* **Borrelli\_C\_Factor.xlsx**: Spreadsheet summarizing the range of C-factor values listed in Borelli et al. This file is not used by any script- it is just for reference.
* **Erosion\_Rate\_Scheme.csv**: Spreadsheet that assigns each landcover type a normalized preferred C factor (C\*). Erodibilities are relative to a preindustrial C factor, C0. The forest cover value is assumed to be equal to C0.
* **NCLD\_2019\_Align.asc**: NLCD land cover raster clipped and reprojected with QGIS to match the Chestatee DEM. DEM grid nodes and NCLD\_2019\_Align.asc pixels match 1-1.
* **K1\_Create.py**: Script creates the K1 array, saved as the K1.csv file in the “Output” folder. The script imports Erosion\_Rate\_Scheme.csv and NCLD\_2019\_Align.asc, assigns each grid node a numerical erodibility value (K1i), and exports an array of erodibility values as a csv file (K1.csv). The erodibility at each node, K1i (i.e. each individual value within K1.csv), is calculated as such:

Where is the normalized preferred C factor at each node:

Where Ci is the C factor of the land cover type at each node (options are 0.00155, 0.08, 0.125, and 0.38; see Erosion\_Rate\_Scheme.csv), and C0 is the C factor of the preindustrial landscape (0.00155). Note that this script requires you to input a value K0. I used the value of K0\_mean (8.29124436168032E-07). No landscape evolution modeling in this script, just calculating and exporting K1.csv. The script then uses the K1 array to calculate the mean catchment erosion rate that must result from this scheme (E1):

First, the script calculates E1 with K0\_mean supplied as the value of K0 (E1\_mean). It then recalculates E1 with K0\_min and K0\_max supplied as the value of K0 (E1\_min and E1\_max).

* **Output**: Folder created by K1\_Create.py that contains Kls.csv.

Some thoughts:

* This scheme hinges of course on the fact that the Chestatee watershed is, for the most part, lithologicaly uniform. When translating this workflow to lithologicaly diverse watersheds, we will need to account for spatial variations in both land cover and lithology. This will require more than one K0 value, i.e. an array of K0 values.

K1.png

