA-55/index_en.html	(Kobayashi et al., 2015)
	NCEP/NCAR	Input dataset	*.mon.mean.nc		https://psl.noaa.gov/data/gridded/dat	(Kalnay et al., 1996)

Figure 3.43	ESACCI-SOILMOISTURE	Input dataset			a.ncep.reanalysis.surface.html ftp://anon-ftp.ceda.ac.uk/neo/dc/esacci/soil_moisture/data/	
	JMA-TRANSCOM	Input dataset	nbp, fgco2			(Maki et al., 2010)
	FLUXCOM ANN-v1	Input dataset			http://www.bgc-jena.mpg.de/geod/b/BGI/Home	
	MTE May12	Input dataset	EnsembleGPP,GL.nc		http://www.bgc-jena.mpg.de/geod/b/BGI/Home	
	LAI3g	Input dataset			http://cliveg.bu.edu/modismisrlai3g-fpar3g.html	Zhu et al., 2013
	Landschuetzer2016	Input dataset	spco2_1982-2015_MPI_SOM-FFN_v2016.nc		https://www.ncdc.noaa.gov/archive/arc0105/0160558/3.3/data/0-data/	Landschützer et al., 2016
	LandFlux-EVAL	Input dataset	LandFluxEVAL.merged.89-05.monthly.all.nc		https://data.iac.ethz.ch/landflux/	Mueller et al., 2013
	ATSR	Input dataset				
	Figure 3.42 Code	Code	recipe_ipccwg1ar6ch3_modes.yml		Link to ESMValTool	
	AIRS RetStd-v5	Input dataset	hus_AIRS_L3_RetStd-v5_*.nc			(Susskind et al., 2006; Tian et al., 2013)
	CERES-EBAF	Input dataset			https://ceres.larc.nasa.gov/data/	(Loeb et al., 2012)
	ERA5	Input dataset	era5_*_*_monthly.nc		doi: 10.24381/cds.68d2bb30 https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-land-monthly-means	(Hersbach et al., 2020)
	ESACCI-SST	Input dataset			ftp://anon-ftp.ceda.ac.uk/n	(Merchant et al., 2014)

					eodc/esacci/sst/da/tt/Analysis/L4/v01.1/		
	Global Historical Climatology Network (GHCN) station data	Input dataset	precip.mon.total.nc		https://www.esrl.noaa.gov/psd/data/gridded/data.ghcngridded.html	(Zhang et al., 2007)	
	Global Precipitation Climatology Project (GPCP) v2.3	Input dataset	pr_GPCP-SG_L3_v2.3_197901-201710.nc		https://esgf-node.llnl.gov/search/obs4mips/	(Huffman et al., 1997, 2009, Adler et al., 2003, 2016)	
	HadISST	Input dataset	HadISST_ice.nc.gz, HadISST_sst.nc.gz		http://www.metoffice.gov.uk/hadobs/hadisst/data/download.html	(Rayner et al., 2003)	
	JRA-55	Input dataset	jra55.mon.PSL.195801-201712.nc		https://jra.kishou.go.jp/JRA-55/index_en.html	(Kobayashi et al., 2015)	
	NCEP/NCAR	Input dataset	*.mon.mean.nc		https://psl.noaa.gov/data/gridded/data.ncep.reanalysis.surface.html	(Kalnay et al., 1996)	
	Figure 3.43 Code	Code			Link to ESMValTool		
Figure 3.44	Bartlein et al., 2011 temperature and precipitation reconstructions for the MidHolocene climate	Input dataset	warmtemp_delta_06ka_ALL_grid_2x2.nc coldtemp_delta_06ka_ALL_grid_2x2.nc map_delta_06ka_ALL_grid_2x2.nc		https://wiki.lsce.ipsl.fr/pmip3/doku.php?pmip3:synth:bartlein:index	(Bartlein et al., 2011; Cleator et al., 2020)	
	Cleator2020 (land-based reconstructions of surface temperature anomalies)	Input dataset	LGM_reconstruction.csv	Creative Commons Attribution 4.0 International	http://dx.doi.org/10.17864/1947.244	https://researchdata.reading.ac.uk/244/1/LGM_reconstruction.csv	(Cleator et al., 2020)
	Tierney2019 (land-based reconstructions of surface temperature	Input dataset	Tierney2020_ProxyData_5x5_deltaSST.nc	Creative Commons Attribution 4.0 International		https://doi.pangaea.de/10.1594/PANGAEA.920596	(Tierney et al., 2020)

	anomalies)						
	Figure 3.44 Code	Code				On DMS	
CC-Box 3.1, Figure 1	HadCRUT5	Input dataset	HadCRUT.5.0.1.0.analysis.anomalies.ensemble_mean.nc, HadCRUT.5.0.1.0.analysis.summary_series.global.monthly.nc, HadCRUT.5.0.1.0.analysis.ensemble_series.global.monthly.nc			https://www.metoffice.gov.uk/hadobs/hadcrut5/data/current/download.html	(Morice et al., 2021)
	BerkeleyEarth	Input dataset	Land_and_Ocean_LatLong1_H4.nc				(Rohde and Hausfather, 2020)
	GISTEMP	Input dataset	GLB.Ts+dSST.csv, gistemp1200_GHCNv4_ERSSTv5.nc			https://data.giss.nasa.gov/gistemp/	(Lenssen et al., 2019)
	Kadow	Input dataset	HadCRUT.5.0.1.0.anomalies.Kadow_et_al_2020_20crAI-infilled.ensemble_mean_185001-202012.nc				(Kadow et al., 2020)
	NOAAGlobalTemp-Interim	Input dataset	temp.ano.merg5.asc			https://www.ncei.noaa.gov/pub/data/cmb/ersst/v5/2020.grl.dat/interim.2020/	(Vose et al., 2021)
	ERA5	Input dataset	era5_2m_temperature_*_monthly.nc, era5_sea_surface_temperature_*_monthly.nc, era5_sea_ice_cover_*_monthly.nc		doi: 10.24381/cds.f17050d7	https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels-monthly-means https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels-monthly-means-preliminary-back-extension	(Hersbach et al., 2020)
	CC-Box 3.1, Figure 1 Code	Code				Link to ESMValTool	

CC-Box 3.2, Figure 1	HadEX3	Input dataset	HadEX3_TXx_ANN.nc			https://www.metoffice.gov.uk/hadobs/hadex3/download.html	(Dunn et al., 2020)
	HadEX3	Input dataset	HadEX3_Rx1day_ANN.nc			https://www.metoffice.gov.uk/hadobs/hadex3/download.html	(Dunn et al., 2020)
	CC-Box 3.2, Figure 1 Code	Code				Link to ESMValTool	
FAQ 3.1, Figure 1							
FAQ 3.2, Figure 1							
FAQ 3.3, Figure 1	JRA-55	Input dataset	jra55.mon.PSL.195801-201712.nc			https://jra.kishou.go.jp/JRA-55/index_en.html	(Kobayashi et al., 2015)
	ERA5	Input dataset	era5_2m_temperature_*_monthly.nc		doi: 10.24381/cds.68d2bb30	https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-land-monthly-means	(Hersbach et al., 2020)
	Global Precipitation Climatology Project (GPCP) v2.3	Input dataset	pr_GPCP-SG_L3_v2.3_197901-201710.nc			https://esgf-node.llnl.gov/search/obs4mips/	(Huffman et al., 1997, 2009, Adler et al., 2003, 2016)
	FAQ 3.3, Figure 1 Code	Code				Link to ESMValTool	

1

2 [END TABLE 3.SM.1 HERE]

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References

- Abram, N. J., Mulvaney, R., Vimeux, F., Phipps, S. J., Turner, J., and England, M. H. (2014). Evolution of the Southern Annular Mode during the past millennium. *Nat. Clim. Chang.* 4, 564–569. doi:10.1038/nclimate2235.
- Adler, R. F., Huffman, G. J., Chang, A., Ferraro, R., Xie, P.-P., Janowiak, J., et al. (2003). The Version-2 Global Precipitation Climatology Project (GPCP) Monthly Precipitation Analysis (1979–Present). *J. Hydrometeorol.* 4, 1147–1167. doi:10.1175/1525-7541(2003)004<1147:TVGPCP>2.0.CO;2.
- Adler, R., Sapiano, M., Huffman, G., Bolvin, D., Gu, G., Wang, J., et al. (2016). The new version 2.3 of the Global Precipitation Climatology Project (GPCP) monthly analysis product. *Univ. Maryland, April*, 1072–1084.
- Allan, R., and Ansell, T. (2006). A new globally complete monthly historical gridded mean sea level pressure dataset (HadSLP2): 1850–2004. *J. Clim.* 19, 5816–5842. doi:10.1175/JCLI3937.1.
- Bartlein, P. J., Harrison, S. P., Brewer, S., Connor, S., Davis, B. A. S., Gajewski, K., et al. (2011). Pollen-based continental climate reconstructions at 6 and 21 ka: A global synthesis. *Clim. Dyn.* 37, 775–802. doi:10.1007/s00382-010-0904-1.
- Bock, L., Lauer, A., Schlund, M., Barreiro, M., Bellouin, N., Jones, C., et al. (2020). Quantifying Progress Across Different CMIP Phases With the ESMValTool. *J. Geophys. Res. Atmos.* 125. doi:10.1029/2019JD032321.
- Brierley, C. M., Zhao, A., Harrison, S. P., Braconnot, P., Williams, C. J. R., Thornalley, D. J. R., et al. (2020). Large-scale features and evaluation of the PMIP4-CMIP6 midHolocene simulations. *Clim. Past* 16, 1847–1872. doi:10.5194/cp-16-1847-2020.
- Brown, R. D., and Robinson, D. A. (2011). Northern Hemisphere spring snow cover variability and change over 1922–2010 including an assessment of uncertainty. *Cryosphere* 5, 219–229. doi:10.5194/tc-5-219-2011.
- Cleator, S. F., Harrison, S. P., Nichols, N. K., Prentice, I. C., and Roulstone, I. (2020). A new multi-variable benchmark for Last Glacial Maximum climate simulations. *Clim. Past* 16, 699–712. doi:10.5194/cp-2019-55.
- Dätwyler, C., Neukom, R., Abram, N. J., Gallant, A. J. E., Grosjean, M., Jacques-Coper, M., et al. (2018). Teleconnection stationarity, variability and trends of the Southern Annular Mode (SAM) during the last millennium. *Clim. Dyn.* 51, 2321–2339. doi:10.1007/s00382-017-4015-0.
- Dee, D. P., Uppala, S. M., Simmons, A. J., Berrisford, P., Poli, P., Kobayashi, S., et al. (2011). The ERA-Interim reanalysis: configuration and performance of the data assimilation system. *Q. J. R. Meteorol. Soc.* 137, 553–597. doi:10.1002/qj.828.
- Slagstad, D., and Tans, P. P. (2020). Trends in Atmospheric Carbon Dioxide. Available at: https://www.esrl.noaa.gov/gmd/ccgg/trends/gl_data.html.
- Dunn, R. J. H., Alexander, L. V., Donat, M. G., Zhang, X., Bador, M., Herold, N., et al. (2020). Development of an Updated Global Land In Situ-Based Data Set of Temperature and Precipitation Extremes: HadEX3. *J. Geophys. Res. Atmos.* 125, e2019JD032263. doi:<https://doi.org/10.1029/2019JD032263>.
- Friedlingstein, P., Jones, M. W., O’Sullivan, M., Andrew, R. M., Hauck, J., Peters, G. P., et al. (2019). Global carbon budget 2019. *Earth Syst. Sci. Data* 11. doi:10.5194/essd-11-1783-2019.
- Gelaro, R., McCarty, W., Suárez, M. J., Todling, R., Molod, A., Takacs, L., et al. (2017). The modern-era retrospective analysis for research and applications, version 2 (MERRA-2). *J. Clim.* 30, 5419–5454. doi:10.1175/JCLI-D-16-0758.1.
- Gillett, N. P., Kirchmeier-Young, M., Ribes, A., Shiogama, H., Hegerl, G. C., Knutti, R., et al. (2021). Constraining human contributions to observed warming since the pre-industrial period. *Nat. Clim. Chang.* doi:10.1038/s41558-020-00965-9.
- Haimberger, L. (2007). Homogenization of radiosonde temperature time series using innovation statistics. *J. Clim.* 20, 1377–1403. doi:10.1175/JCLI4050.1.
- Haimberger, L., Tavolato, C., and Sperka, S. (2012). Homogenization of the global radiosonde temperature dataset through combined comparison with reanalysis background series and neighboring stations. *J. Clim.* 25, 8108–8131. doi:10.1175/JCLI-D-11-00668.1.
- Harris, I., Jones, P. D., Osborn, T. J., and Lister, D. H. (2014). Updated high-resolution grids of monthly climatic observations – the CRU TS3.10 Dataset. *Int. J. Climatol.* 34, 623–642. doi:10.1002/joc.3711.
- Harris, I., Osborn, T. J., Jones, P., and Lister, D. (2020). Version 4 of the CRU TS monthly high-resolution gridded multivariate climate dataset. *Sci. Data* 7, 109. doi:10.1038/s41597-020-0453-3.
- Haywood, A., Tindall, J., Dowsett, H., Dolan, A., Foley, K., Hunter, S., et al. (2020). A return to large-scale features of Pliocene climate: the Pliocene Model Intercomparison Project Phase 2. *Clim. Past Discuss.* (submitted, 1–40). doi:10.5194/cp-2019-145.
- Hersbach, H., Bell, B., Berrisford, P., Hirahara, S., Horányi, A., Muñoz-Sabater, J., et al. (2020). The ERA5 global reanalysis. *Q. J. R. Meteorol. Soc.* 146, 1999–2049. doi:<https://doi.org/10.1002/qj.3803>.
- Hirahara, S., Ishii, M., and Fukuda, Y. (2014). Centennial-Scale Sea Surface Temperature Analysis and Its Uncertainty. *J. Clim.* 27, 57–75. doi:10.1175/JCLI-D-12-00837.1.
- Huang, J., Zhang, X., Zhang, Q., Lin, Y., Hao, M., Luo, Y., et al. (2017). Recently amplified arctic warming has contributed to a continual global warming trend. *Nat. Clim. Chang.* 7, 875–879. doi:10.1038/s41558-017-0009-5.

- Huffman, G. J., Adler, R. F., Arkin, P., Chang, A., Ferraro, R., Gruber, A., et al. (1997). The Global Precipitation Climatology Project (GPCP) Combined Precipitation Dataset. *Bull. Am. Meteorol. Soc.* 78, 5–20. doi:10.1175/1520-0477(1997)078<0005:TGPCPG>2.0.CO;2.
- Huffman, G. J., Adler, R. F., Bolvin, D. T., and Gu, G. (2009). Improving the global precipitation record: GPCP Version 2.1. *Geophys. Res. Lett.* 36. doi:<https://doi.org/10.1029/2009GL040000>.
- Kadow, C., Hall, D. M., and Ulbrich, U. (2020). Artificial intelligence reconstructs missing climate information. *Nat. Geosci.* 13, 408–413. doi:10.1038/s41561-020-0582-5.
- Kalnay, E., Kanamitsu, M., Kistler, R., Collins, W., Deaven, D., Gandin, L., et al. (1996). The NCEP/NCAR 40-Year Reanalysis Project. *Bull. Am. Meteorol. Soc.* 77, 437–472. doi:10.1175/1520-0477(1996)077<0437:TNYRP>2.0.CO;2.
- Kobayashi, S., Ota, Y., Harada, Y., Ebina, A., Moriya, M., Onoda, H., et al. (2015). The JRA-55 reanalysis: General specifications and basic characteristics. *J. Meteorol. Soc. Japan. Ser. II* 93, 5–48.
- Laloyaux, P., de Boisseson, E., Balmaseda, M., Bidlot, J.-R., Broennimann, S., Buizza, R., et al. (2018). CERA-20C: A Coupled Reanalysis of the Twentieth Century. *J. Adv. Model. Earth Syst.* 10, 1172–1195. doi:<https://doi.org/10.1029/2018MS001273>.
- Landschützer, P., Gruber, N., and Bakker, D. C. E. (2016). Decadal variations and trends of the global ocean carbon sink. *Global Biogeochem. Cycles* 30, 1396–1417. doi:10.1002/2015GB005359.
- Lenssen, N. J. L., Schmidt, G. A., Hansen, J. E., Menne, M. J., Persin, A., Ruedy, R., et al. (2019). Improvements in the GISTEMP Uncertainty Model. *J. Geophys. Res. Atmos.* 124, 6307–6326. doi:10.1029/2018JD029522.
- Locarnini, M., Mishonov, A. V., Baranova, O. K., Boyer, T. P., Zweng, M. M., Garcia, H. E., et al. (2018). World ocean atlas 2018, volume 1: Temperature.
- Loeb, N. G., Lyman, J. M., Johnson, G. C., Allan, R. P., Doelling, D. R., Wong, T., et al. (2012). Observed changes in top-of-the-atmosphere radiation and upper-ocean heating consistent within uncertainty. *Nat. Geosci.* 5, 110–113. doi:10.1038/ngeo1375.
- Maki, T., Ikegami, M., Fujita, T., Hirahara, T., Yamada, K., Mori, K., et al. (2010). New technique to analyse global distributions of CO₂ concentrations and fluxes from non-processed observational data. *Tellus, Ser. B Chem. Phys. Meteorol.* 62, 797–809. doi:10.1111/j.1600-0889.2010.00488.x.
- Merchant, C. J., Embury, O., Roberts-Jones, J., Fiedler, E., Bulgin, C. E., Corlett, G. K., et al. (2014). Sea surface temperature datasets for climate applications from Phase 1 of the European Space Agency Climate Change Initiative (SST CCI). *Geosci. DATA J.* 1, 179–191. doi:10.1002/gdj3.20.
- Mitchell, D. M., Lo, Y. T. E., Seviour, W. J. M., Haimberger, L., and Polvani, L. M. (2020). The vertical profile of recent tropical temperature trends: Persistent model biases in the context of internal variability. *Environ. Res. Lett.* 15. doi:10.1088/1748-9326/ab9af7.
- Morice, C. P., Kennedy, J. J., Rayner, N. A., and Jones, P. D. (2012). Quantifying uncertainties in global and regional temperature change using an ensemble of observational estimates: The HadCRUT4 data set. *J. Geophys. Res. Atmos.* 117. doi:10.1029/2011JD017187.
- Morice, C. P., Kennedy, J. J., Rayner, N. A., Winn, J. P., Hogan, E., Killick, R. E., et al. (2021). An Updated Assessment of Near-Surface Temperature Change From 1850: The HadCRUT5 Data Set. *J. Geophys. Res. Atmos.* 126, e2019JD032361. doi:<https://doi.org/10.1029/2019JD032361>.
- Mudryk, L., Santolaria-Otín, M., Krinner, G., Ménégoz, M., Derksen, C., Brutel-Vuilmet, C., et al. (2020). Historical Northern Hemisphere snow cover trends and projected changes in the CMIP6 multi-model ensemble. *Cryosphere* 14, 2495–2514. doi:10.5194/tc-14-2495-2020.
- Mueller, B., Hirschi, M., Jimenez, C., Ciais, P., Dirmeyer, P. A., Dolman, A. J., et al. (2013). Benchmark products for land evapotranspiration: LandFlux-EVAL multi-data set synthesis. *Hydrol. Earth Syst. Sci.*
- PAGES 2k Consortium (2019). Consistent multi-decadal variability in global temperature reconstructions and simulations over the Common Era. *Nat. Geosci.* 12, 643–649. doi:10.1038/s41561-019-0400-0.
- Poli, P., Hersbach, H., Dee, D. P., Berrisford, P., Simmons, A. J., Vitart, F., et al. (2016). ERA-20C: An Atmospheric Reanalysis of the Twentieth Century. *J. Clim.* 29, 4083–4097. doi:10.1175/JCLI-D-15-0556.1.
- Rayner, N. A., Parker, D. E., Horton, E. B., Folland, C. K., Alexander, L. V., Rowell, D. P., et al. (2003). Global analyses of sea surface temperature, sea ice, and night marine air temperature since the late nineteenth century. *J. Geophys. Res.* 108, 4407. doi:10.1029/2002JD002670.
- Robinson, D., David, A., Estilow, T., and Program, N. C. (2012). NOAA Climate Date Record (CDR) of Northern Hemisphere (NH) Snow Cover Extent (SCE), Version 1. *NOAA Natl. Clim. Data Cent.*, 137–142. doi:10.7289/V5N014G9.
- Rohde, R. A., and Hausfather, Z. (2020). The Berkeley Earth Land/Ocean Temperature Record. *Earth Syst. Sci. Data* 12, 3469–3479. doi:10.5194/essd-12-3469-2020.
- Rohde, R., Muller, R. A., Jacobsen, R., Muller, E., Perlmutter, S., Rosenfeld, A., et al. (2013). A New Estimate of the Average Earth Surface Land Temperature Spanning 1753 to 2011. *Geoinformatics Geostatistics An Overv.* 1. doi:10.4172/2327-4581.1000101.
- Santer, B. D., Mears, C., Wentz, F. J., Taylor, K. E., Gleckler, P. J., Wigley, T. M. L., et al. (2007). Identification of human-induced changes in atmospheric moisture content. *Proc. Natl. Acad. Sci.* 104, 15248–15253.

- 1 doi:10.1073/pnas.0702872104.
- 2 Schneider, D. P., and Deser, C. (2018). Tropically driven and externally forced patterns of Antarctic sea ice change:
3 reconciling observed and modeled trends. *Clim. Dyn.* 50, 4599–4618. doi:10.1007/s00382-017-3893-5.
- 4 Schneider, U., Finger, P., Meyer-Christoffer, A., Rustemeier, E., Ziese, M., and Becker, A. (2017). Evaluating the
5 hydrological cycle over land using the newly-corrected precipitation climatology from the Global Precipitation
6 Climatology Centre (GPCC). *Atmosphere (Basel)*. 8, 52. doi:10.3390/atmos8030052.
- 7 Simmons, A., Soci, C., Nicolas, J., Bell, B., Berrisford, P., Dragani, R., et al. (2020). *Global Stratospheric Temperature
8 Bias and Other Stratospheric Aspects of ERA5 and ERA5. 1.* European Centre for Medium Range Weather
9 Forecasts.
- 10 Slivinski, L. C., Compo, G. P., Whitaker, J. S., Sardeshmukh, P. D., Giese, B. S., McColl, C., et al. (2019). Towards a
11 more reliable historical reanalysis: Improvements for version 3 of the Twentieth Century Reanalysis system. *Q. J.
12 R. Meteorol. Soc.* 145, 2876–2908. doi:10.1002/qj.3598.
- 13 Susskind, J., Barnett, C., Blaisdell, J., Iredell, L., Keita, F., Kouvaris, L., et al. (2006). Accuracy of geophysical
14 parameters derived from Atmospheric Infrared Sounder/Advanced Microwave Sounding Unit as a function of
15 fractional cloud cover. *J. Geophys. Res.* 111. doi:10.1029/2005JD006272.
- 16 Tian, B., Fetzer, E. J., Kahn, B. H., Teixeira, J., Manning, E., and Hearty, T. (2013). Evaluating CMIP5 models using
17 AIRS tropospheric air temperature and specific humidity climatology. *J. Geophys. Res. Atmos.* 118, 114–134.
18 doi:10.1029/2012JD018607.
- 19 Tierney, J. E., Zhu, J., King, J., Malevich, S. B., Hakim, G. J., and Poulsen, C. J. (2020). Glacial cooling and climate
20 sensitivity revisited. *Nature* 584, 569–573. doi:10.1038/s41586-020-2617-x.
- 21 Vose, R. S., Huang, B., Yin, X., Arndt, D., Easterling, D. R., Lawrimore, J. H., et al. (2021). Implementing Full Spatial
22 Coverage in NOAA's Global Temperature Analysis. *Geophys. Res. Lett.* 48, e2020GL090873.
23 doi:10.1029/2020GL090873.
- 24 Wentz, F. J. (2013). *SSM/I version-7 calibration report*. Remote Sen.
- 25 Xie, P., and Arkin, P. A. (1997). Global precipitation: A 17-year monthly analysis based on gauge observations,
26 satellite estimates, and numerical model outputs. *Bull. Am. Meteorol. Soc.* 78, 2539–2558.
- 27 Zhang, X., Zwiers, F. W., Hegerl, G. C., Lambert, F. H., Gillett, N. P., Solomon, S., et al. (2007). Detection of human
28 influence on twentieth-century precipitation trends. *Nature* 448, 461–465. doi:10.1038/nature06025.
- 29 Zhu, Z., Bi, J., Pan, Y., Ganguly, S., Anav, A., Xu, L., et al. (2013). Global data sets of vegetation leaf area index
30 (LAI)3g and fraction of photosynthetically active radiation (FPAR)3g derived from global inventory modeling
31 and mapping studies (GIMMS) normalized difference vegetation index (NDVI3G) for the period 1981 to 2.
32 *Remote Sens.* 5, 927–948. doi:10.3390/rs5020927.
- 33 Zweng, M. M., Seidov, D., Boyer, T., Locarnini, M., Garcia, H., Mishonov, A., et al. (2019). World ocean atlas 2018,
34 volume 2: Salinity.
- 35
- 36
- 37
- 38
- 39
- 40