

Glossary

anti-cyclonic	sense of rotation around a centre of high pressure (clockwise in the northern hemisphere, anti-clockwise in the southern hemisphere); see also cyclonic
barrier layer	the depth range between the bottom of the mixed layer and the seasonal thermocline
cast	(also hydrographic cast or hydrographic station) the measurement of temperature, salinity and other properties using either a series of water sampling devices attached to a wire ("bottle cast") or a CTD mounted in a rack ("rosette") holding such devices ("CTD cast"), lowered into the ocean from a ship; also a set of data (usually depth, temperature, salinity, oxygen, and nutrients) collected in that way
convection	vertical movement produced by increasing the density of a fluid at the upper surface of a volume or by decreasing the density at the bottom
convergence	horizontal movement through a volume of fluid in which more fluid enters the volume than leaves it horizontally, resulting in vertical movement out of the volume
cyclonic	sense of rotation around a centre of low pressure (anti-clockwise in the northern hemisphere, clockwise in the southern hemisphere); derived from the circulation around tropical cyclones
diapycnal	directed across surfaces of constant density
divergence	horizontal movement through a volume of fluid in which less fluid enters the volume than leaves it horizontally, resulting in vertical movement into the volume
downwelling	downward vertical movement of water through the bottom of the surface layer produced by a convergence at the surface
eddy	circulation system in which the water follows closed circular or elliptic paths; can be cyclonic or anti-cyclonic
entrainment	movement of mass from one layer of a fluid into another layer without compensatory movement of fluid in the opposite direction
finestructure	variability of a property in space on scales of a metre or less
haline	related to salinity
halocline	the layer where salinity changes most rapidly with depth
interleaving	a process where fluid with given properties moves laterally into a region occupied by fluid with different properties; as a result, layers of the first type of fluid form within the second type of fluid
isobars	contours of constant pressure

isohalines	contours of constant salinity
isopycnals	contours of constant density
isotherms	contours of constant temperature
latitude	the north-south co-ordinate of a position on the earth's surface expressed in degrees, from 90°S (-90°) at the south pole to 0° at the equator and 90°N (+90°) at the north pole
longitude	the east-west co-ordinate of a position on the earth's surface expressed in degrees, from 0° at the longitude of Greenwich to 180° at the date line in the Pacific Ocean, positive or °W to the west of 0° longitude, negative or °E to the east of 0° longitude
meridian	a line of constant longitude
meridional	in the direction of meridians, i.e. north-south
nautical mile	unit of length used in navigation; for oceanographic purposes (taking the earth as perfectly spherical) the nautical mile can be defined as one minute of arc along the equator or along any meridian. One degree of arc has sixty minutes, so one degree of latitude corresponds to 60 nautical miles, which is very close to 111 km
nutrients	in oceanography the name given to the group of dissolved mineral salts most important for marine life, usually comprising anorganic phosphate, nitrate, and silicate; sometimes nitrite and organic and particulate phosphate are included as well
oxygen	in oceanography the amount of oxygen dissolved in seawater, given in millilitres per litre (ml/l) or in micromols per kilogram ($\mu\text{mol kg}^{-1}$); an approximate conversion, exact near a temperature of 5°C and 34.45 salinity, is 1 ml/l = 44.66 $\mu\text{mol kg}^{-1}$
polar	pertaining to the regions under the influence of the easterly winds of very high latitudes
potential temperature	temperature of a water particle, found at some depth, after it is moved adiabatically (i.e. without exchange of heat with its surroundings) to the surface
pycnocline	the layer where density changes most rapidly with depth
pycnostad	a layer where the vertical change of density is very small and displays a local minimum
ring	an eddy formed by separation of part of a strong current (such as a western boundary current); it is characterized by a current band of roughly the width of the parent current and uniform large velocity, and by the trapping of water with properties different from the properties found outside the ring

subpolar	pertaining to the regions between the polar and temperate climate zones
subtropical	pertaining to the regions under the influence of the Trade Winds
temperate	pertaining to the regions under the influence of the Westerlies
thermal	relating to temperature
thermocline	the layer where temperature changes most rapidly with depth during summer (the seasonal thermocline); the depth range where temperature changes rapidly with depth throughout the year (the permanent or oceanic thermocline). Consult chapter 5 for a full explanation of terms
thermohaline	relating to temperature and salinity
thermostat	a layer where the vertical change of temperature is very small and displays a local minimum
tropical	pertaining to the regions between the Trade Winds of the two hemispheres (the Doldrums)
upwelling	upward vertical movement of water through the bottom of the surface layer produced by a divergence at the surface
water mass	a body of water with a common formation history
water type	a set of parameter values to describe water with the corresponding properties
subduction	sinking of water through movement on inclined isopycnal surfaces
source water type	a set of parameter values to describe the properties of a newly formed water mass
tracers	a common name for properties which do not affect the density of seawater and therefore have no impact on water movement but can be used to indicate water movement; in addition to the classical tracers (oxygen and nutrients) oceanography now uses tracers introduced or enriched by human activity such as carbon, cesium, the chlorofluorocarbons (CFCs or freons), plutonium, strontium, tritium, and others
tritium	radioactive isotope of hydrogen with mass number 3; naturally found in seawater at low concentration levels, during the last decades found at elevated concentration levels as a result of fallout from atmospheric bomb testing
zonal	in the direction parallel to the equator, i.e. east-west

units and conversions

property	unit	derived units
distance	metre (m)	1 nautical mile = 1853.2 m = 1.8532 km
velocity	metres per second (m s^{-1})	1 knot = 1 nautical mile per hour = 0.515 m s^{-1} = 44.5 km/day = 16 234 km/year
transport	cubic metres per second ($\text{m}^3 \text{ s}^{-1}$)	1 Sverdrup (Sv) = $10^6 \text{ m}^3 \text{ s}^{-1}$ = $3.6 \text{ km}^3/\text{hour}$
pressure	Pascal (Pa; $1 \text{ Pa} = 1 \text{ kg m}^{-1} \text{ s}^{-2}$)	1 dbar = 10 kPa (equivalent to 1 m depth increase)

Wind velocity is related to wind force, expressed in Beaufort, through the following table:

Beaufort force	knots	m s^{-1}	km/hour
0	under 1	0.0 - 0.2	under 1
1	1 - 3	0.3 - 1.5	1 - 5
2	4 - 6	1.6 - 3.3	6 - 11
3	7 - 10	3.4 - 5.4	12 - 19
4	11 - 16	5.5 - 7.9	20 - 28
5	17 - 21	8.0 - 10.7	29 - 38
6	22 - 27	10.8 - 13.8	39 - 49
7	28 - 33	13.9 - 17.1	50 - 61
8	34 - 40	17.2 - 20.7	62 - 74
9	41 - 47	20.8 - 24.4	75 - 88
10	48 - 55	24.5 - 28.4	89 - 102
11	56 - 63	28.5 - 32.6	103 - 117
12	over 63	over 32.6	over 117