

VIC output variable description

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Water Balance Terms - state variables

Variable	Description	Units
ASAT	Saturate Area Fraction (of exposed land, i.e. non-lake; the total fraction of the grid cell that is completely full of water would be ASAT plus LAKE_AERA_FRAC)	fraction
LAKE_AREA_FRACT	Lake surface area as fraction of grid cell area	fraction
LAKE_DEPTH	Lake depth (distance between surface and deepest point)	m
LAKE_ICE	Moisture stored as lake ice	mm over lake ice area
LAKE_ICE_FRACT	Fractional coverage of lake ice	fraction
LAKE_ICE_HEIGHT	Thickness of lake ice	cm
LAKE_MOIST	Liquid water and ice stored in lake	mm over grid cell
LAKE_SURF_AREA	Lake surface area	m ²
LAKE_SWE	Liquid water equivalent of snow on top of lake ice	m over lake ice area
LAKE_SWE_V	Volumetric liquid water equivalent of snow on top of lake ice	m ³
LAKE_VOLUME	Lake volume	m ³
ROOTMOIST	Total soil moisture in layers that contain roots	mm
SMFROZFRAC	Fraction of soil moisture (by mass) that is ice, for each soil layer	fraction
SMLIQFRAC	Fraction of soil moisture (by mass) that is liquid, for each soil layer	fraction
SNOW_CANOPY	Snow interception storage in canopy	mm
SNOW_COVER	Fractional area of snow cover	fraction
SNOW_DEPTH	Depth of snow pack	cm
SOIL_ICE	Soil ice content for each soil layer	mm
SOIL_LIQ	Soil liquid content for each soil layer	mm
SOIL_MOIST	Total soil moisture content for each soil layer	mm
SOIL_WET	Vertical average of (soil moisture - wilting point)/(maximum soil moisture - wilting point)	mm/mm
SURFSTOR	Storage of liquid water and ice (not snow) on surface (ponding)	mm
SURF_FROST_FRAC	Fraction of soil surface that is frozen	fraction
SWE	Snow water equivalent in snow pack (including vegetation-intercepted snow)	mm
WDEW	Total moisture interception storage in canopy	mm
ZWT	Water table position, using lowest unsaturated soil layer	cm (positive upwards, i.e. negative values indicate below soil surface; 0 = at soil surface)

ZWT_LUMPED	Water table position, lumping all layers' moistures together	cm (positive upwards, i.e. negative values indicate below soil surface; 0 = at soil surface)
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Water Balance Terms – fluxes

Variable	Description	Units
BASEFLOW	Baseflow out of the bottom layer	mm (ALMA_OUTPUT: mm/s)
DELINTERCEPT	Change in canopy interception storage	mm
DELSOILMOIST	Change in soil water content	mm
DELSURFSTOR	Change in surface liquid water storage	mm
DELSWE	Change in snow water equivalent	mm
DELSWE	Change in snow water equivalent	mm
EVAP	Total net evaporation	mm (ALMA_OUTPUT: mm/s)
EVAP_BARE	Net evaporation from bare soil	mm (ALMA_OUTPUT: mm/s)
EVAP_CANOP	Net evaporation from canopy interception	mm (ALMA_OUTPUT: mm/s)
INFLOW	Moisture that reaches top of soil column	mm (ALMA_OUTPUT: mm/s)
LAKE_BF_IN	Incoming baseflow from lake catchment	mm (ALMA_OUTPUT: mm/s)
LAKE_BF_IN_V	Incoming volumetric baseflow from lake catchment	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_BF_OUT	Outgoing baseflow from lake to channel network	mm (ALMA_OUTPUT: mm/s)
LAKE_BF_V	Outgoing volumetric baseflow from lake to channel network	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_CHANNEL_IN	Channel inflow from upstream	mm (ALMA_OUTPUT: mm/s)
LAKE_CHANNEL_IN_V	Volumetric channel inflow from upstream	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_CHANNEL_OUT	Channel outflow from lake to channel network	mm (ALMA_OUTPUT: mm/s)
LAKE_CHANNEL_V	Volumetric channel outflow from lake to channel network	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_DSTOR	Change in lake moisture storage (liquid plus ice cover)	mm (ALMA_OUTPUT: mm/s)

LAKE_DSTOR_V	Volumetric change in lake moisture storage (liquid plus ice cover)	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_DSWE	Change in swe on top of lake ice	mm (ALMA_OUTPUT: mm/s)
LAKE_DSWE_V	Volumetric change in swe on top of lake ice	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_EVAP	Net evaporation from lake surface	mm (ALMA_OUTPUT: mm/s)
LAKE_EVAP_V	Net volumetric evaporation from lake surface	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_PREC_V	Volumetric precipitation over lake surface	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_RCHRG	Recharge from lake to surrounding wetland	mm (ALMA_OUTPUT: mm/s)
LAKE_RCHRG_V	Volumetric recharge from lake to surrounding wetland	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_RO_IN	Incoming runoff from lake catchment	mm (ALMA_OUTPUT: mm/s)
LAKE_RO_IN_V	Incoming volumetric runoff from lake catchment	m ³ (ALMA_OUTPUT: m ³ /s)
LAKE_VAPFLX	Outgoing sublimation from snow on top of lake ice	mm (ALMA_OUTPUT: mm/s)
LAKE_VAPFLX_V	Outgoing volumetric sublimation from snow on top of lake ice	m ³ (ALMA_OUTPUT: m ³ /s)
PET_SATSOIL	Potential evap from saturated bare soil	mm (ALMA_OUTPUT: mm/s)
PET_H2OSURF	Potential evap from open water	mm (ALMA_OUTPUT: mm/s)
PET_SHORT	Potential evap (transpiration only) from short reference crop (grass)	mm (ALMA_OUTPUT: mm/s)
PET_TALL	Potential evap (transpiration only) from tall reference crop (alfalfa)	mm (ALMA_OUTPUT: mm/s)
PET_NATVEG	Potential evap (transpiration only) from current vegetation and current canopy resistance	mm (ALMA_OUTPUT: mm/s)
PET_VEGNOCR	Potential evap (transpiration only) from current vegetation and 0 canopy resistance	mm (ALMA_OUTPUT: mm/s)

PREC	Incoming precipitation	mm (ALMA_OUTPUT: mm/s)
RAINF	Rainfall	mm (ALMA_OUTPUT: mm/s)
REFREEZE	Refreezing of water in the snow	mm (ALMA_OUTPUT: mm/s)
RUNOFF	Surface runoff	mm (ALMA_OUTPUT: mm/s)
SNOW_MELT	Snow melt	mm (ALMA_OUTPUT: mm/s)
SNOWF	Snowfall	mm (ALMA_OUTPUT: mm/s)
SUB_BLOWING	Net sublimation of blowing snow	mm (ALMA_OUTPUT: mm/s)
SUB_CANOP	Net sublimation from snow stored in canopy	mm (ALMA_OUTPUT: mm/s)
SUB_SNOW	Total net sublimation from snow pack (surface and blowing)	mm (ALMA_OUTPUT: mm/s)
SUB_SURFACE	Net sublimation from snow pack surface	mm (ALMA_OUTPUT: mm/s)
TRANSP_VEG	Net transpiration from vegetation	mm (ALMA_OUTPUT: mm/s)
WATER_ERROR	Water budget error	mm

Energy Balance Terms – state variables

Variable	Description	Units
ALBEDO	Average surface albedo	fraction
BARESOILT	Bare soil surface temperature	C (ALMA_OUTPUT: K)
FDEPTH	Depth of freezing fronts for each freezing front	cm (ALMA_OUTPUT: m)
LAKE_ICE_TEMP	Temperature of lake ice	K
LAKE_SURF_TEMP	Lake surface temperature	K
RAD_TEMP	Average radiative surface temperature	K
SALBEDO	Snow pack albedo	fraction
SNOW_PACK_TEMP	Snow pack temperature	C (ALMA_OUTPUT: K)
SNOW_SURF_TEMP	Snow surface temperature	C (ALMA_OUTPUT: K)
SNOWT_FBFLAG	Snow surface temperature fallback flag	0 or 1
SOIL_TEMP	Soil temperature for each soil layer	C (ALMA_OUTPUT: K)
SOIL_TNODE	Soil temperature for each soil thermal node	C (ALMA_OUTPUT: K)
SOIL_TNODE_WL	Soil temperature for each soil thermal node in the wetland	C (ALMA_OUTPUT: K)
SOILT_FBFLAG	Soil temperature flag for each soil thermal node	0 or 1
SURF_TEMP	Average surface temperature	C (ALMA_OUTPUT: K)
SURFT_FBFLAG	Surface temperature fallback flag	0 or 1
TCAN_FBFLAG	Tcanopy fallback flag	0 or 1
TDEPTH	Depth of thawing fronts for each thawing front	cm (ALMA_OUTPUT: m)
TFOL_FBFLAG	Tfoliage fallback flag	0 or 1
VEGT	Average vegetation canopy temperature	C (ALMA_OUTPUT: K)

Energy Balance Terms – fluxes

Variable	Description	Units
ADV_SENS	Net sensible flux advected to snow pack	W/m ²
ADVECTION	Advected energy	W/m ²
DELTACC	Rate of change in cold content in snow pack	W/m ² (ALMA_OUTPUT: J/m ²)
DELTAH	Rate of change in heat storage	W/m ² (ALMA_OUTPUT: J/m ²)
ENERGY_ERROR	Energy budget error	W/m ²
FUSION	Net energy used to melt/freeze soil moisture	W/m ²
GRND_FLUX	Net heat flux into ground	W/m ²
IN_LONG	Incoming longwave at ground surface (under veg)	W/m ²
LATENT	Net upward latent heat flux	W/m ²
LATENT_SUB	Net upward latent heat flux from sublimation	W/m ²
MELT_ENERGY	Energy of fusion (melting) in snowpack	W/m ²
NET_LONG	Net downward longwave flux	W/m ²
NET_SHORT	Net downward shortwave flux	W/m ²
R_NET	Net downward radiation flux	W/m ²
RFRZ_ENERGY	Net energy used to refreeze liquid water in snowpack	W/m ²
SENSIBLE	Net upward sensible heat flux	W/m ²
SNOW_FLUX	Energy flux through snow pack	W/m ²

Miscellaneous Terms

Variable	Description	Units
AERO_COND	Scene aerodynamic conductance (tiles with overstory contribute overstory conductance; others contribute surface conductance)	m/s
AERO_COND1	Surface aerodynamic conductance	m/s
AERO_COND2	Overstory aerodynamic conductance	m/s
AERO_RESIST	Scenecanopy aerodynamic resistance (tiles with overstory contribute over story resistance; others contribute surface resistance)	s/m
AERO_RESIST1	Surface aerodynamic resistance	s/m
AERO_RESIST2	Overstory aerodynamic resistance	s/m
AIR_TEMP	Air temperature	C (ALMA_OUTPUT: K)
DENSITY	Near-surface atmospheric density	kg/m ³
FDIR	fraction of incoming shortwave that is direct	fraction
LAI	Leaf Area Index	fraction
LONGWAVE	Incoming longwave	W/m ²
PRESSURE	Near surface atmospheric pressure	kPa (ALMA_OUTPUT: Pa)
QAIR	Specific humidity	kg/kg
REL_HUMID	Relative humidity	fraction
SHORTWAVE	Incoming shortwave	W/m ²
SURF_COND	Surface conductance	m/s
TSKC	(release 4.1.2 and later) Cloud fraction	fraction
VEGCOVER	Partial vegetation cover fraction	fraction
VP	Near surface vapor pressure	kPa (ALMA_OUTPUT: Pa)
VPD	Near surface vapor pressure deficit	kPa (ALMA_OUTPUT: Pa)
WIND	Near surface wind speed	m/s

Band-specific Quantities

Variable	Description	Units
ADV_SENS_BAND	Net sensible heat flux advected to snow pack	W/m ²
ADVECTION_BAND	Advected energy	W/m ²
ALBEDO_BAND	Average surface albedo	fraction
DELTACC_BAND	Change in cold content in snow pack	W/m ²
GRND_FLUX_BAND	Net heat flux into ground	W/m ²
IN_LONG_BAND	Incoming longwave at ground surface (under veg)	W/m ²
LATENT_BAND	Net upward latent heat flux	W/m ²
LATENT_SUB_BAND	Net upward latent heat flux due to sublimation	W/m ²
MELT_ENERGY_BAND	Energy of fusion (melting) in snowpack	W/m ²
NET_LONG_BAND	Net downward longwave flux	W/m ²
NET_SHORT_BAND	Net downward shortwave flux	W/m ²
RFRZ_ENERGY_BAND	Net energy used to refreeze liquid water in snowpack	W/m ²
SENSIBLE_BAND	Net upward sensible heat flux	W/m ²
SNOW_CANOPY_BAND	Snow interception storage in canopy	mm
SNOW_COVER_BAND	Fractional area of snow cover	fraction
SNOW_DEPTH_BAND	Depth of snow pack	cm
SNOW_FLUX_BAND	Energy flux through snow pack	W/m ²
SNOW_MELT_BAND	Snow melt	mm
SNOW_PACKT_BAND	Snow pack temperature	C (ALMA_OUTPUT: K)
SNOW_SURFT_BAND	Snow surface temperature	C (ALMA_OUTPUT: K)
SWE_BAND	Snow water equivalent in snow pack	mm

Carbon Cycle Terms

Variable	Description	Units
APAR	absorbed PAR	W/m ²
GPP	gross primary productivity	g C/m ² d
RAUT	autotrophic respiration	g C/m ² d
NPP	net primary productivity	g C/m ² d
LITTERFALL	flux of carbon from living biomass into soil	g C/m ² d
RHET	soil (heterotrophic) respiration	g C/m ² d
NEE	net ecosystem exchange (=NPP-RHET)	g C/m ² d
CLITTER	carbon density in litter pool	g C/m ²
CINTER	carbon density in intermediate pool	g C/m ²
CSLOW	carbon density in slow pool	g C/m ²