Documentation for merged CLIMODE ASIS subsurface data
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Summary: Time series of temperature, salinity, density, and velocity on a common, five-minute time base are provided for subsurface data recorded on the ASIS during the 2006 drift. Velocities have not been drift-corrected.

File contents: asis_merged.mat

CLIMODE ASIS 2006 Subsurface Data

Structure	Variable	Description	Units	Source	Raw Rate
	year	deployment year			
	yday	decimal day	noon on 1 Jan = day 1.5		
meta	(various)	metadata			
mcat	temp	temperature	deg C	MicroCATs	1 min
	sal	salinity	psu	MicroCATs	1 min
	dens	density	kg/m^3	MicroCATs	1 min
	pden	potential density (z=0)	kg/m^3	MicroCATs	1 min
	depth	depth bins for microCATs	meters		
aqd	east	east velocity	cm/s	AquaDopp	1 sec
	north	north velocity	cm/s	AquaDopp	1 sec
	vert	vertical (error) velocity	cm/s	AquaDopp	1 sec
	amp	mean intensity (3 beams)	counts	AquaDopp	1 sec
	press	pressure	meters	AquaDopp	1 sec
	pitch	pitch	deg	AquaDopp	1 sec
	roll	roll	deg	AquaDopp	1 sec
	hd	heading	deg	AquaDopp	1 sec
	depth	depth bins for aquadopp	meters	AquaDopp	1 sec
wh	east	east velocity	cm/s	WorkHorse	5 min
	north	north velocity	cm/s	WorkHorse	5 min
	vert	vertical velocity	cm/s	WorkHorse	5 min
	err	error velocity	cm/s	WorkHorse	5 min
	amp	mean intensity (4 beams)	counts	WorkHorse	5 min
	pitch	pitch	deg	WorkHorse	5 min
	roll	roll	deg	WorkHorse	5 min
	hd	heading	deg	WorkHorse	5 min
	depth	depth bins for WorkHorse	meters	WorkHorse	5 min

Processing Notes:

Start/End dates: Desire was to start and end on a 5 min interval to correspond to sampling times of the Aquapro and WorkHorse. MicroCAT conductivities clearly show the time that the sensors came in and out of the water, but velocity and tilt data from current meters indicate that good data start later and end earlier than the MicroCAT records. Conservative start and end were determined to be:

Start: 20 Jan 2006, 20:00:00 UTC, yday = 20.833333
End: 29 Jan 2006, 11:15:00 UTC, yday = 29.468750

Averaging and interpolation: The WorkHorse provides the "master" time base, data are unchanged from the 5 min raw data recorded internally. Aquapro data recorded at 1 sec intervals and MicroCAT data recorded at 1 min intervals are averaged to 5 min and interpolated to the master time base.

Drift: It would be desirable to include the time-varying ASIS GPS position in the data stream, but this has not yet been done. All velocities are relative to the ASIS. The approximate mean position (based on Argos fixes) was 37.92 N, 65.26 W.

Temperature: The temperatures recorded by the current meters were not of sufficient accuracy to warrant including them in the merged data set.

Conductivity: The uppermost MicroCAT (1.8 m nominal depth) showed occasional conductivity drop-outs, presumably due to air bubbles. These points were identified with a first-difference threshold and eliminated.

Velocities: Speeds have been corrected for sound speed variations and directions have been adjusted to account for a magnetic variation of –16.3 degrees at the nominal drift position. As noted above, all velocities are relative to the spar.

Heading: Heading has been averaged and interpolated as a scalar quantity. Heading records are retained in the 5 min merged file for diagnostic purposes only.

Depths: Nominal instrument depths are based on measurements relative to an assumed mean water line of –1.4 m from the ASIS deck. Pressure records from the Norteks indicate that the nominal depths are likely accurate to about 0.2 m.

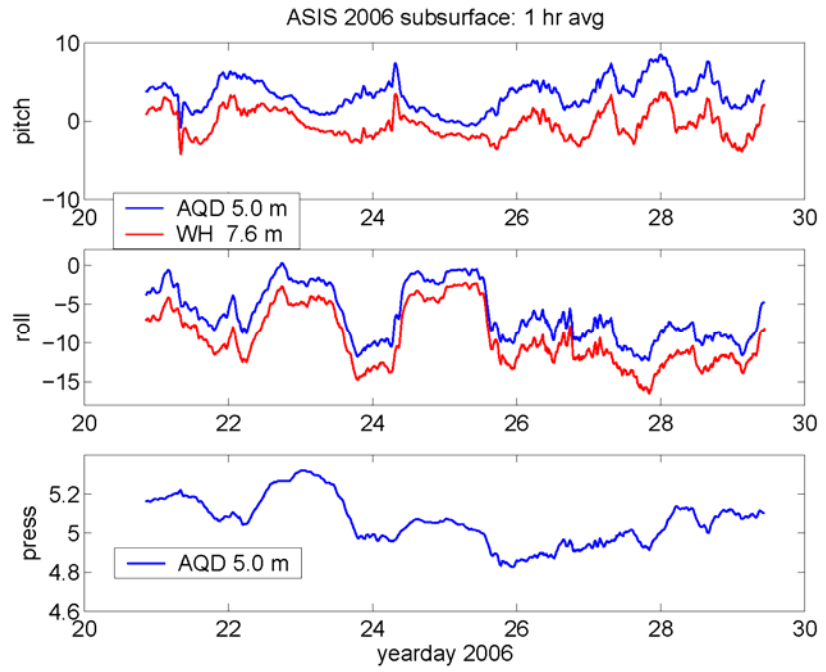

Figure 1. Low-frequency ASIS platform motion as measured by pitch and roll from the Aquadopp (AQD, 5.0 m depth) and WorkHorse (WH, 7.6 m depth) and pressure from the Aquadopp. Mean values may not agree, and may not represent mean ASIS orientation due to mounting offsets.

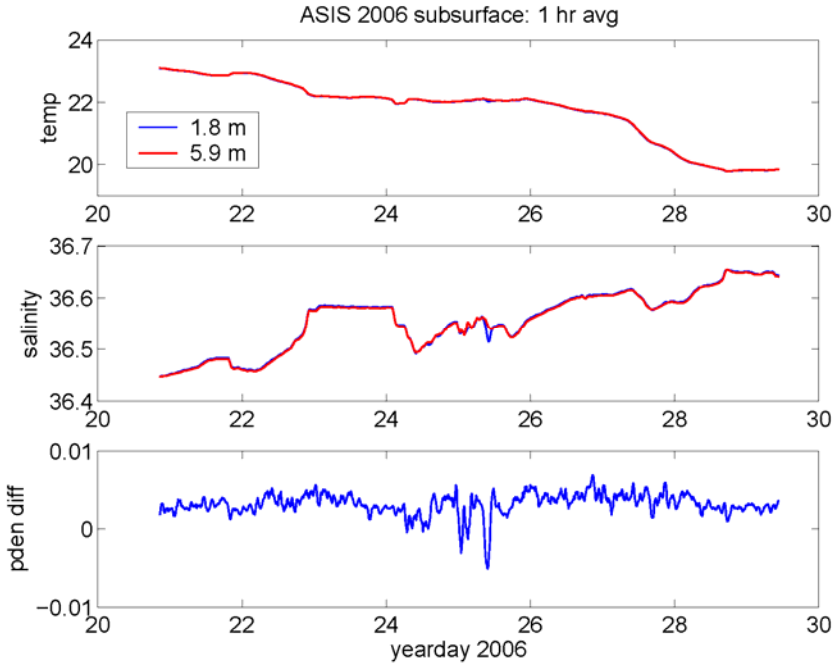

Figure 2. Temperature and salinity at the ASIS as measured by MicroCATs at 1.8 and 5.9 m depth. Mean T, S differences between 1.8 and 5.9 m are very small, 0.009 deg C and 0.0012 PSU, respectively. Mean potential density difference between 1.8 and 5.9 m (lower panel) is 0.0032 kg/m^3, not significantly different from zero given expected sensor accuracy.

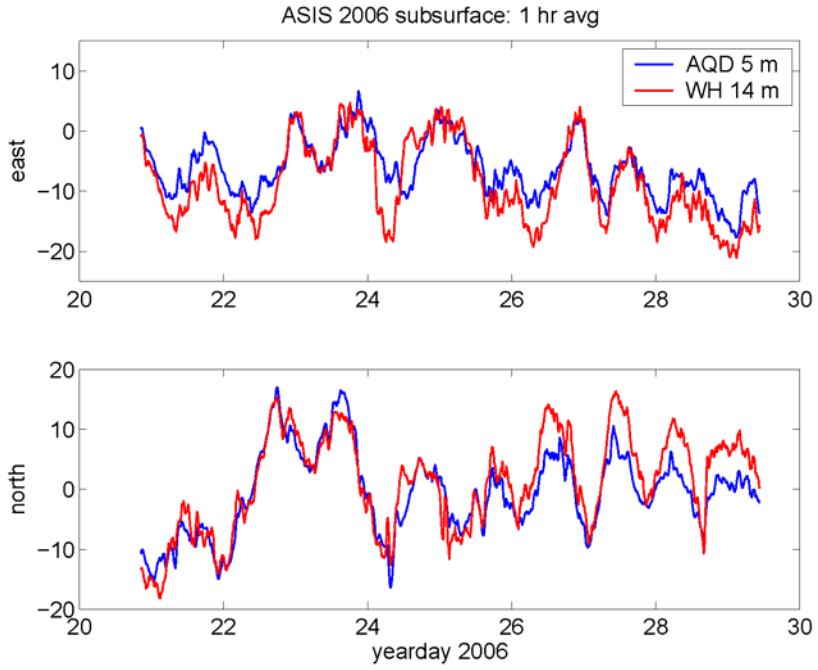

Figure 3. Currents at the ASIS as measured by the Aquadopp (AQD, 1.8 m depth) and the first bin of the WorkHorse (WH, ~14 m depth). Velocity is relative to the ASIS, with a mean flow to of about 10 cm/s to the west and a north/south mean near zero. Variability appears to be dominated by oscillations near the local inertial period of about 19.5 hr.

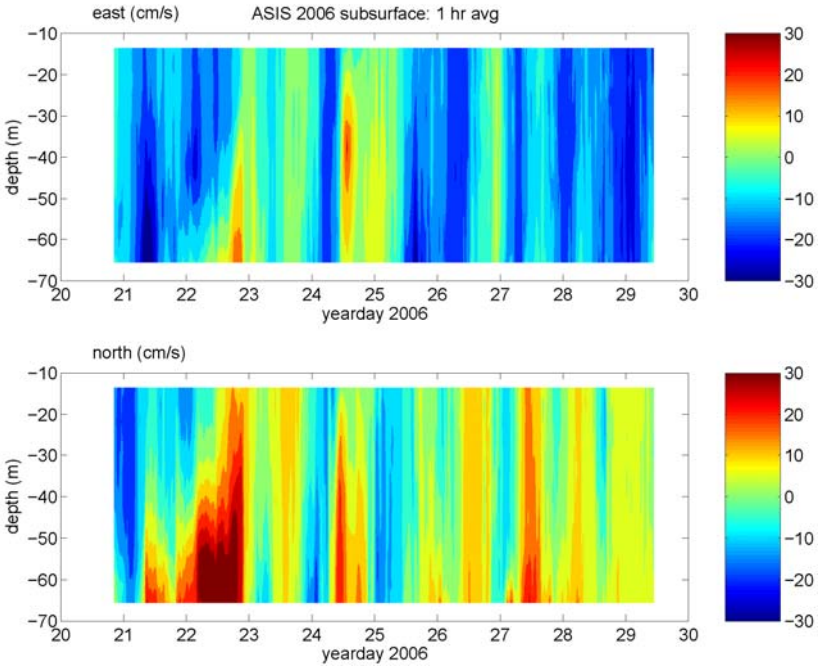

Figure 4. Currents below the ASIS as measured by the WorkHorse (from ~14 to 66 m depth in 4 m bins). Velocity is relative to the ASIS. Shears are generally weak except below 30 m on days 21-22 and at 20-50 m on day 24.