Appendix 2. Descriptions of HBSoilwat functions

Table 1.

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| **function** | **description** | **lines** |
| tnorm | Draws a random sample of size *n* for a truncated normal distribution with mean (*mu*) and standard deviation (*sig*). The distribution is truncated because it is bounded, or supported, from *lo* to *hi*, i.e., . | 7 – 22 |
| tnorm.mvt | Draws a random sample from a truncated multivariate normal with a vector of mean values (*muvec\_*, a covariance matrix (*smat)*, and vectors of lower (*lo*) and upper (*hi*) bounds | 25 – 55 |
| get.priors | Retrieves prior parameter values for a given parameter (*param)* and a given functional group (*group)* | 57 – 59 |
| T\_depth.Jackson1996 | Conditioned of depths (*d*) and parameter values (*param*), this function retrieves proportional and cumulative transpiration for each 1-cm soil layer based on equations found in Jackson et al. 1996. | 61 – 73 |
| T\_depth.Zeng2001 | Conditioned of depths (*d*) and parameter values (*param*), this function retrieves proportional and cumulative transpiration for each 1-cm soil layer based on equations found in Zend et al. 2001. | 75 – 87 |
| T\_depth.Schenk2002 | Conditioned of depths (*d*) and parameter values (*param*), this function retrieves proportional and cumulative transpiration for each 1-cm soil layer based on equations found in Schenk and Jackson 2002 | 89 – 101 |
| E\_depth\_Wythers1999 | Conditioned of depths (*d*), soil textures by depth (*sand*, *clay*), and parameter values (*param*), this function retrieves evaporation by depth based on Wythers et al. 1999. | 103 – 145 |
| calc.dens.params | Calculates the log likelihood of the Soilwat parameters given the data and covariance matrix for site *j* and soil depth *i* | 150 – 188 |
| calc.dens.rho | Calculates the log likelihood of the covariance matrix given the data and Soilwat parameters for site *j* and soil depth *i* | 191 - 237 |
| inv.rmat | Calculates inverse of the matrix R given a number of columns and rows (*n*) and the correlation (*rho*) | 240 – 247 |
| rmat | Calculates the matrix R given a number of columns and rows (*n*) and the correlation (*rho*) | 250 – 254 |
| get.pred | Execute Soilwat with an input object (*Input*) and retrieve the output object | 257 – 273 |
| get.phenology | Proposes new parameter values for the vegetation phenology parameters given a functional group (*GR*) and the Soilwat input object (*Input*) | 276 – 314 |
| get.Evap | Proposes new parameter values for the soil evaporation model given the Soilwat input object (*Input*) | 317 – 343 |
| get.Trans | Proposes new parameter values for the transpiration model given a functional group (*GR*) and the Soilwat input object (*Input*) | 347 – 371 |
| get.crit | Proposes new parameter values for the critical soil water potential given a functional group (*GR*) and the Soilwat input object (*Input*) | 375 – 397 |
| get.drain | Proposes new parameter values for the deep drainage given the Soilwat input object (*Input*) | 401 – 423 |
| params.prop | Retrieves phenology, evaporation, transpiration, drainage, and critical soil water potential parameter proposals. Note that *prop.names* defines which parameters are being allowed to vary. | 425 - 525 |
| comp.prop | Proposes new parameter values for the functional type composition given the Soilwat input object (*Input*) | 527 - 574 |
| soils.prop | Proposes new soil texture values given the Soilwat input object (*Input*) | 576 - 627 |
| model.set | Used to update Soilwat Input object (*Input*) with new parameter values (*set.par*) for a specific parameter type (*set.names*) and a site (*j*) for executing Soilwat | 631 - 688 |
| model.init | Used to update Soilwat Input object (*Input*) with new parameter values for a series of parameter type (*set.names*) from a certain step of the Gibbs sampler (*gg*) for executing Soilwat | 690 - 764 |