SEACOOS Data Dictionary - Version 2.0	**Notes**						
Nov 19, 2008 -- UNC	additional water quality terms						
April 13, 2010 -- UNC	additional adcp terms						
	add quality control terms and tests						
	add HFRADAR terms						

Term	**Definition**	**Short Name**	**Long Name**	**data class**	**units**	**axis**	**valid range**
latitude	Y-coordinate of dependent observation in geographic coordinate. North is positive.	lat	latitude	coordinate	degrees_north	Y	-90.,90.
longitude	X-coordinate of dependent observation in geographic coordinate. East is positive.	lon	longitude	coordinate	degrees_east	X	-180.,180
z	Z-coordinate of observation. Zero (z=0) is defined by reference. Up is positive.	z	vertical coordinate	coordinate	meter	Z	
depth	Z-coordinate of observation in vertical distance below reference. Down is positive. (sea surface | geiod | ellipsoid | MSL | MLLW | AGL)	depth	measurement depth	coordinate	meter	Z	
height	Z-coordinate of observation in vertical distance above reference. Up is positive. (sea surface | geiod | ellipsoid | MSL | MLLW | AGL)	height	height above reference	coordinate	meter	Z	
altitude	Z-coordinate of observation in vertical distance above reference. Up is positive. (sea surface | geiod | ellipsoid | MSL | MLLW | AGL)	altitude	altitude above reference	coordinate	meter	Z	
skin	Upper millimeter to centimeter of a surface.	skin	skin	coordinate	meter	Z	-0.01, 0.01
surface	Upper 1-2 meters of an interface between two layers, commonly the sea surface.	surface	surface	coordinate			
bottom	Bottom of a layer, commonly ocean bottom.	bottom	bottom	coordinate			
time	Time coordinate of observation based on number of seconds since the defined reference time. (UDUNITS {sec | hr | day} since YYYY-MM-DD HH:MM:SS.xxx {+/- ZONE})	time	Time	time	sec since 1970-1-1 00:00:00	T	
sample_interval	Time period between observations.	sample_interval	sampling time interval	sensor	seconds	T	
averaging_interval	Time periood over which several observations are averaged.	average_interval	averaging time interval	sensor	seconds	T	
wind_speed	Magnitude of wind velocity.	wspd	true wind speed	met	m s-1	T,Z	0.,150.
wind_from_direction	Direction from which wind is blowing. Meteorological Convention.	wdir	true wind direction meteorological convention	met	degrees_true	T,Z	0.,360.
wind_to_direction	Direction toward which wind is blowing. Oceanographic convention.	wdir	true wind direction oceanographic convention	met	degrees_true	T,Z	0.,360.
wind_gust	Maximum instantaneous wind speed (usually no more than but not limited to 10 seconds) within a sample averaging interval.	wgust	wind gusts	met	m s-1	T,Z	0., 250.

eastward_wind	East/West component of wind vector. Eastward wind is positive.	east_wind	east/west component of wind	met	m s-1	T,Z	-150., 150.
northward_wind	North/South component of wind vector. Northward wind is positive.	north_wind	north/south component of wind	met	m s-1	T,Z	-150., 150.
upward_wind	Up/Down component of wind vector. Up is positive.	z_wind	upward velocity of air	met	m s-1	T,Z	-150., 150.
wind_stress	Magnitude of wind stress. Wind stress is the force of wind imposed on a unit area.	tau	surface wind stress	met	N m-2		
wind_stress_to_direction	Direction toward which wind stress is acting.	tau_dir	surface wind stress to direction	met	degrees_true		
eastward_wind_stress	East/West component of wind stress. Eastward is positive.	tau_x	eastward surface wind stress	met	N m-2		
northward_wind_stress	North/South component of wind stress. Northward is positive.	tau_y	northward surface wind stress	met	N m-2		
air_temperature	Temperature of air, in situ.	air_temp	air temperature	met	celsius	T,Z	-10.,40.
dew_point_temperature	Temperature at which air begins to condense.	dew_point	dew point temperature	met	celsius	T	-10.,40.
wet_bulb_temperature	Temperature of evaporative cooling.	wet_bulb_temp	wet bulb temperature	met	celsius	T	-10.,40.
relative_humidity	Amount of moisture in the air as vapor relative to how much it can possibly hold at the same temperature.	rel_humid	relative humidity	met	precent	T	0.,105.
mixing_ratio	The ratio of mass of water vapor to the mass of dry air in the sample.	mix	mixing ratio	met	g kg-1	T	
air_pressure	Pressure exerted by overlying air	air_press	atmospheric pressure	met	hPa	T	822.,1040.
air_density	Mass of air per unit volume.	air density	air density	met	kg m-3	T	
precipitation_accumlated_daily	Amount of wet equivalent precipitation accumulated for a 24 hour period.	precip_accum	accumulated precipitation	met	mm	T	
precipitation_rate	Amount of wet equivalent precipitation per unit time.	precip_rate	instantaneous precipitation rate	met	mm hr-1	T	
cloud_cover	Percent of sky covered by clouds of all types.	cloud cover	percent cloud coverage	met	percent	T	0., 100.
latent_heat_flux	Evaporative exchange of heat from the atmosphere to the ocean. Positive is downward.	Q_latent	latent heat flux	air-sea	W m-2	T	-600., 20.
sensible_heat_flux	Conductive or convective exchange of heat from the atmosphere to the ocean. Positive is downward.	Q_sensible	sensible heat flux	air-sea	W m-2	T	-200., 20.
net_heat_flux	Combined net shortwave, net longwave, sensible and latent heat fluxes. Positive is downward.	Q_net	net heat flux	air-sea	W m-2	T	-1000., 600.
sound_velocity	Magnitude of velocity of sound in water.	sound_velocity	sound velocity	physical	m s-1	T,Z	
northward_current	North/South component of ocean current. Northward is positive.	water_v	N/S component of current	physical	cm s-1	T,Z	-300., 300.
eastward_current	East/West component of ocean current. Eastward is positive.	water_u	east/west component of current	physical	cm s-1	T,Z	-300.,300.
vertical_current	Upward/Downward component of ocean current. Upward is positive.	water_w	vertical velocity of water parcel	physical	cm s-1	T,Z	
current_speed	Magnitude of velocity of ocean current.	c_spd	speed of current	physical	cm s-1	T,Z	0.,300.
current_to_direction	Direction towards which ocean current is going.	c_dir	direction of current relative to true north	physical	degrees_true	T,Z	0.,360.

water_temperature	In situ temperature of the ocean.	wtemp	water temperature	physical	celsius	T,Z	10., 35.
conductivity	Ability of a material to pass an electrical current. Inverse of resistance.	cond	conductivity	physical	siemens | uS	T,Z	
specific_conductance	Ability of a specific volume (1 cubic centimeter) of water to pass an electrical current.	sp_cond	specific conductance	physical	uS cm-1		
salinity	Measure of salt content of a seawater sample follows UNESCO standards; approximately parts per thousand.	salinity	salinity	physical	PSS	T,Z	22.,38.
water_density	Mass of water per unit volume	density	density	physical	kg m-3		
surface_elevation	Height or altitude of the sea surface above specified reference.	surf_el	sea surface elevation	physical	meter	T	
water_pressure	Amount of pressure caused by overlying water column.	water_press	water pressure	physical	Pa | bar | dbar | atm	T,Z	
swell_wave_height	Average height of the highest one-third of the swells, if a separation between swell and wind-wave energy peak exists.	swell_ht	swell wave height	wave	meter	T	
swell_from_direction	Direction the swell is coming from.	swell_dir	swell wave direction	wave	degrees_true	T	
swell_wave_period	Period of the swells. Average time in seconds between swell crests	swell_per	swell wave period	wave	second		
wind_wave_height	Average height of the highest one-third of the wind-waves, if a separation between swell and wind-wave energy peak exists.	wind_wv_ht	wind wave height	wave	meter	T	
wind_wave_from_direction	Direction the wind-waves are coming from.	wind_wv_dir	wind wave direction	wave	degrees_true	T	
wind_wave_period	Period of wind-waves.Average time in seconds between wave crests	wind_wv_per	wind wave period	wave	second		
signifcant_wave_height	Average height of the highest one-third of the waves.	sig_wv_ht	significant wave height	wave	meter	T	
signifcant_wave_from_direction	Significant wave direction.	sig_wv_dir	signifcant wave direction	wave	degrees_true	T	
significant_wave_period	Period of the significant wave.Period of higher waves measured during wave sampling	sig_wv_per	significant wave period	wave	second		
wave_steepness	Measure of departure from typical wave slope.taken from wave height and wave period-relationship of	steepness		wave			
oxygen_concentration	Concentration in water of dissolved oxygen.	oxygen_concen	oxygen concentration	chem	ug L-1	T	
oxygen_saturation	Concentration at which oxygen becomes saturated in water.	oxygen_sat	oxygen saturation	chem	ug L-1	T	
transmittance	Ratio of transmitted power to incident power	transmittance	percent transmittance		percent	T	0.,100.
nitrate_concentration		nitrate	nitrate concentration	chem	ug L-1	T	
pCO2	partial pressure of carbon dioxide in the atmosphere or ocean-primarily for flux measurements			chem			
chl_concentration	concentration of chloropyll-a in a defined volume of water	chl_conc	Chlorophyll Concentration	bio	ug L-1 (not kg m-3)	T	
cdom	colored (or chromophoric) dissolved organic matter, of riverine origin	cdom	colored dissolved organic matter	bio	mg/l or 1/m	T	
electromagnetic_wavelength	specific frequency of energy within the electromagnetic spectrum.	wavelength	wavelength	em	m		

spectral_irradiance	Light energy of specific wavelength from all directions at a point and time in space.	E	spectral irradiance	em	W m-2 m-1		
downwelling_irradiance	Irradiance from above.	Ed	downwelling irradiance	em	W m-2 m-1		
upwelling_irradiance	Irradiance from below	Eu	upwelling irradiance	em	W m-2 m-1		
spectral_radiance	Light energy of specific wavelength from a set of directions (solid angle) at a point and time in space.	L	spectral radiance	em	W m-2 m-1 sr-1		
downwelling_radiance	Radiance from below.	Ld	downwelling radiance	em	W m-2 m-1 sr-1		
upwelling_radiance	Radiance from above.	Lu	upwelling radiance	em	W m-2 m-1 sr-1		
water_leaving_radiance	Radiance from below, leaving the water surface.	Luw	water leaving radiance	em	W m-2 m-1 sr-1		
spectral_reflectance	Upwelling irradiance (Eu) divided by downwelling radiance (Ed) at a specific spectral wavelength.	R	reflectance	em	1		
remote_sensing_spectral_reflectance	Upwelling radiance (Lu) divided by downwelling radiance (Ed) at a specific spectral wavelength.	Rrs	remote-sensing reflectance	em	sr-1		
photosynthetically_available_radiation	Integrated downwelling irradiance for wavelengths from 400 to 700nm.	PAR	photosynthetically avail radiation	em	W m-2		
black_white_radiance	Radiance for black body and white light source.	bw_rad	Black & White shortwave radiance	em	W m-2 sr-1		
black_white_irradiance	Irradiance for black body and white light source.	bw_irrad	Black & White shortwave irradiance	em	W m-2		
downwelling_uv_radiance	Integrated downwelling radiance for wavelengths in the ultraviolet region.	uv_rad	UV radiance	em	W m-2 sr-1		
downwelling_uv_irradiance	Integrated downwelling irradiance for wavelengths in the ultraviolet region.	uv_irrad	UV irradiance	em	W m-2		
downwelling_shortwave_irradiance	Integrated downwelling irradiance for spectral wavelengths less than 700nm.	psp_irrad	shortwave irradiance	em	W m-2		
downwelling_longwave_irradiance	Integrated downwelling irradiance for spectral wavelengths greater than 700nm.	pir_irrad	longwave irradiance	em	W m-2		
downward_longwave_radiation	Downward IR radiation. Positive is downward.	Q_dlw	downward longwave radiation	em	W m-2	T	250., 450.
net_longwave_radiation	Net IR radiation, includes reflected IR radiation. Positive is downward.	Q_lw	net longwave radiation	em	W m-2	T	-200., 20.
downward_shortwave_radiation	Downward solar insolation. Positive is downward.	Q_dsw	downward shortwave radiation	em	W m-2	T	0., 1400.
net_shortwave_radiation	Net solar insolation considering albedo effects. Positive is downward.	Q_sw	net shortwave radiation	em	W m-2	T	0., 1400.
albedo	Fraction of downward radiation that is reflected or scattered	alb	albedo	em		T	0., 1.
visibility	Greatest distance an object can be seen and identified. Usually refering to visibility in air, but could be other medium.	visibility	visibility	measurement	m		
light_attenuation_coefficient	Measure of combined effects on light caused by absorption and scattering over a defined distance for a specific wavelength of light.	attenuate	light attenuation	measurement	m-1		

turbidity	Measure of light scattering due to suspended material in water.	turb	turbidity	measurement	NTU		
number_profile_bins	Number of uniformely spaced depth cells where data is collected	number_bins	number of bins in profile	adcp			
transducer_frequency	Operating frequency of ADCP	trans_freq	adcp transducer frequency	adcp	kHz		
bin_size	Width distance between bins	bin_width		adcp	meters		
bin_velocity	Current velocity of bin	bin_vel	current velocity of bin	adcp	cm s-1	T,Z	-300.,300.
bin_direction	Current direction of bin	bin_dir	current direction of bin	adcp	cm s-1	T,Z	0.,360.
transducer_height	Height of transducer above bottom or from surface.			adcp			
blanking_height	Distance from instrument to first bin measurement			adcp			
number_of_transducer_beams	Number of directionally independent beams of the ADCP	number_beams	number of adcp beams	adcp			2,6
beam_velocity	Current velocity measured parallel to the path of beam 1	beam_vel	current velocity from beam1	adcp	cm s-1	T,Z	-300..,300.
beam_echo_intensity	Measure of the echo intensity returning to beam 1 from the ADCP transmit pulse	beam_echo	beam 1 echo intensity	adcp	db	T,Z	0.,200.
bottom_tracking_depth	Distance to sea floor determined by a series of long pulses sent out from ADCP	btm_track_depth	bottom tracking depth	navigation	meters		
bottom_track_heading		btm_track_hdg	ship heading from bottom tracking	navigation	degrees		
relative_wind_speed	Magnitude of wind velocity relative to a moving platform, e.g. ship.	rel_wndspd	relative wind speed	navigation	m s-1	T	0.,70.
relative_wind_from_direction	Direction from which wind is blowing relative to a moving platform, e.g. ship.	rel_wnddirec	relative wind direction meteorological conv	navigation	degrees_true	T	0.,360.
April 13, 2010 -- UNC							
	add quality control terms and tests						
	add HFRADAR terms						
Term	**Definition**	**data class**					
pH		wqm					
dissolved_oxygen		wqm					
turbidity		wqm					
chlorophyll_flourescence		wqm					
range_cell		hfradar					
range_bin		hfradar					
temporal_radial_velocity		hfradar					
spatial_radial_velocity		hfradar					
total_velocity		hfradar					
beam_pattern		hfradar					
sample_interval	Time period between observations.	sensor					
averaging_interval	Time periood over which several observations are averaged.	sensor					

reporting_interval	Time periood between reports to storage media local to station or sensor and/or remotely.	sensor					
voltage		sensor					
sampling_interval		qc					
sample_average_interval		qc					
reporting_interval		qc					
sensor_resolution		qc					
sensor_accuracy		qc					
maximum	The largest value or upper limit of a quantity or measured value.	qc					
minimum	The lowest value or lowest limit of a quantity or measured value.	qc					
threshold		qc					
sigma_t	A defined or empirically derived standard deviation (sigma_t) for a given time difference (delta_t) for each parameter of interest.	qc					
delta_t	The difference between the time of last acceptable measurement or value and the time of the measurement or value of interest.	qc					
delta_m	The difference between the last acceptable measurement or value and the measurement or value of interest.	qc					
rangeTest	The check to ensure that all measurements or values fall within established upper and lower limits.	qc					
timeContinuityTest	This test evaluates the rate of change of a parameter with time. The difference between two consecutive measurements or values of a parameter (delta_m) is verified to be less than a maximum allowable change (sigma_t) defined for a specific time period (delta_t). If delta_m is greater than sigma_t then the measurement fails. If delta_t is greater than maximumTime then the sigma_t evaluated for the maximumTime is used.	qc					