

The file allprofs.mat is a collection of useful data from every EM-APEX float involved in a particular experiment. EM-APEX floats measure Conductivity, Pressure, Temperature, and velocity. A list of the variables found in the file follows.

The variables are sorted into four categories by dimension.

CTD measurement spacing = N

EFP measurement spacing = M

CTD midpoint spacing = P

Number of profiles = Q

### 1 x Q Variables

*apf9\_terr*

Measure of system clock drift. Calculated when gps is good and number of satellites is greater than three.

*argo\_mode*

Switch determining if the profile is in argo mode. 0 for EM profiles and 1 for argo mode. Argo mode is CTD only and only on the up profile.

*botdep*

An estimate of bottom depth interpolated from bathymetry data.

*depl*

Number of times the float has been deployed including current deployment.

*flid*

Float serial number.

*got\_gps*

Switch indicating surface gps fix. 1 indicates gps good 0 indicates gps not good.

*gps.dist*

Distance of surface drift. Determined from first gps fix to last gps fix.

*hpid*

Profile id number, increments on each ascent and descent.

*ind*

A count of the total number of profiles for the experiment.

*lat\_down*

Descent position based on extrapolation from surface gps fixes.

*lat\_gps*

First good gps reading at the surface.

*lat\_up*

Ascent position based on extrapolation from surface gps fixes.

*lon\_down*

Descent position based on extrapolation from surface gps fixes.

*lon\_gps*

First good gps reading at the surface.

*lon\_up*

Ascent position based on extrapolation from surface gps fixes.

*magvar*

The declination of the Earth's magnetic field at the latitude, longitude, and time of the profile.

*maxp*

Maximum pressure recorded from CTD record of the profile.

*ssid*

Sub-surface profile id number. increments each time the float descends and returns to the surface.

*surfaced*

Switch set to 1 if the float pressure is less than threshold (small), 0 if not.

*u\_gps*

Mean subsurface zonal velocity determined from gps positions.

*u\_sfc*

Estimated surface velocity found from a linear fit of surface positions.

*ubs*

U bar star. The mean zonal current offset

*utc\_dep*

Time in Matlab datenum format of deployment.

*utc\_down*

Time of descent based on extrapolation from surface gps fixes.

*utc\_gps*

time of first good gps fix

*utc\_rec*

Time of recovery in Matlab datenum format. Not applicable in DIMES mission.

*utc\_up*

Time of ascent based on extrapolation from surface gps fixes.

*v\_gps*

Mean subsurface meridional velocity determined from gps positions.

*v\_sfc*

Estimated surface velocity found from a linear fit of surface positions.

*vbs*

V bar star. The mean meridional current offset.

*vbsid*

V bar star id number. Increments each time conditions permit calculation of vbs (same conditions as ssid).

## **M x Q Variables**

*E1sdev*

Error in channel 1

*E2sdev*

Error in channel 2

*Pe<sub>f</sub>*

Pressure from CTD data linearly interpolated onto EFP grid spacing.

*U*

Zonal water velocity relative to the float in map coordinates.

*U1*

Channel 1 zonal water velocity relative to the float in magnetic field coordinates  
*U2*  
Channel 2 zonal water velocity relative to the float in magnetic field coordinates  
*UTCef*  
Time in Matlab datenum format sampled with EM current measurements.  
*V*  
Meridional water velocity relative to the float in earth coordinates.  
*V1*  
Channel 1 meridional water velocity relative to the float in magnetic field coordinates  
*V1woW*  
Channel 1 velocity without removal of signal from vertical velocity.  
*V2*  
Channel 2 meridional water velocity relative to the float in magnetic field coordinates  
*V2woW*  
Channel 2 velocity without removal of signal from vertical velocity.  
*Wf*  
Estimate of vertical velocity of the float using the buoyancy of the float and form drag from hull and vanes.  
*Wp*  
Estimate of vertical velocity of the float using  $dP/dt$  from CTD data and interpolated into EFP grid spacing.  
*Wr*  
Estimate of vertical velocity of the float from the rate of rotation of the float.  
*ppos*  
Position of the internal buoyancy piston.

#### **N x Q Variables**

*P*  
Pressure in dbar from CTD.  
*S*  
Salinity in PSU from CTD.  
*T*  
Temperature in C from CTD.  
*UTC*  
Time from onboard system clock sampled with CTD data.

#### **P x Q Variables**

*P\_ca*  
Pressure at CTD midpoint spacing.  
*Wp\_ca*  
 $dP/dt$  at CTD midpoint spacing.  
*mlt\_ca*

Time in Matlab datenum format at CTD midpoint spacing.

*ppos\_ca*

Internal buoyancy piston position at CTD midpoint spacing.

**One variable does not fit into these categories**

*ar*

Geographic limits of float paths in [xmin xmax ymin ymax] format.