HadISDH Data Format
23.5.2023
(Previous: HadISDH_Data_Format_v3: https://zenodo.org/record/7962055)
(Previous: HadISDH_Data_Format_v2: https://zenodo.org/record/7357311)
(Previous: HadISDH_Data_Format: http://cedadocs.ceda.ac.uk/1477)
(Previous: HadISDHTable v1: http://cedadocs.badc.rl.ac.uk/1267/)
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HadISDH Land, Marine, Blend and Extremes Data Format Description

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Table 1. Generic Dimensions for HadISDH.land

Dimension Name	Dimensions
time	??? months
month	12 months
characters	10 characters
latitude	36 5° gridboxes
longitude	72 5° gridboxes
bound_pairs	2 elements

Table 2. Generic Variables for HadISDH.land

Variable Name	standard_name	long_name	units	Dimensions	cell_methods	comments
time	time	time	days since 1973-1-1 00:00:00	time		
bounds_time	time	time period boundaries		time, bound_pairs		
month		month of year		month, characters		
climbounds		climatology period boundaries		month, bound_pairs, characters		
latitude	latitude	gridbox centre latitude	degrees_north	latitude		
bounds_lat	latitude	latitude gridbox boundaries		latitude, bound_pairs		
longitude	longitude	gridbox centre longitude	degrees_east	longitude		
bounds_long	longitude	longitude gridbox boundaries		longitude, bound_pairs		
meanstncount		mean number of stations within gridbox	1	latitude, longitude	time: mean (interval: 1 month) area: sum where land (stations within gridbox)	

stncount		actual number of stations within gridbox	1		time: sum (interval: 1 month) area: sum where land (stations within gridbox)	
stdunc		uncorrelated combined 2 sigma uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly station uncertainty and gridbox sampling uncertainty combined in quadrature assumed uncorrelated
sampunc		uncorrelated 2 sigma sampling uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	area: mean where land (stations within gridbox)	gridbox sampling uncertainty (Jones et al 1997) based on spatio-temporal station presence and intersite correlation assumed uncorrelated
stnunc		uncorrelated 2 sigma station uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	time: mean (interval: 1 month) area: mean where land (stations within gridbox combined in quadtrature)	gridbox mean monthly measurement, adjustment and climatology uncertainty combined in quadrature for each station and then in quadrature over the gridbox assumed to be uncorrelated
measunc		uncorrelated 2 sigma measurement uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	time: mean (interval: 1 month) area: mean where land (stations within gridbox combined in quadtrature)	gridbox mean monthly measurement uncertainty for each station combined in quadrature over the gridbox assumed to be uncorrelated
climunc		uncorrelated 2 sigma climatology uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	area: mean where land (stations within gridbox combined in quadtrature)	gridbox mean monthly climatology uncertainty for each station combined in quadrature over the gridbox assumed to be uncorrelated
adjunc		uncorrelated 2 sigma adjustment uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	area: mean where land (stations within gridbox combined in quadtrature)	gridbox mean monthly adjustment (applied and missed) uncertainty for each station combined in quadrature over the gridbox assumed to be uncorrelated
rbar		intersite correlation (rbar)	1	latitude, longitude		intersite correlation for each gridbox following Jones et al 1997 (rbar)
sbar2		mean gridbox variance (sbar2)	g/kg, hPa, deg C, %rh	latitude, longitude		mean variance over all stations in gridbox following Jones et al 1997 (sbar2)

Table 3. Generic Global Attributes for HadISDH.land

Global Attribute Name	Description
File_created	YYYY-MM-DD HH:MM:SS
Title	title of product
Institution	list of contributing institutions
History	links to further information (additional references, web pages, blogs, twitter handles)
Licence	licensing statement with link to license and instructions on how to cite the data product
Project	overarching project with web page link
Processing_level	brief summary of processes applied to data from source to product
Source	source input data
Comment	any other notes of interest
References	Key journal article to be cited and read for more information
Creator_name	name of main contact author
Creator_email	email for main contact
Version	vX.Y.Z.YYYYp/f: X = major update, Y = minor update, Z = small bug fix or historical data change, YYYY = last year of record, p/f = provisional (p) or final (f)
doi	issued doi for this version
Conventions	CF version that the netCDF file has been checked against

Table 4. Variables for HadISDH.landq/RH/e/Td/Tw/T/DPD. Units are g/kg, %rh, hPa, deg C, deg C, deg C and deg C respectively.

Variable Name	standard_ name	long_name	Dimensions	cell_methods	comments
hussa/ hursa/ vpsa/ tdsa/ twsa/ tasa/ dpdsa	-/ -/ -/ -/ -/ air_temperature_anomaly/ -	**near surface (~2m)** *specific humidity/ relative humiditY/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression* **anomaly**	time, latitude, longitude	time: mean (interval: 1 month comment: anomaly from climatology) area: mean where land (stations within gridbox)	gridbox mean monthly mean climate anomaly from stations
huss/ hurs/ vps/ tds/ tws/ tas/ dpds/	specific_humidity/ relative_humidity/ -/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression /	**near surface (~2m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression*	time, latitude, longitude	time: mean (interval: 1 month) area: mean where land (stations within gridbox)	gridbox mean monthly mean from stations
std		**near surface (~2m)** *specific humidity/ relative humidity/ vapour*	time, latitude, longitude	time: mean (interval: 1 month) area: variance where land	gridbox standard deviation of monthly mean climate anomaly from

		pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression **standard deviation**		(stations within gridbox)	stations
clm		**near surface (~2m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression* **climatology**	time, latitude, longitude	time: mean (interval: 1 month comment: over 30 year climatology period) area: mean where land (stations within gridbox)	gridbox mean of 30 yr climatological monthly mean from stations

2) Description of ASCII file format

There is an ASCII format file for each variable containing the gridded values for actual (_actual), anomalies (_anomaly8110) and 2 sigma combined (station [measurement, climatology and homogeneity adjustment] and gridbox spatio-temporal sampling) uncertainties (_uncertainty2sig):

e.g.,
huss_HadISDH-land_HadOBS_19730101-20141231_v2-0-1-2014p_actual.dat
huss_HadISDH-land_HadOBS_19730101-20141231_v2-0-1-2014p_anomaly8110.dat
huss_HadISDH-land_HadOBS_19730101-20141231_v2-0-1-2014p_uncertainty2sig.dat

The ASCII version of the gridded data lists each month in turn (from January 1973 to the most recent December) identified by a single row with a four character integer for the year (YYYY), a space and a three character string for the month name (MMM).

Each month has 72 columns of longitude (-177.5W to 177.5E grid cell centres) and 36 rows of latitude (-87.5S to 87.5N grid cell centres). The longitudes and latitudes are listed at file end.

Missing data are identified by -9999.99.

Units are in g/kg, %rh, hPa or degrees C depending on the variable. See Tables 1 to 4 for variable names and descriptions and other information about the product.

3) HadISDH.marine tables of netCDF file variable names, descriptions and dimensions

Table 5. Generic Dimensions for HadISDH.marine

Dimension Name	Dimensions
time	??? months
month	12 months
characters	10 characters
latitude	36 5° gridboxes
longitude	72 5° gridboxes

bound_pairs	2 elements

Table 6. Generic Variables for HadISDH.marine

Variable Name	standard_ name	long_name	units	Dimensions	cell_methods	comments
time	time	time	days since 1973-1-1 00:00:00	time		
bounds_tim e	time	time period boundaries		time, bound_pairs		
month		month of year		month, characters		
climbounds		climatology period boundaries		month, bound_pairs, characters		
latitude	latitude	gridbox centre latitude	degrees_n orth	latitude		
bounds_lat	latitude	latitude gridbox boundaries		latitude, bound_pairs		
longitude	longitude	gridbox centre longitude	degrees_e ast	longitude		
bounds_long	longitude	longitude gridbox boundaries		longitude, bound_pairs		
gridcount		number of 1by1 daily grids within gridbox	1	time, latitude, longitude	time: sum (interval: 1 month) area: sum where 1by1 daily grids within gridbox)	
obscount		number of observations within gridbox	1	time, latitude, longitude	time: sum (interval: 1 month) area: sum where observations within gridbox)	
clmgridcoun t		number of 1by1 daily grids within gridbox climatology	1	month, latitude, longitude	time: sum (interval: 1 month) area: sum where 1by1 daily grids within gridbox)	
clmobscount		number of observations within gridbox climatology	1	month, latitude, longitude	time: sum (interval: 1 month) area: sum where observations within gridbox)	
clmstdgridco unt		number of 1by1 daily grids within gridbox climatological standard deviation	1	month, latitude, longitude	time: sum (interval: 1 month) area: sum where 1by1 daily grids within gridbox)	
clmstdobsco unt		number of observations within gridbox climatological standard deviation	1	month, latitude, longitude	time: sum (interval: 1 month) area: sum where observations within gridbox)	
abs_hgtadju nc		correlated 2 sigma uncertainty for ship height bias	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly ship height bias adjustment uncertainty combined in quadrature

		adjustments for actual values				assuming correlation
anoms_hgtadjunc		correlated 2 sigma uncertainty for ship height bias adjustments for anomaly values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly ship height bias adjustment uncertainty combined in quadrature assuming correlation
abs_instadjunc		correlated 2 sigma uncertainty for instrument bias adjustments for actual values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly instrument bias adjustment uncertainty combined in quadrature assuming correlation
anoms_instadjunc		correlated 2 sigma uncertainty for instrument bias adjustments for anomaly values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly instrument bias adjustment uncertainty combined in quadrature assuming correlation
abs_clmunc		correlated 2 sigma uncertainty for climatology for actual values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly climatology uncertainty combined in quadrature assuming correlation
anoms_clmunc		correlated 2 sigma uncertainty for climatology for anomaly values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly climatology uncertainty combined in quadrature assuming correlation
abs_wholeunc		uncorrelated 2 sigma uncertainty for whole number reporting for actual values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly whole number uncertainty combined in quadrature assuming no correlation
anoms_wholeunc		uncorrelated 2 sigma uncertainty for whole number reporting for anomaly values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly whole number uncertainty combined in quadrature assuming no correlation
abs_measunc		uncorrelated 2 sigma uncertainty for measurement for actual values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly measurement uncertainty combined in quadrature assuming no correlation
anoms_measunc		uncorrelated 2 sigma uncertainty for measurement for anomaly values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly measurement uncertainty combined in quadrature assuming no correlation
abs_obsunc		uncorrelated 2 sigma combined observation	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly combined observations uncertainty combined in

		uncertainty for actual values				quadrature assuming no correlation
anoms_obsunc		uncorrelated 2 sigma combined observations uncertainty for anomaly values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly combined observations uncertainty combined in quadrature assuming no correlation
abs_sampunc		uncorrelated 2 sigma sampling uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	area: mean where marine (ships within gridbox)	gridbox sampling uncertainty (Jones et al 1997) based on spatio-temporal station presence and intersite correlation assumed uncorrelated
anoms_sampunc		uncorrelated 2 sigma sampling uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	area: mean where land (stations within gridbox)	gridbox sampling uncertainty (Jones et al 1997) based on spatio-temporal station presence and intersite correlation assumed uncorrelated
pseudostncount		number of pseudo stations within gridbox	1	time, latitude, longitude		
abs_sbarsq		gridbox mean pseudo-station variance (sbarSQ for sampling uncertainty) for gridbox actual values	g/kg, hPa, deg C, %rh	latitude, longitude		mean variance over all observations in gridbox following Jones et al 1997 (sbarSQ)
anoms_sbarsq		gridbox mean pseudo-station variance (sbarSQ for sampling uncertainty) for gridbox anomaly values	g/kg, hPa, deg C, %rh	latitude, longitude		mean variance over all observations in gridbox following Jones et al 1997 (sbarSQ)
meanpseudostncount		mean number of pseudo stations within gridbox	1	latitude, longitude		
abs_rbar		intersite correlation (rbar) for actual values	1	latitude, longitude		intersite correlation for each gridbox following Jones et al 1997 (rbar)
anoms_rbar		intersite correlation (rbar) for anomaly values	1	latitude, longitude		mean variance over all observations in gridbox following Jones et al 1997 (sbarSQ)
abs_stdunc		uncorrelated combined 2 sigma uncertainty for	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly observation uncertainty and gridbox sampling uncertainty combined in

		actual values				quadrature assumed uncorrelated
anoms_stdunc		uncorrelated combined 2 sigma uncertainty for anomaly values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly observation uncertainty and gridbox sampling uncertainty combined in quadrature assumed uncorrelated

Table 7. Generic Global Attributes for HadISDH.marine

Global Attribute Name	Description
File_created	YYYY-MM-DD HH:MM:SS
Title	title of product
Institution	list of contributing institutions
History	links to further information (additional references, web pages, blogs, twitter handles)
Licence	licensing statement with link to license and instructions on how to cite the data product
Project	overarching project with web page link
Processing_level	brief summary of processes applied to data from source to product
Source	source input data
Comment	any other notes of interest
References	Key journal article to be cited and read for more information
Creator_name	name of main contact author
Creator_email	email for main contact
Version	vX.Y.Z.YYYYp/f: X = major update, Y = minor update, Z = small bug fix or historical data change, YYYY = last year of record, p/f = provisional (p) or final (f)
doi	issued doi for this version
Conventions	CF version that the netCDF file has been checked against

Table 8. Variables for HadISDH.marineq/RH/e/Td/Tw/T/DPD. Units are g/kg, %rh, hPa, deg C, deg C, deg C and deg C respectively.

Variable Name	standard_ name	long_name	Dimensions	cell_methods	comments
hussa/ hursa/ vpsa/ tdsa/ twsa/ tasa/ dpdsa	-/ -/ -/ -/ -/ air_temperature_anomaly/ -	**near surface (~10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression* **anomaly**	time, latitude, longitude	time: mean (interval: 1 month comment: anomaly from climatology) area: mean where marine (ships within gridbox)	gridbox mean monthly mean climate anomaly from ships
huss/ hurs/ vps/ tds/ tws/ tas/ dpds/	specific_humidity/ relative_humidity/ -/ dew point temperature/ wet bulb temperatu	**near surface (~10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air*	time, latitude, longitude	time: mean (interval: 1 month) area: mean where marine (ships within gridbox)	gridbox mean monthly mean from ships

	re/ air temperature/ dew point depression /	*temperature/ dew point depression*			
clmstd		**near surface (~10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression* **climatological standard deviations**	time, latitude, longitude	area: mean where marine (ships within gridbox) time: standard deviation of monthly means (interval: 1 month comment: over 30 year climatology period)	30 yr standard deviation of gridbox monthly mean
clm		**near surface (~10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature / dew point depression* **climatology**	time, latitude, longitude	time: mean (interval: 1 month comment: over 30 year climatology period) area: mean where marine (ships within gridbox)	30 year monthly mean of gridbox mean

4) HadISDH.blend tables of netCDF file variable names, descriptions and dimensions

Table 9. Generic Dimensions for HadISDH.blend

Dimension Name	Dimensions
Time	??? months
Month	12 months
Characters	10 characters
Latitude	36 5° gridboxes
Longitude	72 5° gridboxes
bound_pairs	2 elements

Table 10. Generic Variables for HadISDH.blend

Variable Name	standard_ name	long_name	Units	Dimensions	cell_methods	comments
time	time	time	days since 1973-1-1 00:00:00	time		
bounds_tim e	time	time period boundaries		time, bound_pairs		
month		month of year		month, characters		

climbounds		climatology period boundaries		month, bound_pairs, characters		
latitude	latitude	gridbox centre latitude	degrees_north	latitude		
bounds_lat	latitude	latitude gridbox boundaries		latitude, bound_pairs		
longitude	longitude	gridbox centre longitude	degrees_east	longitude		
bounds_long	longitude	longitude gridbox boundaries		longitude, bound_pairs		
land_meanstncount		mean number of stations within gridbox	1	latitude, longitude	time: mean (interval: 1 month) area: sum (obervations within gridbox)	
land_stncount		actual number of stations within gridbox	1		time: sum (interval: 1 month) area: sum (observations within gridbox)	
marine_gridcount		number of 1by1 daily grids within gridbox	1	time, latitude, longitude	time: sum (interval: 1 month) area: sum (1by1 daily grids within gridbox)	
marine_obscount		number of observations within gridbox	1	time, latitude, longitude	time: sum (interval: 1 month) area: sum (observations within gridbox)	
marine_clmgridcount		number of 1by1 daily grids within gridbox climatology	1	month, latitude, longitude	time: sum (interval: 1 month) area: sum (1by1 daily grids within gridbox)	
marine_clmobscount		number of observations within gridbox climatology	1	month, latitude, longitude	time: sum (interval: 1 month) area: sum (observations within gridbox)	
marine_clmstdgridcount		number of 1by1 daily grids within gridbox climatological standard deviation	1	month, latitude, longitude	time: sum (interval: 1 month) area: sum (1by1 daily grids within gridbox)	
marine_clmstdobscount		number of observations within gridbox climatological standard deviation	1	month, latitude, longitude	time: sum (interval: 1 month) area: sum (observations within gridbox)	
abs_obsunc		uncorrelated 2 sigma combined observation uncertainty for actual values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly combined observations uncertainty combined in quadrature assuming no correlation
anoms_obsunc		uncorrelated 2 sigma combined observations	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly combined observations uncertainty combined in

		uncertainty for anomaly values				quadrature assuming no correlation
abs_sampunc		uncorrelated 2 sigma sampling uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	area: mean (obervations within gridbox)	gridbox sampling uncertainty (Jones et al 1997) based on spatio-temporal station presence and intersite correlation assumed uncorrelated
anoms_sampunc		uncorrelated 2 sigma sampling uncertainty for gridbox	g/kg, hPa, deg C, %rh	time, latitude, longitude	area: mean (observations within gridbox)	gridbox sampling uncertainty (Jones et al 1997) based on spatio-temporal station presence and intersite correlation assumed uncorrelated
marine_pseudostncount		number of pseudo stations within gridbox	1	time, latitude, longitude		
abs_sbarsq		gridbox mean pseudo-station variance (sbarSQ for sampling uncertainty) for gridbox actual values	g/kg, hPa, deg C, %rh	latitude, longitude		mean variance over all observations in gridbox following Jones et al 1997 (sbarSQ)
anoms_sbarsq		gridbox mean pseudo-station variance (sbarSQ for sampling uncertainty) for gridbox anomaly values	g/kg, hPa, deg C, %rh	latitude, longitude		mean variance over all observations in gridbox following Jones et al 1997 (sbarSQ)
marine_meanpseudostncount		number of pseudo stations within gridbox	1	latitude, longitude		
abs_stdunc		uncorrelated combined 2 sigma uncertainty for actual values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly observation uncertainty and gridbox sampling uncertainty combined in quadrature assumed uncorrelated
anoms_stdunc		uncorrelated combined 2 sigma uncertainty for anomaly values	g/kg, hPa, deg C, %rh	time, latitude, longitude		gridbox mean monthly observation uncertainty and gridbox sampling uncertainty combined in quadrature assumed uncorrelated

Table 11. Generic Global Attributes for HadISDH.blend

Global Attribute Name	Description
File_created	YYYY-MM-DD HH:MM:SS
Title	title of product
Institution	list of contributing institutions

History	links to further information (additional references, web pages, blogs, twitter handles)
Licence	licensing statement with link to license and instructions on how to cite the data product
Project	overarching project with web page link
Processing_level	brief summary of processes applied to data from source to product
Source	source input data
Comment	any other notes of interest
References	Key journal article to be cited and read for more information
Creator_name	name of main contact author
Creator_email	email for main contact
Version	vX.Y.Z.YYYYp/f: X = major update, Y = minor update, Z = small bug fix or historical data change, YYYY = last year of record, p/f = provisional (p) or final (f)
doi	issued doi for this version
Conventions	CF version that the netCDF file has been checked against

Table 12. Variables for HadISDH.blendq/RH/e/Td/Tw/T/DPD. Units are g/kg, %rh, hPa, deg C, deg C, deg C and deg C respectively.

Variable Name	standard_ name	long_name	Dimensions	cell_methods	comments
hussa/ hursa/ vpsa/ tdsa/ twsa/ tasa/ dpdsa	-/ -/ -/ -/ -/ air_temperature_anomaly/ -	**near surface (~2/10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression* **anomaly**	time, latitude, longitude	time: mean (interval: 1 month comment: anomaly from climatology) area: mean (observations within gridbox)	gridbox mean monthly mean climate anomaly
huss/ hurs/ vps/ tds/ tws/ tas/ dpds/	specific_humidity/ relative_humidity/ -/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression/	**near surface (~2/10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression*	time, latitude, longitude	time: mean (interval: 1 month) area: mean (observations within gridbox)	gridbox mean monthly mean from ships
clm		**near surface (~2/10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb*	time, latitude, longitude	time: mean (interval: 1 month comment: over 30 year climatology period) area: mean (observations within gridbox)	30 year monthly mean of gridbox mean

		temperature/ air temperature / dew point depression **climatology**			
marine_clmstd		**near surface (~2/10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression* **climatological standard deviations**	time, latitude, longitude	area: mean where ocean (observations within gridbox) time: standard deviation of monthly means (interval: 1 month comment: over 30 year climatology period)	30 yr standard deviation of gridbox monthly mean
land_std		**near surface (~2/10m)** *specific humidity/ relative humidity/ vapour pressure/ dew point temperature/ wet bulb temperature/ air temperature/ dew point depression* **standard deviation**		time: mean (interval: 1 month) area: variance where land (observations within gridbox)	gridbox standard deviation of monthly mean climate anomaly from observations

5) HadISDH.extremes tables of netCDF file variable names, descriptions and dimensions

Table 13. Generic Dimensions for HadISDH.extremes

Dimension Name	Dimensions
time	??? months
month	12 months
characters	10 characters
latitude	36 5° gridboxes
longitude	72 5° gridboxes
bound_pairs	2 elements

Table 14. Generic Variables for HadISDH.extremes

Variable Name	standard_name	long_name	units	Dimensions	cell_methods	comments
time	time	time	days since 1973-1-1 00:00:00	time		
bounds_time	time	time period boundaries		time, bound_pairs		
month		month of year		month, characters		

climbounds		climatology period boundaries		month, bound_pairs, characters		
latitude	latitude	gridbox centre latitude	degrees_north	latitude		
bounds_lat	latitude	latitude gridbox boundaries		latitude, bound_pairs		
longitude	longitude	gridbox centre longitude	degrees_east	longitude		
bounds_long	longitude	longitude gridbox boundaries		longitude, bound_pairs		
meanstncount		mean number of stations within gridbox	1	latitude, longitude	time: mean (interval: 1 month) area: sum where land (stations within gridbox)	
stncount		actual number of stations within gridbox	1		time: sum (interval: 1 month) area: sum where land (stations within gridbox)	

Table 15. Generic Global Attributes for HadISDH.extremes

Global Attribute Name	Description
File_created	YYYY-MM-DD HH:MM:SS
Title	title of product
Institution	list of contributing institutions
History	links to further information (additional references, web pages, blogs, twitter handles)
Licence	licensing statement with link to license and instructions on how to cite the data product
Project	overarching project with web page link
Processing_level	brief summary of processes applied to data from source to product
Source	source input data
Comment	any other notes of interest
References	Key journal article to be cited and read for more information
Creator_name	name of main contact author
Creator_email	email for main contact
Version	vX.Y.Z.YYYYp/f: X = major update, Y = minor update, Z = small bug fix or historical data change, YYYY = last year of record, p/f = provisional (p) or final (f)
doi	issued doi for this version
Conventions	CF version that the netCDF file has been checked against

Table 16. Variables for HadISDH.extremes<*var*> where <*var*> can be any of TwX/ TwN/ TwXX/ TwX90p/ TwM90p/ TwM10p/ TwN10p/ TwX25/ TwX27/ TwX29/ TwX31/ TwX33/ TwX35/ TX/ TN/ TXX/ TX90p/ TM90p/ TM10p/ TN10p/ TX25/ TX30/ TX35/ TX40/ TX45/ TX50/ TN18. Units are deg C (for TwX, TwN, TwXX, TX, TN and TXX) and %.

Variable Name	standard_name	long_name	Dimensions	cell_methods	comments
twxa/ twna/ twxxa/ twx90pa/ twm90pa/ twm10pa/ twn10pa/ twx25a/		**near surface (~2m)** *maximum wetbulb temperature/ minimum wetbulb temperature/ maximum maximum wetbulb temperature/ percentage of days per month of > 90pct maximum wetbulb temperature/ percentage of days per month of > 90pct mean wetbulb*	time, latitude, longitude	time: index (interval: 1 month comment: anomaly from climatology) area: mean where land	gridbox mean monthly index climate anomaly from stations

twx27a/ twx29a/ twx31a/ twx33a/ twx35a/ txa/ tna/ txxa/ tx90pa/ tm90pa/ tm10pa/ tn10pa/ tx25a/ tx30a/ tx35a/ tx40a/ tx45a/ tx50a/ tn18a/		*temperature/ percentage of days per month of < 10pct mean wetbulb temperature/ percentage of days per month of < 10pct mean wetbulb temperature/ percentage of days per month of ≥ 25 °C maximum wetbulb temperature/ percentage of days per month of ≥ 27 °C maximum wetbulb temperature/ percentage of days per month of ≥ 29 °C maximum wetbulb temperature/ percentage of days per month of ≥ 31 °C maximum wetbulb temperature/ percentage of days per month of ≥ 33 °C maximum wetbulb temperature/ percentage of days per month of ≥ 35 °C maximum wetbulb temperature/ maximum temperature/ minimum temperature/ maximum maximum temperature/ percentage of days per month of > 90pct maximum temperature/ percentage of days per month of > 90pct mean temperature/ percentage of days per month of < 10pct mean temperature/ percentage of days per month of < 10pct mean temperature/ percentage of days per month of ≥ 25 °C maximum temperature/ percentage of days per month of ≥ 30 °C maximum temperature/ percentage of days per month of ≥ 35 °C maximum temperature/ percentage of days per month of ≥ 40 °C maximum temperature/ percentage of days per month of ≥ 45 °C maximum temperature/ percentage of days per month of ≥ 50 °C maximum temperature/ percentage of days per month of ≥ 18 °C minimum temperature/* **anomaly**		(stations within gridbox)	
twx/ twn/ twxx/ twx90p/ twm90p/ twm10p/ twn10p/ twx25/ twx27/ twx29/ twx31/ twx33/ twx35/ tx/ tn/ txx/ tx90p/ tm90p/ tm10p/		**near surface (~2m)** *maximum wetbulb temperature/ minimum wetbulb temperature/ maximum maximum wetbulb temperature/ percentage of days per month of > 90pct maximum wetbulb temperature/ percentage of days per month of > 90pct mean wetbulb temperature/ percentage of days per month of < 10pct mean wetbulb temperature/ percentage of days per month of < 10pct mean wetbulb temperature/ percentage of days per month of ≥ 25 °C maximum wetbulb temperature/ percentage of days per month of ≥ 27 °C maximum wetbulb*	time, latitude, longitude	time: index (interval: 1 month) area: mean where land (stations within gridbox)	gridbox mean monthly index from stations

tn10p/ tx25/ tx30/ tx35/ tx40/ tx45/ tx50/ tn18/		*temperature/ percentage of days per month of ≥ 29 °C maximum wetbulb temperature/ percentage of days per month of ≥ 31 °C maximum wetbulb temperature/ percentage of days per month of ≥ 33 °C maximum wetbulb temperature/ percentage of days per month of ≥ 35 °C maximum wetbulb temperature/ maximum temperature/ minimum temperature/ maximum maximum temperature/ percentage of days per month of > 90pct maximum temperature/ percentage of days per month of > 90pct mean temperature/ percentage of days per month of < 10pct mean temperature/ percentage of days per month of < 10pct mean temperature/ percentage of days per month of ≥ 25 °C maximum temperature/ percentage of days per month of ≥ 30 °C maximum temperature/ percentage of days per month of ≥ 35 °C maximum temperature/ percentage of days per month of ≥ 40 °C maximum temperature/ percentage of days per month of ≥ 45 °C maximum temperature/ percentage of days per month of ≥ 50 °C maximum temperature/ percentage of days per month of ≥ 18 °C minimum temperature/*			
std		**near surface (~2m)** *maximum wetbulb temperature/ minimum wetbulb temperature/ maximum maximum wetbulb temperature/ percentage of days per month of > 90pct maximum wetbulb temperature/ percentage of days per month of > 90pct mean wetbulb temperature/ percentage of days per month of < 10pct mean wetbulb temperature/ percentage of days per month of < 10pct mean wetbulb temperature/ percentage of days per month of ≥ 25 °C maximum wetbulb temperature/ percentage of days per month of ≥ 27 °C maximum wetbulb temperature/ percentage of days per month of ≥ 29 °C maximum wetbulb temperature/ percentage of days per month of ≥ 31 °C maximum wetbulb temperature/ percentage of days per month of ≥ 33 °C maximum wetbulb temperature/ percentage of days per month of ≥ 35 °C maximum wetbulb*	time, latitude, longitude	time: index (interval: 1 month) area: variance where land (stations within gridbox)	gridbox standard deviation of monthly index climate anomaly from stations

		temperature/ maximum temperature/ minimum temperature/ maximum maximum temperature/ percentage of days per month of > 90pct maximum temperature/ percentage of days per month of > 90pct mean temperature/ percentage of days per month of < 10pct mean temperature/ percentage of days per month of < 10pct mean temperature/ percentage of days per month of ≥ 25 °C maximum temperature/ percentage of days per month of ≥ 30 °C maximum temperature/ percentage of days per month of ≥ 35 °C maximum temperature/ percentage of days per month of ≥ 40 °C maximum temperature/ percentage of days per month of ≥ 45 °C maximum temperature/ percentage of days per month of ≥ 50 °C maximum temperature/ percentage of days per month of ≥ 18 °C minimum temperature/ **standard deviation**			
clm		**near surface (~2m)** *maximum wetbulb temperature/ minimum wetbulb temperature/ maximum maximum wetbulb temperature/ percentage of days per month of > 90pct maximum wetbulb temperature/ percentage of days per month of > 90pct mean wetbulb temperature/ percentage of days per month of < 10pct mean wetbulb temperature/ percentage of days per month of < 10pct mean wetbulb temperature/ percentage of days per month of ≥ 25 °c maximum wetbulb temperature/ percentage of days per month of ≥ 27 °c maximum wetbulb temperature/ percentage of days per month of ≥ 29 °c maximum wetbulb temperature/ percentage of days per month of ≥ 31 °c maximum wetbulb temperature/ percentage of days per month of ≥ 33 °c maximum wetbulb temperature/ percentage of days per month of ≥ 35 °c maximum wetbulb temperature/ maximum temperature/ minimum temperature/ maximum maximum temperature/ percentage of days per month of > 90pct maximum temperature/ percentage of days per month of > 90pct mean temperature/*	time, latitude, longitude	time: mean (interval: 1 month comment: over 30 year climatology period) area: mean where land (stations within gridbox)	gridbox mean of 30 yr climatological monthly index from stations

		percentage of days per month of < 10pct mean temperature/ percentage of days per month of < 10pct mean temperature/ percentage of days per month of ≥ 25 °C maximum temperature/ percentage of days per month of ≥ 30 °C maximum t*emperature/ percentage of days per month of ≥ 35 °C maximum temperature/ percentage of days per month of ≥ 40 °C maximum temperature/ percentage of days per month of ≥ 45 °C maximum temperature/ percentage of days per month of ≥ 50 °C maximum temperature/ percentage of days per month of ≥ 18 °C minimum temperature/* **climatology**			
hq1		Homogeneity Quality Score 1: station count in gridbox	time, latitude, longitude		0=good (2+ stations), 1=moderate quality (1 station only)
hq2		Homogeneity Quality Score 2: inhomogeneity density per station in gridbox	time, latitude, longitude		0=good (0 inhomogeneities), 2=poor quality (1 inhomogeneity per station)
hq3		Homogeneity Quality Score 3: small (0-0.5 deg C) inhomogeneity density per station in gridbox	time, latitude, longitude		0=good (no small inhomogeneities), 1=moderate quality (1 small inhomogeneity per station)
hq4		Homogeneity Quality Score 4: moderate (0.5-1 deg C) inhomogeneity density per station in gridbox	time, latitude, longitude		0=good (no moderate inhomogeneities), 3=poor quality (1 moderate inhomogeneity per station)
hq5		Homogeneity Quality Score 5: large (1-2 deg C) inhomogeneity density per station in gridbox	time, latitude, longitude		0=good (no moderate inhomogen

					eities), 5=very poor quality (1 large inhomogeneity per station)
hq6		Homogeneity Quality Score 6: very large (>2 deg C) inhomogeneity density per station in gridbox	time, latitude, longitude		0=good (no moderate inhomogeneities), 10=extremely poor quality (1 very large inhomogeneity per station)
hq7		Homogeneity Quality Score 7: mean adjustment magnitude over stations in gridbox	time, latitude, longitude		0=good (no inhomogeneity), 10=extremely poor quality (>= +/-2 deg C mean adjustment per station)
hq8		Homogeneity Quality Score 8: mean absolute adjustment magnitude over stations in gridbox	time, latitude, longitude		No score, just for information
hqscore		Homogeneity Quality Flag: sum of hq1 to hq7	time, latitude, longitude		0=excellent quality, >=7=poor to very poor quality