MEMO: Using Python Codes for Heat Flow and Temperature-at-Depth Calculations
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Notes:
Temperature-at-Depth (TaD) – calculations for temperature at any desired depth.
Heat Flow – calculations for site heat flow, which then translates into a map of regional heat flow.
BEG – Bureau of Economic Geology, University of Texas, Austin

1) Temperature data –
    a. New BHT – "SMUNewETXBHT20km.xlsx", converted from a csv text file
        i. Hand entered temperature and depth (Bottom Logged Interval) values from DrillingInfo.com downloaded well log header files.
        ii. Correct the temperatures using the Harrison Correction
            1. Remove outliers
    b. SMU BHT – "SMUBHT20km.xlsx", converted from a csv text file
        i. SMU uploaded NGDS SMU Heat Flow Database from BHT Data, which includes a column for temperature-at-depth
    c. BEG BHT – "BEGBHTAOI.xlsx", converted from a csv text file
        i. BEG uploaded NGDS BEG at University of Texas Consolidated Well Database file
2) Constrain data to the 20 km radius
    a. Completed for previously collected BEG and SMU files
    b. New temperature data were only collected from within 10 km and an additional in 20 km as time permitted
3) Remove Duplicates
    a. Match APIs, Latitude and Longitude
    b. First order to keep SMU Heat Flow file temperature points
    c. Secord order to keep SMU New temperature header uncorrected
    d. Third order keep BEG uncorrected temperatures (use these as a corrected value)
4) Combine BEG and NEW temperature values to calculate both heat flow and TaD
    a. Combine the BEG and SMU New spreadsheets into one Excel file
    b. Set up the data into the required input file format for the python script
    c. Use the code thermalmodelstructure.py
5) Generate the Python code inputs columns
    a. The ArcGIS raster files (listed below) are generated ahead of time for use in the individual well site extractions
    b. Use ArcGIS *spatial analysis toolbar/ extract multi values 2 points* to build a dataset of values at each well site for the following parameters:
        i. Sediment thickness
        ii. Surface temperature
        iii. Pettet top depth
        iv. Travis Peak top depth

> > > v. Cotton Valley top depth
> > > vi. Bossier top depth
> 6) Calculate just TaD from existing SMU heat flow values
> > a. Use the thermalregime_wthheatflow.py