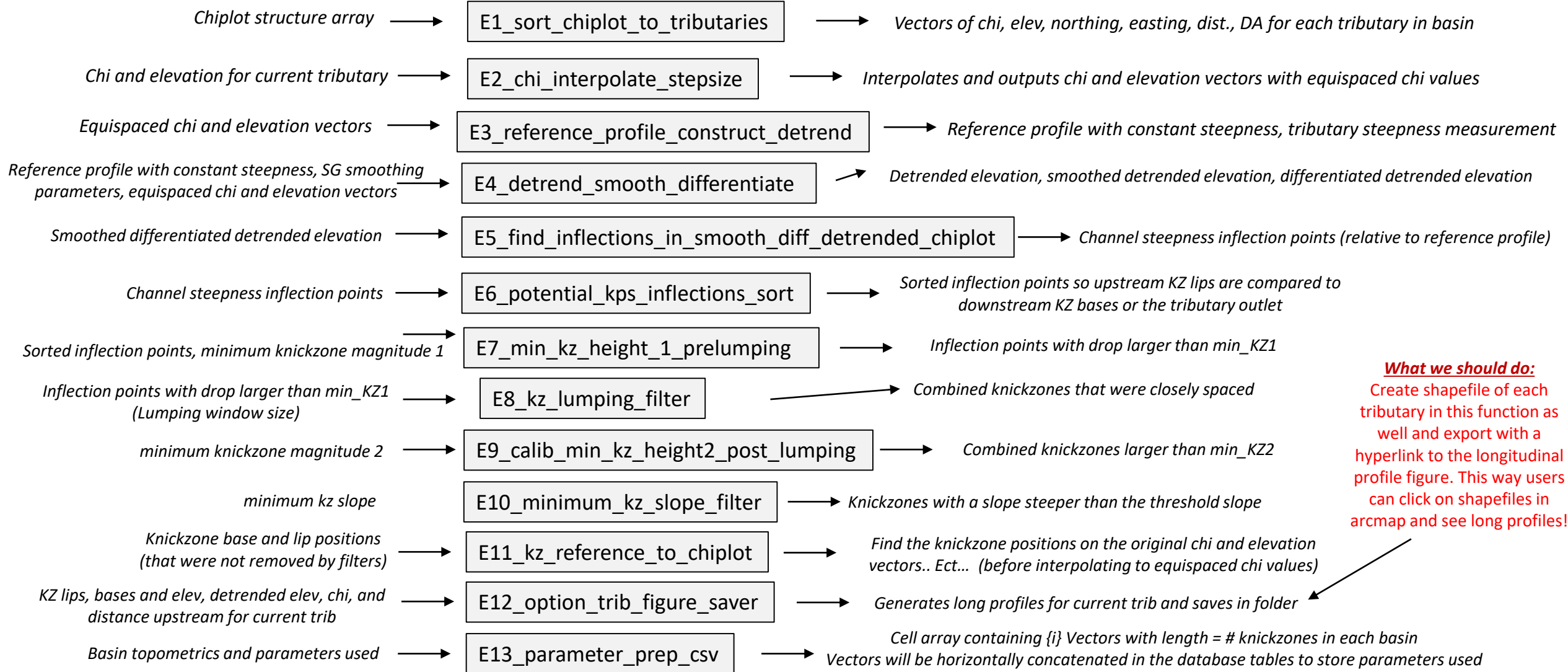


Inputs: chiplot cell array {i} for each basin,
streamOBJ structure array {i}, parameter values

E_KZ_Knickzone_selection

Outputs: database tables with knickzone position,
geometry, and basin topometrics for each basin {i}



What we should do:
Create shapefile of each tributary in this function as well and export with a hyperlink to the longitudinal profile figure. This way users can click on shapefiles in arcmap and see long profiles!

- **Outputs:** database tables with knickzone position, geometry, and basin topometrics for each basin {i}. These can be used to plot knickzone position in arcmap or generate histograms of knickzone elevation.. Chi ect...
- Long profiles and chiplots with knickzones plotted (preliminary)
- I want to output shapefiles with the tributary long profiles. This would be really nice to view in arcmap.

Cycles through a range of smoothing parameter values and records the parameter values that maximize the fit with the calibration knickzones

E_calib_KZ_calibration_I

ONLY CALIBRATES 1 BASIN!!
(if you input more than 1 basin in 'C_KZ_drainage_basin_plot_and_select', it will only calibrate algorithm selections made in the 1st index basin)

Inputs: chiplot structure array, streamOBJ structure array, parameter values

Chiplot structure array

E1_sort_chiplot_to_tributaries

Vectors of chi, elev, northing, easting, dist., DA for each tributary in basin

Chi and elevation for current tributary

E2_chi_interpolate_stepsize

Interpolates and outputs chi and elevation vectors with equispaced chi values

Equispaced chi and elevation vectors

E3_reference_profile_construct_detrend

Reference profile with constant steepness, tributary steepness measurement

Reference profile with constant steepness, SG smoothing parameters, equispaced chi and elevation vectors

E4_detrend_smooth_differentiate_calib

Detrended elevation, smoothed detrended elevation, differentiated detrended elevation
(NOTE: smoothing parameters change each iteration within calibration script)

Smoothed differentiated detrended elevation

E5_find_inflections_in_smooth_diff_detrended_chiplot

Channel steepness inflection points (relative to reference profile)

Channel steepness inflection points

E6_potential_kps_inflections_sort

Sorted inflection points so upstream KZ lips are compared to downstream KZ bases or the tributary outlet

Sorted inflection points, minimum knickzone magnitude 1

E7_calib_min_kz_height_1_prelumping

Inflection points with drop larger than min_KZ1
(NOTE: value of min_KZ1 will change depending on iteration in calibration script)

Inflection points with drop larger than min_KZ1
(Lumping window size)

E8_calib_kz_lumping_filter

Combined knickzones that were closely spaced
(NOTE: value of lumping filter will change depending on iteration in calibration script)

minimum knickzone magnitude 2

E9_calib_min_kz_height2_post_lumping

Combined knickzones larger than min_KZ2
(NOTE: value of min_KZ2 will change depending on iteration in calibration script)

minimum kz slope

E10_minimum_kz_slope_filter

Knickzones with a slope steeper than the threshold slope

Knickzone base and lip positions
(that were not removed by filters)

E11_kz_reference_to_chiplot

Find the knickzone positions on the original chi and elevation vectors.. Ect... (before interpolating to equispaced chi values)

E12_calib_kz_attributes_unpack

Open the stored lists of knickzone attributes, organize into vectors containing all the knickzones in the basin

Saved knickzone attributes organized into cell arrays
Saved tributary ID's stored in cell arrays

E13_calib_trib_id_num_for_kp

Vector containing all of the tributary ID numbers and tributary steepnesses

Parameters used for current iteration

E14_calib_parameters_save

Vector containing all of the parameter values

OUTPUTS: Cell array containing matrices of knickzone attributes for each parameter combination run (these are read and compared to the calibration knickzones in the next script!!)

Cycles through the results from each parameter combination and compares the position and size of algorithm knickzones to the calibration knickzones

E_calib_KZ_calibration_II

*Inputs: table.csv of calibration knickzones (Lips and bases) <- NOTE row 1 must be a header!! The script starts reading at row 2.
Cell array containing matrices with each knickzone position for parameter combinations in prior script*

*Table.csv for calibration bases and lips
(column #s containing northing/easting/relief)*

F1_calib_load_calib_kz

*Vectors of calibration knickzone easting,
northing, and relief (for lips and bases)*

*Vectors of calibration knickzone easting,
northing, and relief (for lips and bases)*

F2_calib_calib_kz_reference2streamOBJ

*Calibration knickzones referenced to streamOBJ (knickzones further than
'calibration_snapping_distance' are discarded)
Outputs figures showing location of calibration knickzones and any
discarded calibration knickzones*

*Output cell array containing matrices
of algorithm results in each cell*

F3_calib_load_algorithm_output_table

*Vectors of algorithm knickzone easting, northing, and relief (for lips
and bases)... for current parameter combination*

*Algorithm knickzone positions and calibration
knickzone positions*

F4_calib_alg_tp_or_fp_and_fn

*Number of true positives, false positives, and false negatives for
current iteration (set of algorithm results)*

*Algorithm knickzone relief and calibration
knickzone relief*

F5_calib_geometric_accuracy

Geometric accuracy (% error in measured algorithm relief)



Measured R,S,G for all parameter combinations.

Maximized R,S,G parameter combination is indexed out and recorded

Maximized R,S parameter combination is indexed out and recorded (only weights spatial accuracy of selections)

Generates figures showing parameter sensitivity and best fit parameter results

Cycles through the results from each parameter combination and compares the position ONLY of algorithm knickzones and calibration knickzones

*Used because takes a lot longer to record Calib. Bases.
(Quicker but maybe less accurate calibration)*

E_calib_KZ_calibration_II_only_calib_lips

*Inputs: table.csv of calibration knickzones (Lips ONLY) <- NOTE row 1 must be a header!! The script starts reading at row 2.
Cell array containing matrices with each knickzone position for parameter combinations in prior script*

*Table.csv for calibration bases and lips
(column #s containing northing/easting/relief)*

F1_calib_load_calib_kz

*Vectors of calibration knickzone easting,
northing, and relief (for lips and bases)*

Same as slide 3 but only with lips

F2_calib_calib_kz_reference2streamOBJ_only_calib_lips

Same as slide 3 but only with lips

*Output cell array containing matrices
of algorithm results in each cell (only lips though)*

F3_calib_load_algorithm_output_table

Vectors of algorithm knickzone easting, northing, and relief (for lips ONLY)... for current parameter combination

*Algorithm knickzone positions and calibration
knickzone positions*

F4_calib_alg_tp_or_fp_and_fn

*Number of true positives, false positives, and false negatives for
current iteration (set of algorithm results)*



Maximized R,S parameter combination is indexed out and recorded (only weights spatial accuracy of selections)

Generates figures showing parameter sensitivity and best fit parameter results

(NOTE because there are no calibration bases, we can't measure G or the accuracy of base selections)