

One of 3 Upload Forms for the SMU Equilibrium Heat Flow Database
(This is 'point'. The other two are 'reference' and 'table')
Updated April 6, 2021

Column	Column Name	Format	Description
A	gid	string	The SMU site ID number. First two characters are state. Original heat flow values are from 0 - 04999. New heat flow values start with 05000. These values are sites that previously were not included because unpublished or because only gradient data available. 06000 sites are the AMAX dataset (not previously available in the heat flow databases). 07000 are wells that are data from well log headers that have detailed temperature data. University of North Dakota data overlapped the SMU data sites so the two were combined. When a site was only in the UND dataset it was coded by State-UND- UND code.
B	area_or_ams_map	string	The AMS - Army Map Service maps were used originally to group data together and are sized by 1°Latitude x 2°Longitude. Names of specific geothermal areas are used when possible to cluster related site data.
C	hole_name	string	Published site name. The name was abbreviated in the past to fit into the limit of 8 characters.
D	pub_ref	string	Original format for heat flow reference: first four digits of first author's last name: two digit year of publication: number of other authors. This cell may now be blank.
E	new_pub_ref	string	First author's full last name or company name: two digit year of publication: number of other authors.
F	twng_rng_sec	string	Township/Range-Section for location of point. The abcd format is based on a box with 4 quadrants with a=upper right, b=upper left, c=lower left, d=lower right.
G	county	string	County of the site location.
H	state	string	State of the site location.
I	tect_prov	string	Tectonic province of the site location based on the USGS Fenneman 1946 publication.
J	w_long	decimal	Decimal Longitude in WGS84 (- for west). Note all data were originally in NAD27 and converted in 2013.
K	n_lat	decimal	Decimal Latitude in WGS84. Note all data were originally in NAD27 and converted in 2013 or as added.
L	location_notes	string	Description of site location accuracy as available. The SMU Heat Flow database sites were originally all hand plotted on a map in the field, then transferred to decimal degrees of latitude & longitude using the most detailed topographic map available at the time. For some western US sites this was the AMS sheet and therefore the resolution of latitude & longitude is only good to approximately 2 decimal places. All SMU sites now have field notes scanned and linked to them showing the original field plotted location and notes about the well site.
M	meas_date	date	Date the well temperature was measured in MM/DD/YYYY format. All months are converted to January in the system. Update them in csv files for direct download.
N	drill_date	date	Date the well was drilled/completed in MM/DD/YYYY format. All months are converted to January in the system. Update them in csv files for direct download.

O	collar_elevation	decimal	(Meters above sea level) The collar elevation for the SMU heat flow data represent approximate ground level. When the temperatures are measured it is usually after well completion and there is a wellhead installed.
P	drill_depth	decimal	(meters) The drilled depth of the well. Depending on the person entering the data this could also be the maximum measured depth during logging.
Q	water_table	decimal	(meters) The water table determined from the temperature log based on the change between air/water junction jump in the log.
R	water_symbold	string	The water table is an estimated value and can change with seasons so additional information is given with symbols: > deeper than, < more shallow than, * approximated depth.
S	surf_temp	decimal	(°C) The air temperature at the time of temperature logging the well.
T	min_temp	decimal	(°C) The coldest temperature in the well. This is often NOT the most shallow point of the well.
U	max_temp	decimal	(°C) The hottest temperature in the well; this is often NOT the deepest point in the well if the well is in a geothermal area and therefore can be used as a geothermal site indicator when it is not the same as the bottom temperature.
V	bot_temp	decimal	(°C) The bottom logged temperature in a well.
W	lit_info	string	Lithology in the well borehole.
X	comment_info	string	Comments, notes, additional information to help users understand information about the well. If a well site was combined with others, the additional names are given here.

One of 3 Upload Forms for the SMU Equilibrium Heat Flow Database
(This is 'table'. The other two are 'point' and 'reference')

NOTE: The upload screen says 'table'. The lab has traditionally called this worksheet 'heat flow', hence the file name of this workbook.

Updated April 6, 2021

Column	Column Name	Format	Description
A	gid	string	The SMU site ID number. First two characters are state. Original heat flow values are from 0 - 04999. New heat flow values start with 05000. These values are sites that previously were not included because unpublished or because only gradient data available. 06000 sites are the AMAX dataset (not previously available in the heat flow databases). 07000 are wells that are data from well log headers that have detailed temperature data. University of North Dakota data overlapped the SMU data sites so the two were combined. When a site was only in the UND dataset it was coded by State-UND- UND code.
B	interval_id	string	Number of interval measurements within this well. Default is 1 interval. ID designation uses letters with the highest quality depth data is in interval "a".
C	depth	decimal	Interval shallowest depth level. (meters)
D	bottom	decimal	Interval deepest depth level. (meters)

E	avg_tcu	decimal	(W/m/K) Laboratory measurement or estimated in situ rock thermal conductivity value for the depth interval. If 'intervals' = 1 (default) this value should be identical to SiteThermalConductivity.
F	avg_tcu_sym	string	Thermal conductivity symbols: * = estimated or if stated SMU estimated based on publication and lithology values for the area. < less than calculated value or > greater than calculated value based on the temperature measurements and lithology.
G	avg_tcu_std_err	decimal	Standard Error for thermal conductivity value.
H	bulk_tcu	decimal	(W/m/K) Thermal conductivity values based on samples run as cuttings with the value representing the entire cell = rock+ water.
I	bulk_tcu_repeats	decimal	Number of conductivity samples run to get measurement value.
J	porosity	decimal	Percentage of rock porosity calculated from running conductivity measurements.
K	geoth_grad	decimal	(°C/km) Initial geothermal gradient for the well interval. This value is considered uncorrected because it only takes into consideration the raw temperature measurements.
L	geoth_grad_sym	string	Geothermal Gradient symbols: * = estimated or if stated SMU estimated based on publication and lithology values for the area. < less than calculated value or > greater than calculated value based on the temperature measurements and lithology.
M	geoth_grad_std_err	decimal	Standard Error for geothermal gradient value (geoth_grad).
N	cgeoth_grad	decimal	(°C/km) Corrected thermal gradient measurement for the depth interval with corrections on temperature and terrain applied.
O	cgeoth_grad_sym	string	Corrected Geothermal Gradient symbols: * = estimated or if stated SMU estimated based on publication and lithology values for the area. < less than calculated value or > greater than calculated value based on the temperature measurements and lithology.
P	cgeoth_grad_std_err	decimal	Standard Error for Corrected Gradient Value; Please do not use for comments on gradient calculation- Decimal value.
Q	heat_flow	decimal	(mW/m²) Uncorrected heat flow value for the depth interval. Based on thermal conductivity and uncorrected gradient.
R	heat_flow_sym	string	Uncorrected Heat Flow symbols: * = estimated or if stated SMU estimated based on publication and lithology values for the area. < less than calculated value or > greater than calculated value based on the temperature measurements and lithology.
S	heat_flow_std_err	decimal	Standard Error for uncorrected Heat Flow Value.
T	cheat_flow	decimal	(mW/m²) Calculated or estimated corrected heat flow value based on corrected gradient and thermal conductivity. If 'Intervals' = 1 (default) this value will be identical to SiteHeatFlow. Possible to have only heat flow value from publication without gradient and conductivity information.
U	cheat_flow_sym	string	Corrected Heat Flow symbols: * = estimated or if stated SMU estimated based on publication and lithology values for the area. < less than calculated value or > greater than calculated value based on the temperature measurements and lithology.
V	cheat_flow_std_err	decimal	Standard Error for Corrected Heat Flow Value. Decimal value. Please do not use for comments.
W	heat_production	decimal	(µW/m3) Calculated value(s) from K, U, Th for an interval or for a drill hole.

X	heat_production_sym	string	Heat Production symbols: * = estimated or if stated SMU estimated based on publication and lithology values for the area. < less than calculated value or > greater than calculated value based on the temperature measurements and lithology.
Y	heat_production_std_err	decimal	Standard Error for Heat Production value.
Z	num_hg	decimal	Number of Heat Production samples used to determine the Heat Generation value.
AA	aquifer_temp	decimal	(°C) Measured, calculated or inferred value from equilibrium temperature logging.
AB	aquifer_temp_sym	string	Aquifer Temperature symbols: * = estimated or if stated SMU estimated based on publication and lithology values for the area. < less than calculated value or > greater than calculated value based on the temperature measurements and lithology.
AC	aquifer_temp_std_err	decimal	Standard Error for Aquifer Temperature value.
AD	quality_code	string	Quality Code to indicate confidence of the heat flow value for entire well. The first interval (a) is has the highest confidence. For Equilibrium Temperature Logs: A - High Quality Data: Deeper than 100 meters with at least a 50 meter linear gradient with corrections applied; B - Medium Quality Data: Deeper than 50 meters with gradient corrections applied; C - Poor Quality Data: Shallow or has some Isothermal section; D - Use for background information but not mapping; G - Geothermal System: too high a value for regional maps; X - data accuracy low but want site recorded; For BHT Data: BHT-C: Many wells nearby with similar values; BHT-X: Single data source with no method to confirm accuracy of temperature or unreliable conductivity values. Other defined codes may be added.

One of 3 Upload Forms for the SMU Equilibrium Heat Flow Database

(This is 'reference'. The other two are 'point' and 'table')

Updated Feb 10, 2014

Below please find descriptions of the columns

Column	Column Name	Format	Description
A	pub_ref	string	Original format for heat flow reference: first four digits of first author's last name: two digit year of publication: number of other authors. This cell may now be blank.
B	new_pub_ref	string	First author's full last name or company name: two digit year of publication: number of other authors.
C	info	string	Full reference title publication pages etc.
D	smu_id	string	The ID number SMU is using to organize all SMU Library items.
E	link	string	A URL to the publication if it is online and/or copyrighted material.
F	copyrighted	string	yes = copyright material; no = not copyrighted.
G	second_link	string	Other sources for the document in case one source is no longer available.