```
%  _    _                      _                          _____ _______ _____
% | |  | |                    | |                        / ____|__   __|  __ \
% | |__| | ___  _ __ ___   ___| |__  _ __ _____      __ | |       | |  | |  | |
% |  __  |/ _ \| '_ ` _ \ / _ \ '_ \| '__/ _ \ \ /\ / / | |       | |  | |  | |
% | |  | | (_) | | | | | |  __/ |_) | | |  __/\ V  V /  | |____   | |  | |__| |
% |_|  |_|\___/|_| |_| |_|\___|_.__/|_|  \___| \_/\_/    \_____|  |_|  |_____/
% (ASCII font Big from https://www.coolgenerator.com/ascii-text-generator

% Homebrew CTD Data Grapher / Visualizer
% Author: Sophie Scopazzi
% Author Website: sophiescopazzi.com
% Date: OCT 2022

% always
clear all
close all

%% INSTRUCTIONS - HOW TO USE THIS CODE
% There are comments throughout code as well
% If you want to contact me about this code, use my website

% 1. Put this script in same folder as datafile.txt
    % Check name of datafile is the same as in the script
% 2. Ensure sensors are in the correct order in the data from the Arduino
    % script, or none of it will make sense (EC, TDS, sal, etc) in order
% 3. Fine correct time values in this plot, record for next step
    % Want data from downward travel, upward water column is disturbed
% 4. Recomment step 3, put the values recorded into DEPLOY DATA PULLING
% 5. Plots or subplots as desired. Set xlims and ylims as necessary

%% 2. DATA INGEST AND CLEANING
% datafile from CTD, ensure name is correct, script in same folder as data
data = readtable('DATAFILE.TXT');

% ensure the data is labeled correctly, will depend on Arduino code
% get data from data table, BUT it has nans
    EC_nans       =   data(:,1);  %EC data
    TDS_nans      =   data(:,2);  %TDS
    sal_nans      =   data(:,3);  %salinity
    mbar_nans     =   data(:,4);  %mbar
    temp_nans     =   data(:,5);  %temp in C
    dmeter_nans   =   data(:,6);  %depth in meters

        % take nans out of above data
        EC_table      =   rmmissing(EC_nans);
        TDS_table     =   rmmissing(TDS_nans);
        sal_table     =   rmmissing(sal_nans);
        mbar_table    =   rmmissing(mbar_nans);
        temp_table    =   rmmissing(temp_nans);
        dmeter_table  =   rmmissing(dmeter_nans);

    % convert data from table to array for plotting / manipulation
    EC            =   table2array(EC_table);
    TDS           =   table2array(TDS_table);
```

```
55      sal             =   table2array(sal_table);
56      mbar            =   table2array(mbar_table);
57      temp            =   table2array(temp_table);
58      dmeter          =   table2array(dmeter_table);
59
60  % convert mbar to feet, incase you want to do that
61  % depth_feet = mbar.*0.033455256555148;
62
63  % convert meters to feet, in case you want to use the Mapping Toolbox
64  % deploy_feet = distdim(dmeter,'meters','feet'); %(needs Mapping Toolbox)
65  dfeet = dmeter.*3.28084; % I didn't want to use Mapping Toolbox
66
67  %% 3. TO FIND CORRECT START / STOP VALUES IN TIME
68      % FIND TIME VALUES IN THIS PLOT
69      % look in this plot to find where depth values start and stop
70      % this is what you will put in below, the (93:135), etc
71      % uncomment below --- 56-59
72      % n = length(mbar);
73      % time = 1:n;
74      % figure;
75      % plot(time,mbar);
76
77  %% 4. DEPLOY DATA PULLING
78      % take out only parts of the data for deployments
79      % this is the values found 'FIND DEPTH VALUE PLOT'
80      % if you have more or less than four, change it
81
82      % ONE
83      deploy1_EC      =   EC      (93:135,1);
84      deploy1_TDS     =   TDS     (93:135,1);
85      deploy1_feet    =   dfeet   (93:135,1);
86      deploy1_temp    =   temp    (93:135,1);
87      deploy1_sal     =   sal     (93:135,1);
88
89      % TWO
90      deploy2_EC      =   EC      (609:660,1);
91      deploy2_TDS     =   TDS     (609:660,1);
92      deploy2_feet    =   dfeet   (609:660,1);
93      deploy2_temp    =   temp    (609:660,1);
94      deploy2_sal     =   sal     (609:660,1);
95
96      % THREE
97      deploy3_EC      =   EC      (774:799,1);
98      deploy3_TDS     =   TDS     (774:799,1);
99      deploy3_feet    =   dfeet   (774:799,1);
100     deploy3_temp    =   temp    (774:799,1);
101     deploy3_sal     =   sal     (774:799,1);
102
103     % FOUR
104     deploy4_EC      =   EC      (832:979,1);
105     deploy4_TDS     =   TDS     (832:979,1);
106     deploy4_feet    =   dfeet   (832:979,1);
107     deploy4_temp    =   temp    (832:979,1);
108     deploy4_sal     =   sal     (832:979,1);
```

```
109
110 %% 5. GRAPHS
111 % however many you did, make that many subplot graphs
112 % or you can put them on their own plots (not subplot them)
113 % these are the same with the numbers changed, 1-4
114     figure;
115     subplot(2,2,1); % subplot since I want four graphs on one figure
116     plot(deploy1_temp,deploy1_feet,'red');
117     title('One');
118     hold
119     plot(deploy1_sal,deploy1_feet,'blue');
120     set(gca,'Ydir','reverse'); % to make zero the top of Y axis
121     ylim([0 40]);   % use the depth you deployed
122     xlim([14.5 19]) % use the range of your data
123     legend('temp','salinity')
124     ylabel('depth (ft)');
125     xlabel('°C | PSU (ppt)');
126
127         subplot(2,2,2);
128         plot(deploy2_temp,deploy2_feet,'red');
129         title('Two');
130         hold
131         plot(deploy2_sal,deploy2_feet,'blue');
132         set(gca,'Ydir','reverse');
133         ylim([0 40]);   % use the depth you deployed
134         xlim([14.5 19]) % use the range of your data
135         legend('temp','salinity')
136         ylabel('depth (ft)');
137         xlabel('°C | PSU (ppt)');
138
139     subplot(2,2,3);
140     plot(deploy3_temp,deploy3_feet,'red');
141     title('Three');
142     hold
143     plot(deploy3_sal,deploy3_feet,'blue');
144     set(gca,'Ydir','reverse');
145     ylim([0 40]);   % use the depth you deployed
146     xlim([14.5 19]) % use the range of your data
147     legend('temp','salinity')
148     ylabel('depth (ft)');
149     xlabel('°C | PSU (ppt)');
150
151         subplot(2,2,4);
152         plot(deploy4_temp,deploy4_feet,'red');
153         title('Four');
154         hold
155         plot(deploy4_sal,deploy4_feet,'blue');
156         set(gca,'Ydir','reverse');
157         ylim([0 40]);   % use the depth you deployed
158         xlim([14.5 19]) % use the range of your data
159         legend('temp','salinity')
160         ylabel('depth (ft)');
161         xlabel('°C | PSU (ppt)');
```