

Appendix E

List of standard output variables

Table E.1: Key ids of the variables which can be used for defining standard output variables. The variables denoted by a * are W-node variables for which the node variable attribute can be reset to 'W'.

| key id | description | unit |
|-------------------|---|-----------------------|
| 0-D variables | | |
| iarr_dissip0d | domain integrated energy dissipation | W |
| iarr_dryfac | fraction of dry area | – |
| iarr_edens0d | domain integrated baroclinic energy | J |
| iarr_ekin0d | domain integrated kinetic energy | J |
| iarr_epot0d | domain integrated potential energy | J |
| iarr_etot0d | domain integrated total energy | J |
| 2-D variables | | |
| iarr_alphatc_fld | drying factor α | |
| iarr_airtemp | air temperature T_a | $^{\circ}\text{C}$ |
| iarr_atmpres | atmospheric pressure P_a | N/m^2 |
| iarr_bdragcoefatc | bottom drag coefficient C_{db} | – |
| iarr_bfricatc | bottom friction velocity u_{*b} | m/s |
| iarr_bstresatc | bottom stress τ_b | N/m^2 |
| iarr_cds | surface drag coefficient C_{ds} | – |
| iarr_ces | surface exchange coefficient C_e for the latent heat flux | – |
| iarr_chs | surface exchange coefficient C_h for the sensible heat flux | – |
| iarr_cloud_cover | cloud cover f_c | – |
| iarr_depmeanatc | mean water depth h | m |
| iarr_deptotatc | total water depth H | m |

(Continued)

Table E.1: Continued

| | | |
|--------------------|---|----------------------|
| iarr_deptotatc_err | total water depth error $\delta_e H$ | m |
| iarr_edens2d | vertically integrated baroclinic energy | J/m ² |
| iarr_edissip2d | vertically integrated energy dissipation | W/m ² |
| iarr_eflux2du | X-component of the depth-integrated energy flux | J/s/m |
| iarr_eflux2dv | Y-component of the depth-integrated energy flux | J/s/m |
| iarr_ekin2d | vertically integrated kinetic energy | J/m ² |
| iarr_epot2d | vertically integrated potential energy | J/m ² |
| iarr_etot2d | vertically integrated total energy | J/m ² |
| iarr_evapminprec | evaporation minus precipitation rate | kg/m ² /s |
| iarr_hdifcoef2datc | depth mean horizontal diffusion coefficient | m ² /s |
| hdvelmag | magnitude of the depth-integrated current | m ² /s |
| hmvelmag | magnitude of the depth-mean current | m/s |
| iarr_precipitation | precipitation rate R_{pr} | kg/m ² /s |
| iarr_qlatent | latent heat flux Q_{la} | W/m ² |
| iarr_qlwave | long wave heat flux Q_{lw} | W/m ² |
| iarr_qnonsol | non-solar heat flux $Q_{n\text{sol}}$ | W/m ² |
| iarr_qrad | surface solar irradiance Q_s | W/m ² |
| iarr_qsensible | sensible heat flux Q_{se} | W/m ² |
| iarr_qtot | total downward surface heat flux | W/m ² |
| iarr_relhum | relative humidity RH | – |
| iarr_ssalflux | surface salinity flux | PSU m/s |
| iarr_sstresatc | surface stress τ_s | N/m ² |
| iarr_udvel | X-component of the depth-integrated current U | m ² /s |
| iarr_umvel | X-component of the depth-mean current \bar{u} | m/s |
| iarr_uwindatc | X-component of the surface wind U_{10} | m/s |
| iarr_vdvel | Y-component of the depth-integrated current V | m ² /s |
| iarr_vmvel | Y-component of the depth-mean current \bar{v} | m/s |
| iarr_vortic2d | vertically integrated vorticity | m/s |
| iarr_vwindatc | Y-component of the surface wind V_{10} | m/s |
| iarr_zeta | surface elevation ζ | m |
| iarr_zroughatc | bottom roughness z_0 | m |
| 3-D variables | | |
| iarr_beta_sal | salinity expansion coefficient β_S | PSU ⁻¹ |
| iarr_beta_temp | temperature expansion coefficient β_T | °C ⁻¹ |
| iarr_buofreq2* | squared buoyancy frequency N^2 | s ⁻² |
| iarr_dens | mass density ρ | kg/m ³ |
| iarr_dissip* | dissipation of turbulent kinetic energy ε | W/kg |
| iarr_edens3d | baroclinic energy | J/m ³ |

(Continued)

Table E.1: Continued

| | | |
|--------------------|--|-------------------|
| iarr_eddisip3d | energy dissipation | W/m ³ |
| iarr_eflux3du | X-component of the energy flux | W/m ³ |
| iarr_eflux3dv | Y-component of the energy flux | W/m ³ |
| iarr_eflux3dw | vertical component of the energy flux | W/m ³ |
| iarr_ekin3d | kinetic energy | J/m ³ |
| iarr_etot3d | total energy | J/m ³ |
| iarr_hdifcoef3datc | horizontal diffusion coefficient ν_H | m ² /s |
| hvelmag | magnitude of the 3-D current | m/s |
| iarr_radiance | solar irradiance I | W/m ² |
| iarr_ricnum* | Richardson number Ri | – |
| iarr_sal | salinity S | PSU |
| iarr_shearfreq2* | squared shear frequency M^2 | s ⁻² |
| iarr_temp | temperature T | ⁰ C |
| iarr_tke* | turbulent kinetic energy k | J/kg |
| iarr_uvel | X-component of the current u | m/s |
| iarr_vdifcoefmom* | eddy viscosity ν_T | m ² /s |
| iarr_vdifcoefscal* | eddy diffusivity λ_T | m ² /s |
| iarr_vdifcoefcke* | vertical diffusion coefficient for turbulence energy ν_k | m ² /s |
| iarr_vortic3d | vertical vorticity | s ⁻¹ |
| iarr_vvel | Y-component of the current v | m/s |
| iarr_wphys | physical vertical current w | m/s |
| iarr_wvel* | transformed vertical current ω | m/s |
| iarr_zlmix* | mixing length l | m |

Table E.2: Key ids of the variables which can be used for defining standard output variables from the sediment module. In case the variables have an extra dimension for different sediment fractions (variables marked by a *), the attribute `numvar` must be defined with a value between 1 and `nf`.

| key id | description | unit |
|------------------------------------|---|-----------------------------------|
| 2-D variables | | |
| <code>iarr_bdragcoefatc_sed</code> | skin bottom drag coefficient | – |
| <code>iarr_bed_fraction*</code> | volume sediment fraction at the sea bed | – |
| <code>iarr_beta_sed</code> | ratio of sediment diffusion to eddy viscosity coefficient | – |
| <code>iarr_bottom_sed_flux*</code> | erosion minus deposition rate | m/s |
| <code>iarr_bstresatc_sed</code> | skin bed shear stress | N/m ² |
| <code>iarr_ceq*</code> | equilibrium concentration | m ³ /m ³ |
| <code>iarr_cref*</code> | bottom reference concentration | m ³ /m ³ |
| <code>iarr_d50_bed</code> | median particle diameter at the sea bed | m |
| <code>iarr_height_c*</code> | reference height for bottom concentration | m |
| <code>iarr_qbedatc*</code> | volumetric bed load transport | m ² /s |
| <code>iarr_qbedatu*</code> | X-component of volumetric bed load transport | m ² /s |
| <code>iarr_qbedatv*</code> | Y-component of volumetric bed load transport | m ² /s |
| <code>iarr_qsusatc*</code> | volumetric suspended load transport | m ² /s |
| <code>iarr_qtotatc*</code> | volumetric total load transport | m ² /s |
| <code>iarr_qtotatu*</code> | X-component of volumetric total load transport | m ² /s |
| <code>iarr_qtotatv*</code> | Y-component of volumetric total load transport | m ² /s |
| <code>iarr_tau_cr*</code> | critical shear stress | N/m ² |
| <code>iarr_t_equil*</code> | dimensionless adaptation time scale | – |
| <code>iarr_zroughatc_sed</code> | skin roughness length | m |
| 3-D variables | | |
| <code>iarr_beta_state_sed*</code> | sediment expansion coefficient | – |
| <code>iarr_ctot*</code> | total volumetric sediment concentration | m ³ /m ³ |
| <code>iarr_cvol*</code> | volumetric sediment concentration | m ³ /m ³ |
| <code>sedsruser*</code> | user defined sediment sources | m ³ /m ³ /s |
| <code>iarr_vdiffcoef_sed*</code> | sediment diffusion coefficient | m ² /s |
| <code>iarr_wfall*</code> | settling velocity | m/s |