The goal of this product is to be able to readily access all moored thermistor chain and ADCP data, without having to download individual moorings and sift through different variable names, time zones, coordinate systems, etc. This allows for insight into larger-scale processes as well as easily being able to focus in on particular moorings.

For ease of use:

- Measurements are on same time vector
- Times are in UTC and “datenum” format
- Coordinate system is standardized (true north)
- Data are filtered into different frequency bands

The variables can be explored using the Matlab GUI

Editor – synthesized_product_demo.m

Variables – ADCP_60min

ADCP_60min

1x46 struct with 22 fields

Fields	ID	nBins	time_dnum	u	u_mean	u_ST	u_DU	u_SD	u_HF	v	v_mean	v_ST	v_DU
1	'OC25NB'	75	1x1465 double	75x1465 ...	75x1 dou...	75x1465 ...	75x1465 ...	75x1465 ...	75x1465 ...	75x1465 ...	75x1 dou...	75x1465 ...	75x1465 ...
2	'OC50'	85	1x1465 double	85x1465 ...	85x1 dou...	85x1465 ...	85x1465 ...	85x1465 ...	85x1465 ...	85x1465 ...	85x1 dou...	85x1465 ...	85x1465 ...
3	'PS30M'	22	1x1465 double	22x1465 ...	22x1 dou...	22x1465 ...	22x1465 ...	22x1465 ...	22x1465 ...	22x1465 ...	22x1 dou...	22x1465 ...	22x1465 ...
4	'PS30S'	25	1x1465 double	25x1465 ...	25x1 dou...	25x1465 ...	25x1465 ...	25x1465 ...	25x1465 ...	25x1465 ...	25x1 dou...	25x1465 ...	25x1465 ...
5	'PS40M'	17	1x1465 double	17x1465 ...	17x1 dou...	17x1465 ...	17x1465 ...	17x1465 ...	17x1465 ...	17x1465 ...	17x1 dou...	17x1465 ...	17x1465 ...
6	'PS40N'	17	1x1465 double	17x1465 ...	17x1 dou...	17x1465 ...	17x1465 ...	17x1465 ...	17x1465 ...	17x1465 ...	17x1 dou...	17x1465 ...	17x1465 ...
7	'PS40S'	17	1x1465 double	17x1465 ...	17x1 dou...	17x1465 ...	17x1465 ...	17x1465 ...	17x1465 ...	17x1465 ...	17x1 dou...	17x1465 ...	17x1465 ...
8	'PS50'	22	1x1465 double	22x1465 ...	22x1 dou...	22x1465 ...	22x1465 ...	22x1465 ...	22x1465 ...	22x1465 ...	22x1 dou...	22x1465 ...	22x1465 ...
9	'VB30N'	25	1x1465 double	25x1465 ...	25x1 dou...	25x1465 ...	25x1465 ...	25x1465 ...	25x1465 ...	25x1465 ...	25x1 dou...	25x1465 ...	25x1465 ...
10	'VB50N'	21	1x1465 double	21x1465 ...	21x1 dou...	21x1465 ...	21x1465 ...	21x1465 ...	21x1465 ...	21x1465 ...	21x1 dou...	21x1465 ...	21x1465 ...
11	'VB50S'	21	1x1465 double	21x1465 ...	21x1 dou...	21x1465 ...	21x1465 ...	21x1465 ...	21x1465 ...	21x1465 ...	21x1 dou...	21x1465 ...	21x1465 ...
12	'STR1'	20	1x1465 double	20x1465 ...	20x1 dou...	20x1465 ...	20x1465 ...	20x1465 ...	20x1465 ...	20x1465 ...	20x1 dou...	20x1465 ...	20x1465 ...
13	'STR2'	20	1x1465 double	20x1465 ...	20x1 dou...	20x1465 ...	20x1465 ...	20x1465 ...	20x1465 ...	20x1465 ...	20x1 dou...	20x1465 ...	20x1465 ...

Editor – synthesized_product_demo.m

Variables – Tchain_60min

Tchain_60min

1x93 struct with 19 fields

Fields	ID	numT	numP	time_dnum	T	T_mean	T_ST	T_DU	T_SD	T_HF	P	zbedT	zbedP
1	'OC25NB'	8	8	1x1465 double	8x1465 d...	[14.7748;...	8x1465 d...	8x1465 d...	8x1465 d...	8x1465 d...	8x1465 d...	[21.3661,...	[21.3661,...
2	'PS30M'	8	8	1x1465 double	8x1465 d...	[14.7109;...	8x1465 d...	8x1465 d...	8x1465 d...	8x1465 d...	8x1465 d...	[23.7468,...	[23.7468,...
3	'PS30N'	9	9	1x1465 double	9x1465 d...	[14.8821;...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	[27.3582,...	[27.3582,...
4	'PS30S'	9	9	1x1465 double	9x1465 d...	[14.6596;...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	[26.1579,...	[26.1579,...
5	'PS35M'	9	9	1x1465 double	9x1465 d...	[14.5804;...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	[25.0992,...	[25.0992,...
6	'PS40M'	9	9	1x1465 double	9x1465 d...	[14.6975;...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	[35.7180,...	[35.7180,...
7	'PS40N'	9	9	1x1465 double	9x1465 d...	[14.7141;...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	[36.4706,...	[36.4706,...
8	'PS40S'	9	9	1x1465 double	9x1465 d...	[14.7719;...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	[36.8993,...	[36.8993,...
9	'PS50'	9	9	1x1465 double	9x1465 d...	[14.7708;...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	[46.5162,...	[46.5162,...
10	'VB30N'	8	8	1x1465 double	8x1465 d...	[14.6410;...	8x1465 d...	8x1465 d...	8x1465 d...	8x1465 d...	8x1465 d...	[25.9065,...	[25.9065,...
11	'VB50N'	9	9	1x1465 double	9x1465 d...	[14.9052;...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	9x1465 d...	[45.5438,...	[45.5438,...
12	'STR1_B'	8	0	1x1465 double	8x1465 d...	[16.4651;...	8x1465 d...	8x1465 d...	8x1465 d...	8x1465 d...	[]	[9,8.4500...	[]
13	'STR1_C'	6	0	1x1465 double	6x1465 d...	[16.4880;...	6x1465 d...	6x1465 d...	6x1465 d...	6x1465 d...	[]	[7,6.4500...	[]

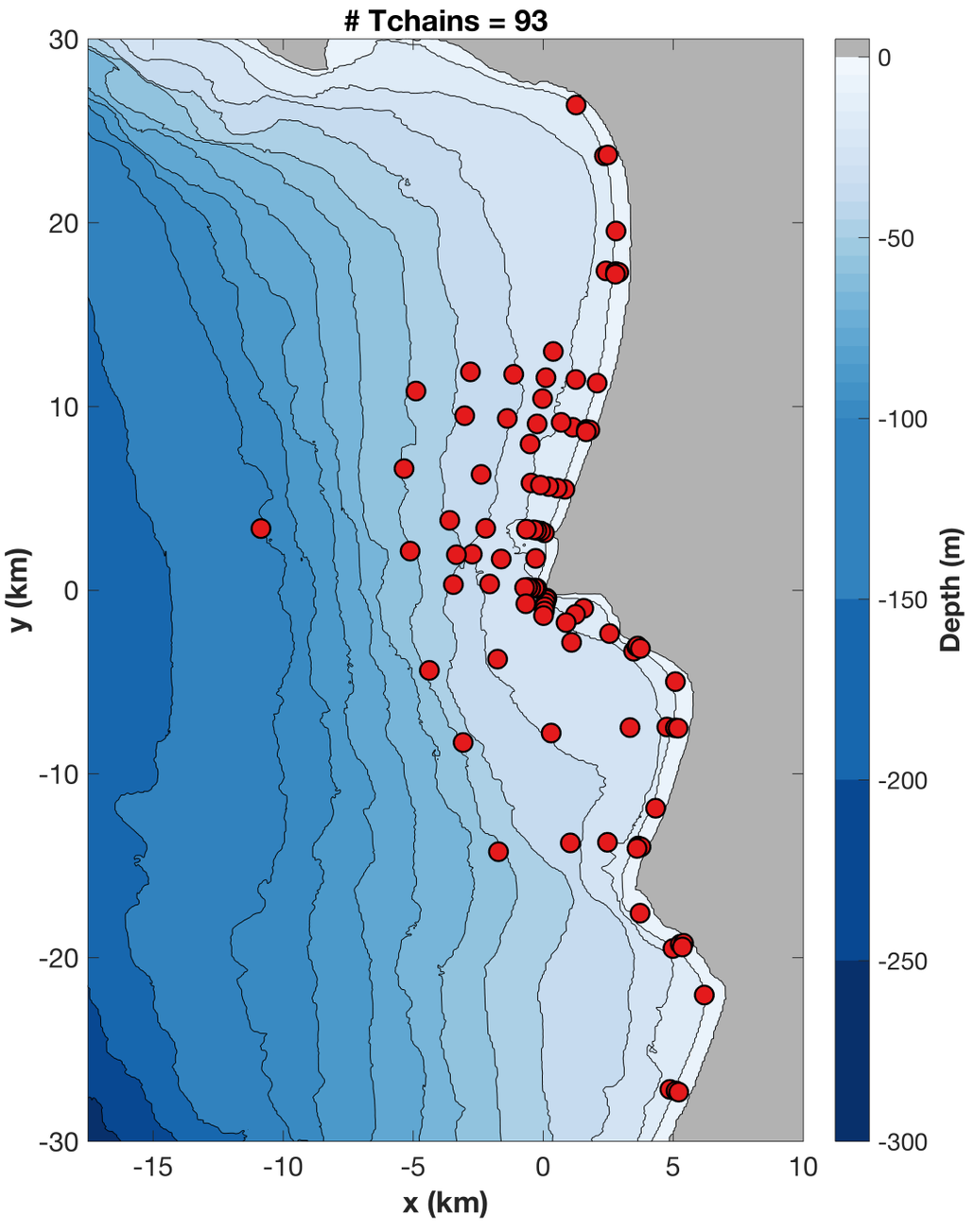
Also easy to use with just command line:

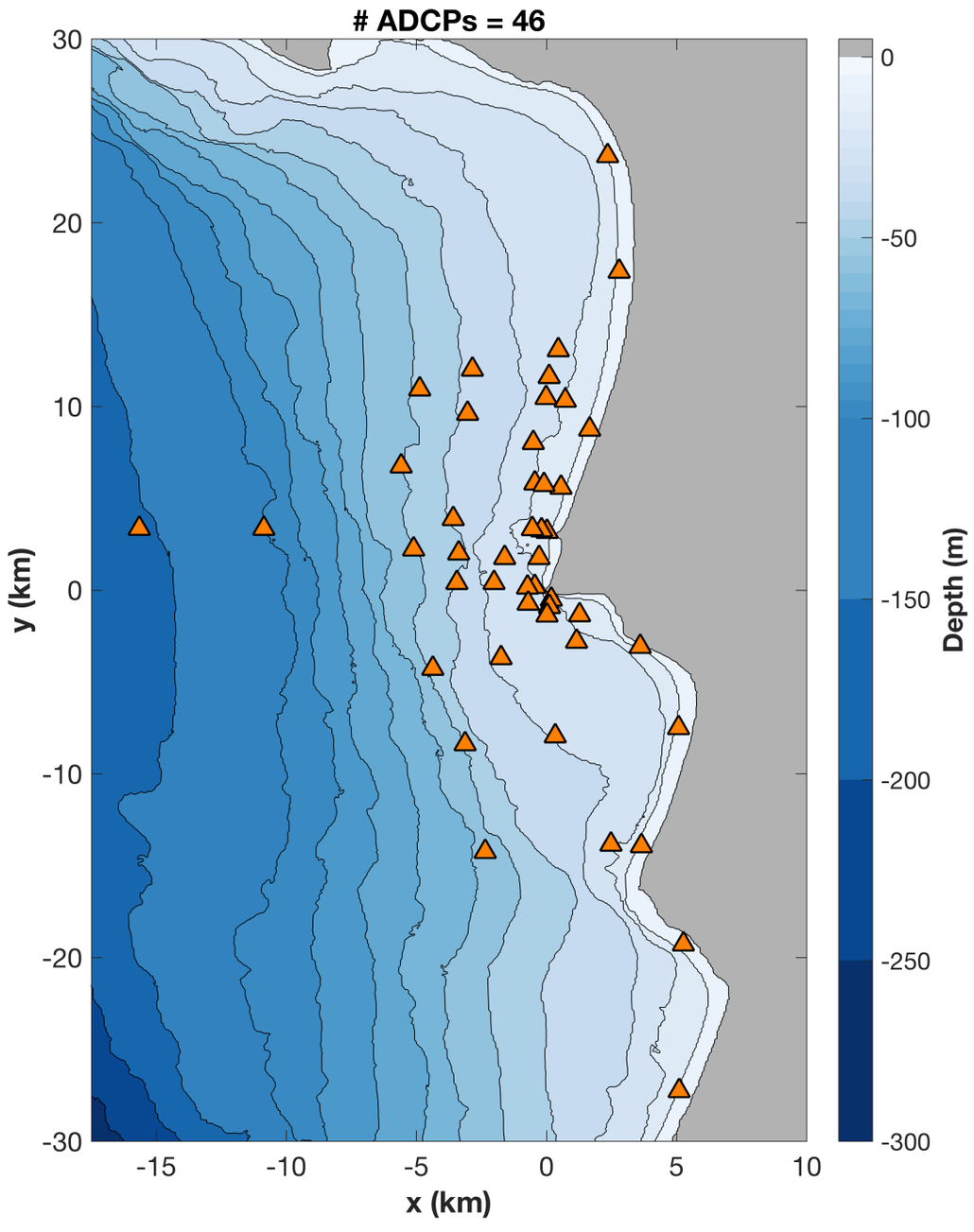
```
>> indA = find(strcmp({ADCP_60min.ID},'OC25M'))

indA =

    30

>> ADCP_60min(indA)

ans =

  struct with fields:

           ID: 'OC25M'
        nBins: 54
    time_dnum: [1×1465 double]
            u: [54×1465 double]
       u_mean: [54×1 double]
         u_ST: [54×1465 double]
         u_DU: [54×1465 double]
         u_SD: [54×1465 double]
         u_HF: [54×1465 double]
            v: [54×1465 double]
       v_mean: [54×1 double]
         v_ST: [54×1465 double]
         v_DU: [54×1465 double]
         v_SD: [54×1465 double]
         v_HF: [54×1465 double]
         zbed: [54×1 double]
        depth: 25
          lat: 34.9974
          lon: -120.6695
            x: -12.3558
            y: 1.0472e+04
        notes: 'SIO group: for questions contact André Palóczy, apaloczy@ucsd.edu.'
```

Also easy to use with just command line:

```
>> indT = find(strcmp({Tchain_60min.ID},'PS50'))

indT =

     9

>> Tchain_60min(indT)

ans =

  struct with fields:

          ID: 'PS50'
        numT: 9
        numP: 9
  time_dnum: [1×1465 double]
           T: [9×1465 double]
      T_mean: [9×1 double]
        T_ST: [9×1465 double]
        T_DU: [9×1465 double]
        T_SD: [9×1465 double]
        T_HF: [9×1465 double]
           P: [9×1465 double]
      zbedT: [46.5162 44.5162 41.5162 37.5162 30.5162 23.0667 16.0667 9.0667 4.7729]
      zbedP: [46.5162 44.5162 41.5162 37.5162 30.5162 23.0667 16.0667 9.0667 4.7729]
      depth: 50
        lat: 34.9231
        lon: -120.7275
          x: -5.1166e+03
          y: 2.1138e+03
      notes: 'NPS group: for questions contact John Colosi, jacolosi@nps.edu↵↵zbed is depth minus mean pressure.'
```

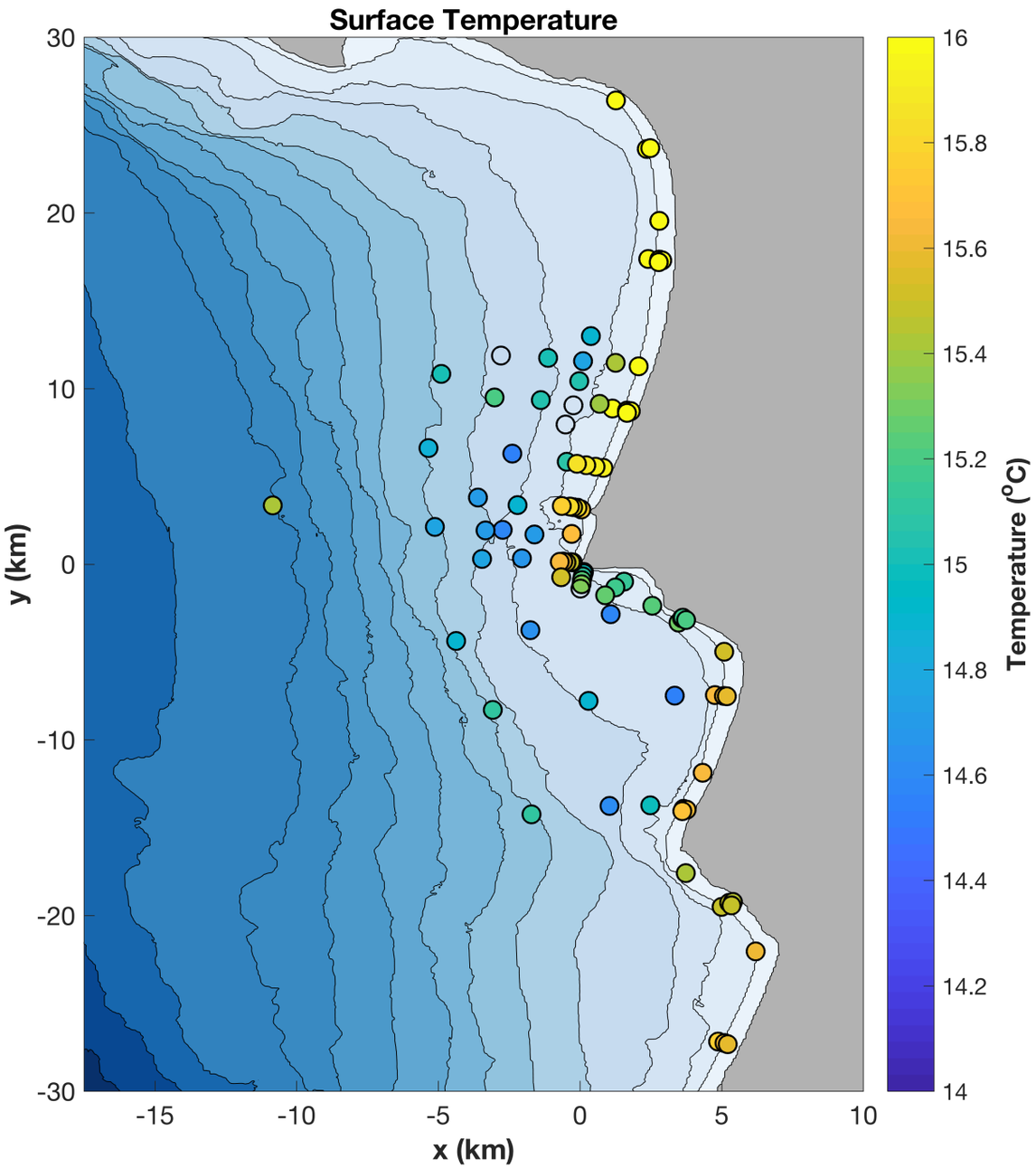
Locations of all moorings and ADCPs

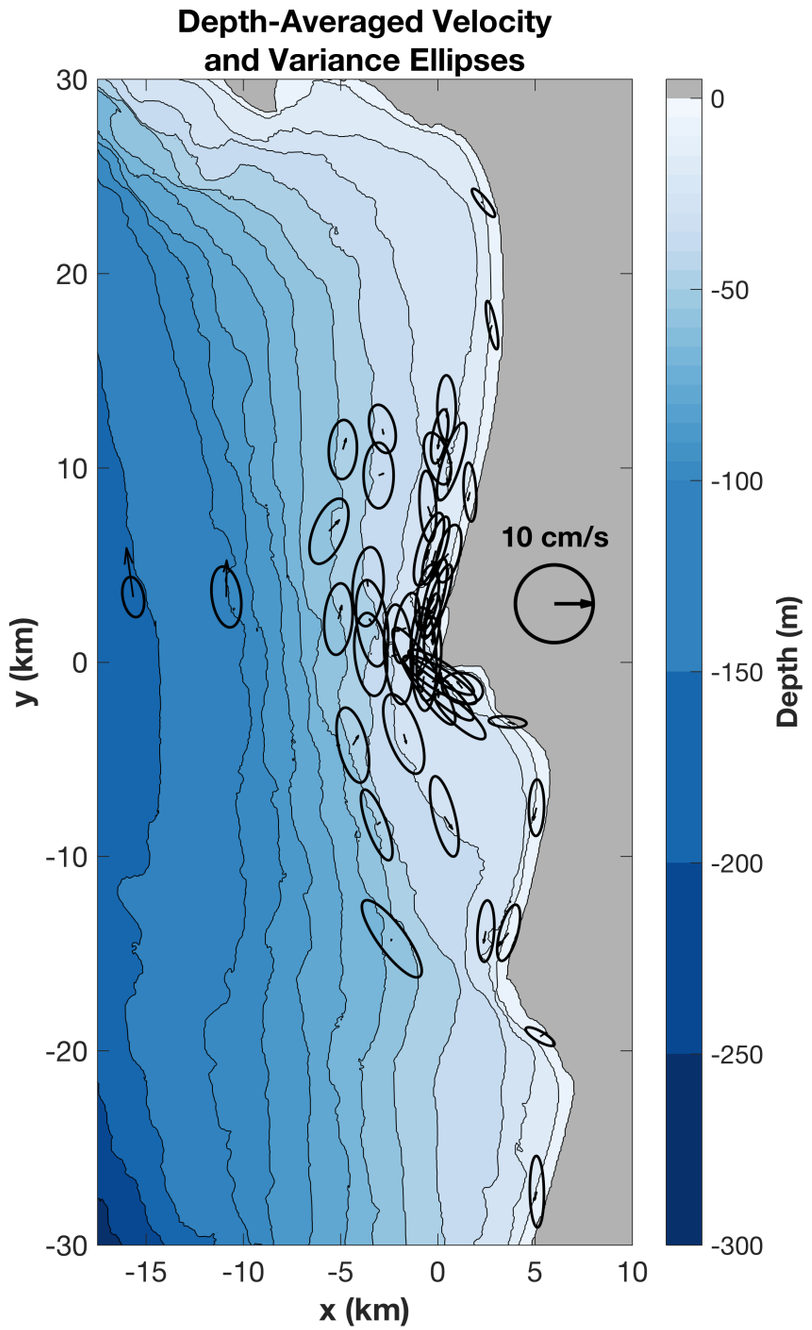





```
>> scatter([Tchain_60min.x],[Tchain_60min.y])
>> scatter([ADCP_60min.x],[ADCP_60min.y])
```

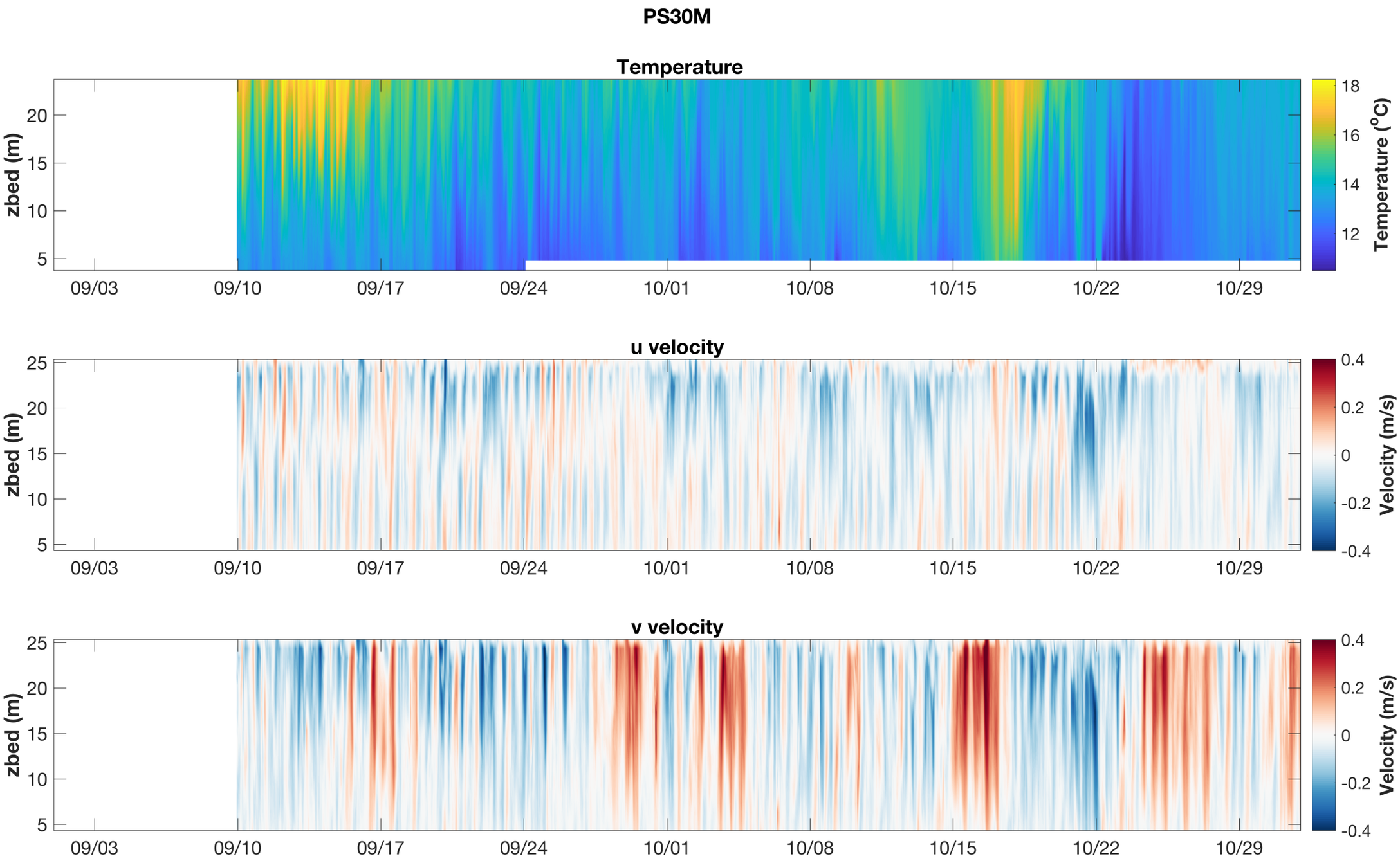
Easy to look at experiment long averages and statistics





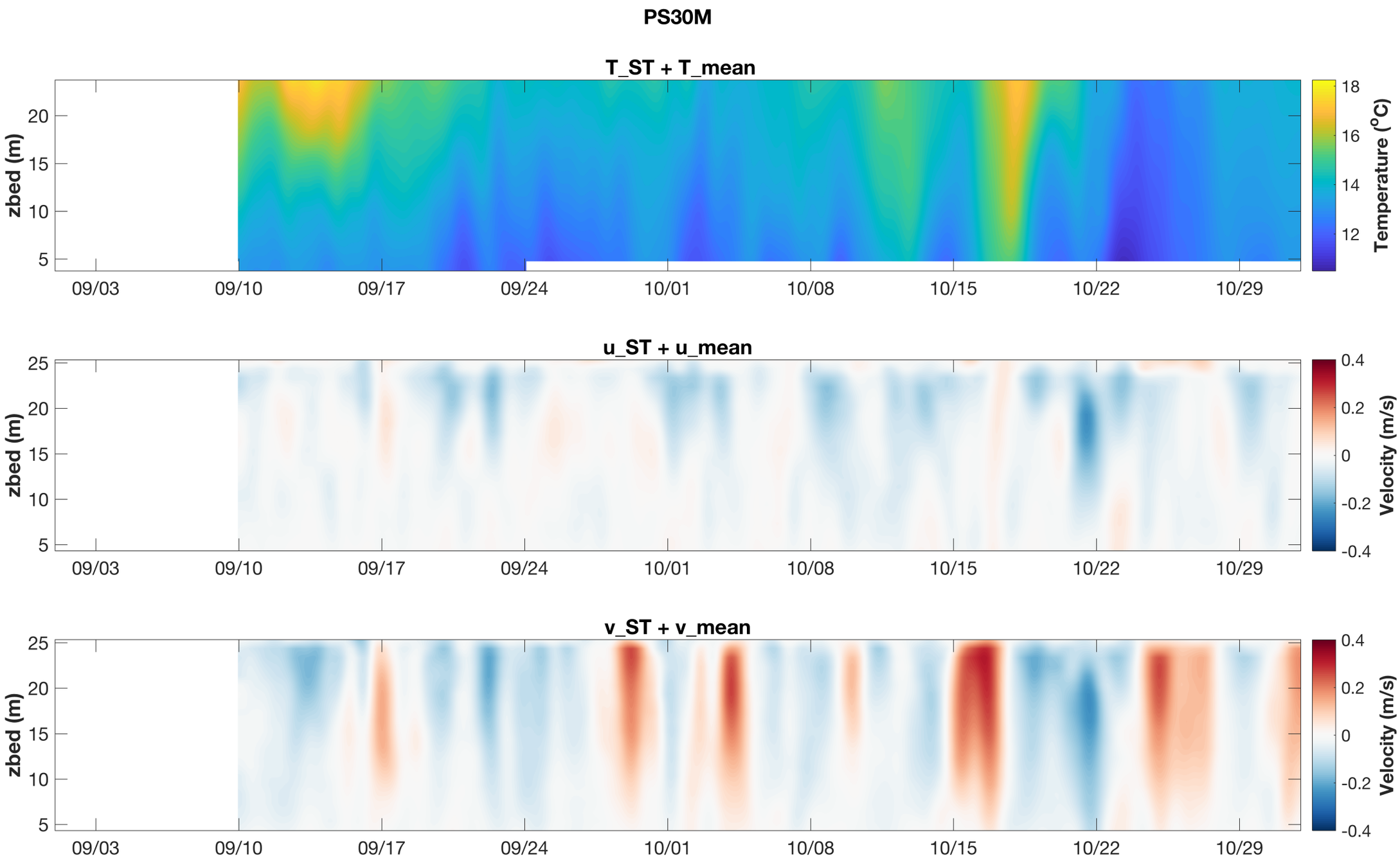

```
>> for ii = 1:length(Tchain_60min)
       scatter(Tchain_60min(ii).x, ...
               Tchain_60min(ii).y, ...
               nanmean(Tchain_60min(ii).T(1,:)))
   end
```

Each variable is given on the same time vector (either 10- or 60-minute)




```
>> indT = find(strcmp({Tchain_60min.ID},'PS30M'));
>> pcolor(Tchain_60min(indT).time_dnum, ...
Tchain_60min(indT).zbedT,Tchain_60min(indT).T)
```

Variables are also filtered into different frequency bands (e.g. subtidal shown here)




```
>> indA = find(strcmp({ADCP_60min.ID},'PS30M'));
>> pcolor(ADCP_60min(indA).time_dnum, ...
ADCP_60min(indA).zbed, ...
ADCP_60min(indA).u_ST+ADCP_60min(indA).u_mean)
```

In addition to unfiltered, the data are de-meaned and filtered into four frequency bands using the PL64 filter described in Rosenfeld, 1983 WHOI technical report 85-35, pg.21.

The filtering breakdown is defined as follows:

```
T = T_mean(z) + T_ST(z,t) + T_DU(z,t) + T_SD(z,t) + T_HF(z,t)
u = u_mean(z) + u_ST(z,t) + u_DU(z,t) + u_SD(z,t) + u_HF(z,t)
v = v_mean(z) + v_ST(z,t) + v_DU(z,t) + v_SD(z,t) + v_HF(z,t)
```

where:

```
      Subtidal (ST) = T > 33 hr
       Diurnal (DU) = 16 hr < T < 33 hr
  Semi-diurnal (SD) = 10 hr < T < 16 hr
High-Frequency (HF) = T < 10 hr
```