# Corresponding functions of SW in GSW

Here we present a table that shows some function names in the GSW Oceanographic Toolbox of TEOS-10 and the corresponding function names in the SeaWater Matlab Library of EOS-80, http://www.cmar.csiro.au/datacentre/ext_docs/seawater.htm.

| Variable | SeaWater & ESO-80 | Gibbs-SeaWater (GSW) & TEOS-10 |
|---|---|---|
| Absolute Salinity | – | gsw_SA_from_SP(SP,p,long,lat) |
| Conservative Temperature | – | gsw_CT_from_t(SA,t,p) |
| density (i.e. in situ density) | sw_dens(SP,t,p) | gsw_rho_CT(SA,CT,p),  or  gsw_rho_CT_exact(SA,CT,p), or gsw_rho_t_exact(SA,t,p) |
| potential density | sw_pden(SP,t,p,pr) | gsw_rho_CT(SA,CT,pr), or gsw_rho_CT_exact(SA,CT,pr) |
| potential temperature | sw_ptmp(SP,t,p,pr) | gsw_pt_from_t(SA,t,p,pr) |
| in situ temperature from pt | sw_temp(SP,pt,p,pr) | gsw_pt_from_t(SA,pt,pr,p) |
| $\sigma_0$, using $\theta_0 = $ sw_ptmp(SP,t,p,0) | sw_dens(SP, $\theta_0$,0) $- 1000$ kg m$^{-3}$ | gsw_sigma0_CT(SA,CT), or gsw_sigma0_CT_exact(SA,CT) |
| $\sigma_2$, using $\theta_2 = $ sw_ptmp(SP,t,p,2000) | sw_dens(SP, $\theta_2$,2000) $- 1000$ kg m$^{-3}$ | gsw_sigma2_CT(SA,CT), or gsw_sigma2_CT_exact(SA,CT) |
| $\sigma_4$, using $\theta_4 = $ sw_ptmp(SP,t,p,4000) | sw_dens(SP, $\theta_4$,4000) $- 1000$ kg m$^{-3}$ | gsw_sigma4_CT(SA,CT), or gsw_sigma4_CT_exact(SA,CT) |
| specific volume anomaly | sw_svan(SP,t,p) | gsw_specvol_anom_CT(SA,CT,p)  or gsw_specvol_anom_CT_exact(SA,CT,p) |
| dynamic height anomaly | $-$ sw_gpan(SP,t,p) | gsw_geo_strf_dyn_height(SA,CT,p,p_ref) |
| geostrophic velocity | sw_gvel(ga,lat,long) | gsw_geostrophic_velocity(geo_str,long,lat,p) |
| $N^2$ | sw_bfrq(SP, t, p, lat) | gsw_Nsquared(SA,CT,p,lat) |
| pressure from height (SW uses depth, not height) | sw_pres( $-$ z,lat) | gsw_p_from_z(z,lat) |
| height from pressure (SW outputs depth, not height) | z = $-$ sw_dpth(p,lat) | gsw_z_from_p(p,lat) |
| sound speed | sw_svel(SP,t,p) | gsw_sound_speed_CT_exact(SA,CT,p), or gsw_sound_speed_CT(SA,CT,p), or gsw_sound_speed_t_exact(SA,t,p) |
| isobaric heat capacity | sw_cp(SP,t,p) | gsw_cp(SA,t,p) |
| adiabatic lapse rate* | sw_adtg(SP,t,p) | gsw_adiabatic_lapse_rate_t_exact(SA,t,p) |
| SP from conductivity ratio, (PSS-78) | sw_salt(R,t,p) | gsw_SP_from_R(R,t,p) |
| conductivity ratio from SP, (PSS-78) | sw_cndr(SP,t,p) | gsw_R_from_SP(SP,t,p) |
| distance | sw_dist(lat,long,units) | gsw_distance(long,lat,p) |
| gravitational acceleration | sw_g(lat,z) | gsw_grav(lat,p) |
| Coriolis parameter | sw_f(lat) | gsw_f(lat) |
| testing of all functions | sw_test | gsw_check_functions |
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**\*** The SW and GSW functions output the adiabatic lapse rate in different units, being  K (dbar)$^{-1}$ and  K Pa$^{-1}$ respectively.