Files and Folders

File	Type	Description
BottomWaterAuxApp.mlapp	app	auxiliary GUI for defining bottom water temperature
cbValueChange.m	function	shows or hides data from each sensor on GUI plots based on sensor's checkbox value
ChiSquaredFit.m	function	computes the linear regression and associated uncertainties
DiscardData.mlapp	app	auxiliary GUI for ignoring data from processing
DiscardSensorsNoHP.m	function	removes any unchecked sensors from the dataset when there is no heat pulse. removes Teq values only, as there are no calculated k values
FrictionalDecay.m	function	computes equilibrium temperatures for each sensor
GetFiles.m	function	gets input files (.pen, .tap, and/or .mat files) and creates output .res file
HeatFlowAnalysis.m	function	computes heat flow using the Bullard method
HeatFlowRegression.m	function	computes "scatter" of heat flow and how it varies% with decreasing the number of sensors
HeatPulseDecay.m	function	computes thermal conductivities for each sensor from the thermal response following the calibrated heat pulse
images	folder	houses images needed for the GUI
InitializeProcessing.m	function	initializes the processing of the raw penetration data
InitializeProgram.m	function	initializes SlugHeat
inputs	folder	houses input files
outputs	folder	houses output files. this folder is created if it does not already exist
PlotCheckboxes.m	function	plots all sensor checkbox panels for each tab, along with callbacks for each checkbox to turn sensor lines on and off
PlotFrictionalDecay.m	function	plots results from each step of the frictional equilibration reduction
PlotHeatFlowAnalysis.m	function	plots results from the heat flow analysis
PlotHeatFlowRegression.m	function	plots results from the heat flow regression analysis
PlotHeatPulseDecay.m	function	plots results of the heat pulse decay reduction
plotLayout.m	function	controls visibility of plots on the GUI based on the values of checkboxes for each
PlotPolynomial.m	function	plots a 2nd order polynomial regression for the thermal gradient and Bullard plot.
PlotTemp.m	function	plots the calibrated temperatures relative to bottom water temperature
PlotDepth.m	function	plots the depth data from the tap file
PlotTilt.m	function	plots the tilt data from the tap file
PrintBullardResults.m	function	prints results from heat flow analysis to .res file
PrintFricResults.m	function	prints results of frictional decay processing to .res file
PrintHeaderResults.m	function	prints header of .res file
PrintHeatPulseResults.m	function	prints results of frictional decay processing to .res file
PrintNewPar.m	function	prints all input parameters to a new .par file
PrintParametersResults.m	function	prints all parameters used to .res file
PrintSensResults.m	function	prints results of sensitivity analysis to .res file
PrintStatus.m	function	print out the current status of the program onto an output file

README.md	markdown	program read me file
ReadParFile.m	function	reads in the parameters from .par file
ReadPenFile_withPulse.m	function	reads all penetration data from the .mat file
ReadPenText_withPulse.m	function	reads all penetration data from the .pen text file
ReadTAPFile.m	function	reads all tilt and pressure data from the .mat file
ReadTAPText.m	function	reads all tilt and pressure data from the .tap text file
ResetAll.m	function	resets the axes and all plotting information to conditions prior to reading in a penetration file
SensitivityAnalysis.m	function	runs the heat flow sensitivity analysis
SetParams.mlapp	app	auxiliary GUI for setting input parameters
SetUpSensAnalysis.mlapp	app	auxiliary GUI for setting input parameters and generating parameter distributions for the sensitivity analysis
QuickStartGuide.pdf	pdf	quick start guide for using SlugHeat
SlugHeat.mlapp	app	main GUI for running SlugHeat
SlugHeat22.par	text	default parameters (.par) file automatically loaded in with the start of SlugHeat
SplitDecays.m	function	splits the penetration data into two sets: (a) thermal response following penetration and (b) thermal response following the calibrated heat pulse
TempCorrection.m	function	corrects the raw temperature data with sensor calibration and referencing to bottom water temperature
updateLabels.m	function	updates the layout of the SlugHeat GUI to current conditions
xAlign.m	function	aligns the X axes of each plot on the penetration data tab
xAlignHPD.m	function	aligns the X axes of each plot on the heat pulse decay tab

Callbacks

Callback	Description	Functions called
startupFcn	executes when the figure is created	InitializeProgram
		ReadParFile
		updateLabels
button_ControlWindowExitButtonPushed	executes when button to close controls panel is pushed	xAlign
		xAlignHPD
button_LoadPenPushed	executes when button to load penetration data is pushed	ResetAll
		GetFiles
		ReadPenText_withPulse
		ReadTAPText
		ReadPenFile_withPulse
		ReadTAPFile
		TempCorrection
		SplitDecays
		PlotTemp
		PlotDepth

		PlotTilt
		PlotCheckboxes
		plotLayout
		updateLabels
		xAlign
		PrintHeaderResults
		PrintStatus
checkbox_BottomWaterPlotValueChanged	executes when the bottom water plot checkbox is turned on or off.	plotLayout
		xAlign
checkbox_DepthPlotValueChanged	executes when the depth plot checkbox is turned on or off	plotLayout
		xAlign
checkbox_TiltPlotValueChanged	executes when the tilt plot checkbox is turned on or off	plotLayout
		xAlign
button_SetParamsPushed	executes when button for manually selecting parameters is pressed	SetParams**
button_ProcessButtonPushed	executes when button for manually selecting parameters is pressed	PrintStatus
		SplitDecays
		InitializeProcessing
		FrictionalDecay
		PlotFrictionalDecay
		HeatPulseDecay
		PlotHeatPulseDecay
		HeatFlowAnalysis
		PlotHeatFlowAnalysis
		HeatFlowRegression
		PlotHeatFlowRegression
		PrintNewPar
		PrintParametersResults
		PrintFricResults
		PrintHeatPulseResults
		PrintBullardResults
button_RestartPushed	executes when button for restarting entire program is pressed	ResetAll
		ReadParFile
edit_PenStartValueChanged	executes when penetration start time text edit field value is changed	
edit_HPValueChanged	executes when heat pulse start time text edit field value is changed	
edit_PenEndValueChanged	executes when penetration end time text edit field value is changed	
figure_MainSizeChanged	executes when the main figure size changes	xAlign
		xAlignHPD
button_IgnoreDataPushed		DiscardSensorsNoHP

	executes when the user chooses to discard data using the Ignore Data button	DiscardData**
checkbox_TempvDepthValueChanged	executes when user wants to turn off or on Temp vs. Depth plot	
checkbox_TCvDepthValueChanged	executes when user wants to turn off or on Thermal Conductivity vs. Depth plot	
checkbox_TempvCTRValueChanged	executes when user wants to turn off or on Bullard plot	
button_NextIterationPushed	executes when next iteration button is pressed	
button_EndIterationsPushed	executes when end iterations button is pressed	
button_saveresultsPushed	executes when save results button is pressed	
button_clearresultsPushed	executes when clear results button is pressed	
buttongroup_PlotControls_FricSelectionChanged2	executes the user moves to the frictional decay tab on the GUI	plotLayout
checkbox_HFPlotValueChanged	executes the user wants to turn on or off the heat flow "scatter" plot	plotLayout
checkbox_SigmaPlotValueChanged	executes the user wants to turn on or off the normalized heat flow "scatter" plot	plotLayout
button_OpenControlsPanelButtonPushed	executes when the button for bringing back the user controls window is pressed	xAlign
		xAlignHPD
switch_PauseBetweenIterValueChanged	executes when switch button for pausing between iterations is switched	
tabgroup_MainSelectionChanged	executes when the user moves to another tab in the GUI	
button_resetPushed	executes when the reset penetration button is pressed	PlotTemp
		PlotDepth
		PlotTilt
		PlotCheckboxes
checkbox_UseHPValueChanged	executes when the user manually defines whether to use a heat pulse or ignore it with the Use HP checkbox	
button_SensAnButtonPushed	executes when the Run Sensitivity Analysis button is pressed	SetUpSensAnalysis**
		SensitivityAnalysis
		PrintSensResults
button_saveErrRestultsButtonPushed	executes when the save error and ucnertaitny table button is pressed	
button_clearErrResultsButtonPushed	executes when the clear error and ucnertaitny table button is pressed	
button_NewParFilePushed	executes when the new parameters (.par) file button is pressed	ReadParFile
button_changeBWValueChanged	executes when the cahnge bottom water temperature button is pressed	BottomWaterAuxApp**
		TempCorrection

		SplitDecays
		PlotTemp
		PlotDepth
		PlotTilt
		PlotCheckboxes
		plotLayout
		updateLabels
		xAlign
edit_bottomwaterValueChanged	executes when the bottom water temperature value is changed	TempCorrection
		SplitDecays
		PlotTemp
		PlotDepth
		PlotTilt
		PlotCheckboxes
		plotLayout
		updateLabels
		xAlign
button_DiscardSensorsPushed	executes when the discard sensors button below the sensor legend on the penetration tab is pressed	PrintStatus
		TempCorrection
buttongroup_PlotControls_HPSelectionChanged	executes when theselected plots to show or hide heat pulse decay reduction tab is changed	plotLayout
checkbox_TiltPlot_2ValueChanged	executes when tilt plot checkbox value is changed	

Variables

Each variable is global and is recognized by the main application, that is it can be called in any callback. Each variable can be called by dot indexing into the app.

*Function that creates the variable

Variable name	Function*	Description	Units
Version	InitializeProgram.m	version of SlugHeat	
Update		update of SlugHeat	
NumberOfColumns		number of columns for .res file	
CurrentPath		current path	
CurrentDateTime		current data and time	
ParFile		full .par file name and path	
ParFilePath		.par file path	
ParFileName		.par file name	

DefaultParFile		default .par file name (*SlugHeat.par*)	
ProgramLogId		.log file ID	
AppPath		path of app if using a compiled app	
AppOutputs		path of directory for storing outputs if using a compiled app	
PenFileName	GetFiles	.pen file name	
PenFilePath		.pen file path	
PenFile		full .pen file name and path	
TAPName		.tap file name	
TAPFileName		.tap file path	
TAPFile		full .tap file name and path	
MATFileName		.mat file name	
MATFile		full .mat file name and path	
LogFileName		.log file name	
LogFile		full .log file name and path	
ResFileName		.res file name	
ResFile		full .res file name and path	
ResFileId		.res file ID	
LogFileId		.log file ID	
S_ParFile	ReadParFile	structure holing parameters from .par file	
NumberOfSensors		total number of sensors excluding bottom water sensor, as defined in .par file	
WaterThermistor		water temperature thermistor? 1:Y 0:N, as defined in .par file	
TimeScalingFactor		seconds per record number, as defined in .par file	s/unit
DeltaTime		time between thermistor readings, as defined in .par file	s
SensorRadius		radius of the sensor, as defined in .par file	m
SensorDistance		distance between sensors, as defined in .par file	m
TempError		assumed temperature error, as defined in .par file	°C
CalibrationCoeffs		calibration coefficients, as defined in .par file	
HyndmanCoeffs		Hyndmann coefficients, as defined in .par file	
FrictionalDelays		frictional time delays, as defined in .par file	s
FricMaxStep		max frictional time step, as defined in .par file	s
TimeInc		time step increment for frictional reduction, as defined in .par file	s
FricTauMin		min τ for frictional reduction, as defined in .par file	

FricTauMax		max τ for frictional reduction, as defined in .par file	
PulseDelays		heat pulse time delays, as defined in .par file	s
kInit		initial thermal conductivities (k) function coefficients, as defined in .par file	
ktype		the first argument of kInit in the .par file. if = 99, use kInit(z), as defined in .par file	
PulsePowerPARFile		pulse power per length, as defined in .par file	J/m
TimeShiftInit		initial time shift, as defined in .par file	s
TimeShiftInc		time step increment for heat pulse reduction, as defined in .par file	s
PulseMaxStep		max heat pulse time step, as defined in .par file	s
kTolerance		k tolerance for defining for convergence, as defined in .par file	W/m°C
PulseTauMin		min τ for heat pulse reduction, as defined in .par file	
PulseTauMax		max τ for heat pulse reduction, as defined in .par file	
HeatPulseLength		duration of heat pulse, as defined in .par file	s
MinTotalkChange		convergence criteria - minimum change of Sigma(k), as defined in .par file	W/m°C
MaxNumberOfIterations		max number of iterations, as defined in .par file	
MaxSAIterations		max number of realizations for sensitivity analysis, as defined in .par file	
Sigmak0		standard deviation in k for sensitivity analysis, as defined in .par file	W/m°C
kMin		min k for sensitivity analysis, as defined in .par file	W/m°C
kMax		max k for sensitivity analysis, as defined in .par file	W/m°C
MinThickness		minimum layer thickness for sensitivity analysis, as defined in .par file	W/m°C
kAnisotropy		k bias in the horizontal direction for the sensitivity analysis, as defined in .par file	
TopSensorDepth		distance between top sensor and bottom of weight stand, as defined in .par file	m
ProbeLength		length of probe, as defined in .par file	m
Offset		manual temperature offset of sensor calibration, as defined in .par file	°C
S_MATFile	ReadPenFile	structure holding data loaded in from .mat file, as defined by .pen or .mat file	
FullExpeditionName		expedition name, as defined by .pen or .mat file	

StationName		station name, as defined by .pen or .mat file	
Penetration		penetration number, as defined by .pen or .mat file	
CruiseName		cruise name, as defined by .pen or .mat file	
Datum		datum, as defined by .pen or .mat file	
Latitude		latitude, as defined by .pen or .mat file	
Longitude		longitude, as defined by .pen or .mat file	
DepthMean		mean depth recorded during penetration, as defined by .pen or .mat file	mbsf
TiltMean		mean tilt recorded during penetration, as defined by .pen or .mat file	°
LoggerId		logger ID, as defined by .pen or .mat file	
ProbeId		probe ID, as defined by .pen or .mat file	
PenetrationRecord		record number for start of penetration, as defined by .pen or .mat file	
HeatPulseRecord		record number for firing of heat pulse, as defined by .pen or .mat file	
EndRecord		record number for end of penetration, as defined by .pen or .mat file	
AllRecords		vector of all record numbers during penetration, as defined by .pen or .mat file	
AllSensorsRawData		all temperature data (excluding bottom water sensor) before sensor calibration, as defined by .pen or .mat file	°C
WaterSensorRawData		bottom water sensor temperature data before sensor calibration, as defined by .pen or .mat file	°C
EqmStartRecord		record number for start of calibration period, as defined by .pen or .mat file	
EqmEndRecord		record number for end of calibration period, as defined by .pen or .mat file	
PulsePower		heat pulse power, as defined by .pen or .mat file	J/m
TAPRecord	ReadTAPFile	all tilt and pressure data record numbers, as defined by .tap file	
Tilt		all tilt data, as defined by .tap file	°
Depth		all depth data, as defined by .tap file	mbsf
BottomWaterTemp	TemperatureCorrection	bottom water temperature	°C
WaterSensorTemp		all bottom water sensor temperature data after sensor calibration	°C
AllSensorsTemp		all temperature data relative to bottom water, excluding bottom water sensor, before sensor calibration	°C
AllSensorsCalibratedTemp		all temperature data relative to bottom water, excluding bottom water sensor, after sensor calibration	°C
FricTime	SplitDecays	times of frictional equilibration	s
FricTemp		temps during frictional equilibration	°C

PulseData		indicator of whether a heat pulse was fired of not (0 = no, 1 = yes)	
PulseTime		times of heat pulse decay	s
PulseTemp		temps during heat pulse decay	°C
S_Lines	PlotRawTemp	structure of all temperature vs. time lines	
AllSensors		all sensors with data plotted	
h_axTempAboveBWT		axis for temperature relative to bottom water plot	
PenCheckboxes	PlotCheckboxes	checkboxes on penetration tab	
FricCheckboxes		checkboxes on frictional equilibration tab	
HPCheckboxes		checkboxes on heat pulse decay tab	
kFunction	InitializeProcessing	assumed thermal conductivity function	
Currentk		current k values for each sensor	W/m°C
CurrentT		current Teq values for each sensor	°C
TChange		change of Teq between each sensor from previous iteration	°C
kChange		change of Teq between each sensor from previous iteration	W/m°C
Iteration		current iteration number	
kInitial		initial thermal conductivity function	
FirstIteration		first iteration number	
TotalIterations		total number of iterations	
AnotherTrial		indicator for a new trial to be run	
RelativeDepths		relative depths of all sensors	mbsf
A		coefficient used for defining k with assumed function	
B		coefficient used for defining k with assumed function	
C		coefficient used for defining k with assumed function	
D		coefficient used for defining k with assumed function	
E		coefficient used for defining k with assumed function	
F		coefficient used for defining k with assumed function	
NumberOfFricUsedPoints	FrictionalDecay	number of data points used from frictional equilibration reduction	
MinimumFricEqTemp		Teq with minimum misfit from linear regression	°C
MinimumFricError		Teq error with minimum misfit from linear regression	°C
MinimumFricDelays		Teq time shift with minimum misfit from linear regression	s
MinimumFricSlope		Teq vs. depth slope with minimum misfit from linear regression	°C/m
HPTooLow		indicator for heat pulse power too low	1= yes, 0 = no

ShiftedTime		shifted time	s
IndexOfMinimums		index for Teq data with minimum misfit from linear regression	
DataTemp		corrected temperature	°C
TimeShifts		time shifts	s
ShiftedTau		shifted τ	
DataFAT		data for cylindrical decay function $F(\alpha, \tau)$	
DataLimits		temperature data limits	
b		temporary variable used for defining linear regression	
a		temporary variable used for defining linear regression	
RMS		residual misfit from linear regression for frictional equilibration reduction	°C
h_axFricTempvTime	PlotFrictionalDecay	axis for frictional equilibration vs time plot	
h_axFricTempvTau		axis for frictional equilibration vs t τ plot	
h_axFricTempvTauPoints		data points for frictional equilibration vs τ plot	
h_axFricTempvTauLines		lines for frictional equilibration vs τ plot	
h_axFricRMSvTimeShift		axis for RMS of frictional equilibration vs time shift plot	
h_axFricRMSvTimeShiftMinDelays		lines for minimums on RMS of frictional equilibration vs time shift plot	
MeankPointAtMinkDiff	HeatPulseDecay	mean k(point) with minimum deviation from k(slope)	W/m°C
kSlopeAtMinkDiff		k(slope) with minimum misfit from linear regression	W/m°C
MeankPointAtZeroInfTemp		mean k(point) with minimum misfit from linear regression based on Teq = T at infinite time	W/m°C
MeankPointAtMinRMS		mean k(point) with minimum misfit from linear regression based on RMS	W/m°C
kSlopeAtZeroInfTemp		mean k(slope) with minimum misfit from linear regression based on Teq = T at infinite time	W/m°C
kSlopeAtMinRMS		mean k(slope) with minimum misfit from linear regression based on RMS	W/m°C
TempAtInf		T relative to Teq at infinity when k(slope) and k(point) difference is minimized	°C
NumberOfUsedPoints		Number of data points used from heat pulse decay reduction	
MinimumPulseDelays		k time shift with minimum misfit from linear regression	s
kError		k error	
HeatPulseTime		time during penetration of heat pulse decay	s
MinkDiffIndex		index for k data with minimum misfit from linear regression	

kSlopeRMS		residual misfit from linear regression for heat pulse decay reduction	W/m°C
TempAtInfinity		T relative to Teq at infinity (all)	°C
OneOverTime		1 / time	1 / s
kSlope		k as determined by k(slope)	W/m°C
h_axHPTempvTime	PlotHeatPulseDecay	axis for heat pulse decay vs time plot	
h_axHPRMS		axis for heat pulse decay residual misfits vs time shift plot	
h_axHPRMSLine		lines for heat pulse decay T relative to Teq vs time shift plot	
h_axHPTempvInvTime		axis for heat pulse decay vs 1 / time plot	
h_axHPTempvInvTimeBestFit		best fit lines for heat pulse decay vs 1 / time plot	
h_axHPTempvTimeShift		axis for heat pulse decay residual misfits vs time shift plot	
h_axHPTempvTimeShiftBestFit		best fit lines for heat pulse decay vs 1 / time plot	
SensorsUsedForBullardFit	HeatFlowAnalysis	sensors with CTR to use for heat flow (Bullard) reduction	
GoodkIndex		index for k to use in heat flow reduction	
CTRToUse		sensors with CTR to use for heat flow (Bullard) reduction	
CTR		cumulative thermal resistance for all sensors	m2/W°C
ShiftedCTR		shifted cumulative thermal resistance for all sensors so that Teq = 0 at seafloor	m2/W°C
ShiftedRelativeDepths		shifted deptsh so that Teq = 0 at seafloor	mbsf
TToUse		sensors with Teq used for heat flow (Bullard) reduction	
kToUse		sensors with k used for heat flow (Bullard) reduction	
Slope		slope of thermal gradient linear best fit	°C/m
Shift		depth shift for all sensors	m
S_BullPlots		structure for holding children of Bullard plot	
HeatFlow		final heat flow value	mW/m2
Averagek		average k value for all sensors	W/m°C
Gradient		thermal gradient	°C/m
HFErr		heat flow error based on linear best fit	mW/m2
HFShift		heat flow shift	mW/m2
HFShiftErr		heat flow shift error	mW/m2
kErr		k error	W/m°C
GradErr		thermal gradient error	°C/m
GradShift		thermal gradient shift	°C/m
GradShiftErr		thermal gradient shift error	°C/m
Sigmaa	HeatFlowRegression	probable uncertainty in the estimates of heat flow	mW/m2

Sigmab		probable uncertainty in the estimates of the depth shift	m
Scatter		scatter	mW/m2
ScatterHeatFlow		heat flow from scatter analysis	mW/m2
HFLine	PlotHeatFlowRegression	heat flow plot in scatter analysis	
ScatterLine		scatter plot in scatter analysis	
SigmaHFLine		standard deviation in heat flow plot in scatter analysis	
SigmaScatterLine		standard deviation in scatter plot in scatter analysis	
Results	SensitivityAnalysis	structure holding all results from sensitivity analysis	
Params		structure holding all parameters from sensitivity analysis	
NewParFileName	New PAR file callback	name of new .par file created with current parameters	
NewParFile		full name and path of of new .par file created with current parameters	
BWPlot	SlugHeat main app	indicator for showing bottom water temperature plot	1= yes, 0 = no
DepthPlot		indicator for showing depth plot	1= yes, 0 = no
TiltPlot		indicator for showing tilt plot	1= yes, 0 = no
TempPlot		indicator for showing sediment temperature plot	1= yes, 0 = no
TempTimePlot		indicator for showing temperature vs. time plot	1= yes, 0 = no
TempTauPlot		indicator for showing temperature vs. τ plot	1= yes, 0 = no
TempBullFuncPlot		indicator for showing temperature vs. F(α, τ) plot	1= yes, 0 = no
MisfitShiftPlot		indicator for showing residual misfit vs. time shift plot	1= yes, 0 = no
BullTempvDepthPlot		indicator for showing thermal gradient plot	1= yes, 0 = no
TCvDepthPlot		indicator for showing k vs. depth plot	1= yes, 0 = no
TempvCTRPlot		indicator for showing Bullard plot	1= yes, 0 = no
HFPlot		indicator for showing top scatter plot	1= yes, 0 = no
SigmaPlot		indicator for showing bottom scatter plot	1= yes, 0 = no
UseWaterSensor		indicator for using bottom water sensor	1= yes, 0 = no
UseHP		indicator for using a heat pulse	1= yes, 0 = no
NoInitialize		indicator for initializing program	1= yes, 0 = no
Reprocess		indicator for reprocessing in a new trial	1= yes, 0 = no
RunAnalysis		indicator for if the analysis has been run for this trial yet	1= yes, 0 = no
Badk		sensors to ignore k values	
BadT		sensors to ignore Teq values	
PenStartChanged		indicator for penetration start time changed in SlugHeat	1= yes, 0 = no

HeatPulseChanged		indicator for heat pulse time changed in SlugHeat	1= yes, 0 = no
PenEndChanged		indicator for penetration end time changed in SlugHeat	1= yes, 0 = no
Trial		trial number	
Pause		indicator for whether to pause between iterations	1= yes, 0 = no
Converged		indicator for if convergence has been reached	1= yes, 0 = no
TempTimePlotHPPlot		indicator for showing temp vs. time following heat pulse plot	1= yes, 0 = no
MisfitShiftHPPlot		indicator for showing misfit vs time shift following heat pulse plot	1= yes, 0 = no
TempInvTimeHPPlot		indicator for showing temp vs. 1/time following heat pulse plot	1= yes, 0 = no
TempTimeShiftHPPlot		indicator for showing temp vs. time shift following heat pulse plot	1= yes, 0 = no
SetParamsDialogApp		dialog app for setting input parameters	
DiscardDataDialogApp		dialog app for ignoring data	
SetUpSensDialogApp		dialog app for setting up parameters for sensitivity analysis	
BottomWaterApp		dialog app for changing bottom water temperature	
PreviousT		Teq in previous iteration	°C
Previousk		k in previous iteration	W/m°C
LightGrey		color for plot backgrounds	
OrigNumberOfSensors		original number of sensors, before any data is ignored	
IgnoredSensors		ignored sensors	
SensorsToUse		sensors to be used in all processing	
HFData		heat flow results summary data	
ErrData		error and uncertatinty results summary data	
S_FricResults		structure for all frictional decay reduction results	
S_HPResults		structure for all heat pulse decay reduction results	
S_HeatFlowResults		structure for all heat flow reduction results	
S_Results		structure for all results	
S_SensResults		structure for all sensitivity analysis results	
OrigParams		original parameters	
BWChosen		indicator bottom water temperature has been chosen	1= yes, 0 = no
BottomWaterValue		value of bottom water temperature if it's manually chosen by user	°C
NumSensAnalyses		number of sensitivity analyses that have been run for this penetration	

TotkChange		sum of differences in k each iteration for all sensors	W/m°C
kDistribution		distribution of k type for all sensors for sensitivity analysis	1 = Gaussian, 2 = Gamma, 3 = single value
r		distribution of k values for each sensor for sensitivity analysis	W/m°C
Bins		bin size for k distributions for sensitivity analysis	
UseFrictional		indicator for recalculating Teq with new k in sensitivity analysis	1= yes, 0 = no
Meank	SlugHeat main app	mean k for each sensor	W/m°C