

**bfg\*\_control**

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
time_iso	valid time	N/A
lon	T-cell longitude	degrees east
lat	T-cell latitude	degrees north
acond	Aerodynamic conductance	m/s
albedo_ave	surface albedo	%
alnsf	mean nir albedo with strong cosz dependency	%
alnwf	mean nir albedo with weak cosz dependency	%
alvsf	mean vis albedo with strong cosz dependency	%
alwvf	mean vis albedo with weak cosz dependency	%
c0	nsst coefficient1 to calculate d(tz)/d(ts)	numerical
cd	nsst coefficient2 to calculate d(tz)/d(ts)	n/a
cduvb_ave	Clear sky UV-B Downward Solar Flux	W/m**2
cldfra	Instantaneous 3D Cloud Fraction	frac
cnvprcp	convective rain at this time step	XXX
cnwat	canopy water (cnwat in gfs data)	mm
cpofp	Percent frozen precipitation	fraction
cprat_ave	averaged surface convective precipitation rate	kg/m**2/s
cpratb_ave	averaged bucket surface convective precipitation rate	kg/m**2/s
crain	instantaneous categorical rain	number
csdlf	Clear Sky Downward Long Wave Flux	W/m**2
csdsf	Clear Sky Downward Short Wave Flux	W/m**2
csulf	Clear Sky Upward Long Wave Flux	W/m**2
csulftoa	Clear Sky Upward Long Wave Flux at toa	W/m**2
csusf	Clear Sky Upward Short Wave Flux	W/m**2
csusftoa	Clear Sky Upward Short Wave Flux at toa	W/m**2
cwork_aveclm	cloud work function (valid only with sas)	J/kg
dconv	nsst thickness of free convection layer	m
dlwrf	instantaneous surface downward longwave flux	W/m**2
dlwrf_ave	surface downward longwave flux	W/m**2
dswrf	instantaneous surface downward shortwave flux	W/m**2
dswrf_ave	averaged surface downward shortwave flux	W/m**2
dswrf_avetoa	top of atmos downward shortwave flux	W/m**2
dtcool	nsst sub-layer cooling amount	k
duvb_ave	UV-B Downward Solar Flux	W/m**2
ecan_acc	total evaporation of intercepted water	kg/m**2
edir_acc	total soil surface evaporation	kg/m**2
etran_acc	total plant transpiration	kg/m**2
evbs_ave	Direct Evaporation from Bare Soil	W/m**2
evcw_ave	Canopy water evaporation	W/m**2
f10m	10-meter wind speed divided by lowest model wind speed	N/A
facsf	fractional coverage with strong cosz dependency	XXX
facwf	fractional coverage with weak cosz dependency	XXX
ffhh	fh parameter from PBL scheme	XXX

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
ffmm	fm parameter from PBL scheme	XXX
fldcp	Field Capacity (volumetric)	fraction
fricv	uustar surface frictional wind	XXX
frozr	accumulated surface graupel	kg/m**2
frozrb	accumulated surface graupel in bucket	kg/m**2
frzr	accumulated surface freezing rain	kg/m**2
frzrb	accumulated surface freezing rain in bucket	kg/m**2
gflux	instantaneous surface ground heat flux	W/m**2
gflux_ave	surface ground heat flux	W/m**2
hgt_hyblev1	layer 1 height	m
hpbl	surface planetary boundary layer height	m
icec	surface ice concentration (ice=1; no ice=0)	fraction
icetk	sea ice thickness (icetk in gfs_data)	m
land	sea-land-ice mask (0-sea, 1-land, 2-ice)	numerical
lfrac	land fraction	fraction [0:1
lhtfl	instantaneous surface latent heat net flux	W/m**2
lhtfl_ave	surface latent heat flux	w/m**2
nbdsf_ave	Near IR Beam Downward Solar Flux	W/m**2
nddsf_ave	Near IR Diffuse Downward Solar Flux	W/m**2
orog	surface geopotential height	gpm
pah_ave	Total Precipitation Advected Heat	W/m**2
pahi	instantaneous precipitation advected heat flux	W/m**2
pevpr	instantaneous surface potential evaporation	W/M**2
pevpr_ave	averaged potential evaporation rate	W/M**2
prate_ave	surface precipitation rate	kg/m**2/s
prateb_ave	bucket surface precipitation rate	kg/m**2/s
pres_avehcb	pressure high cloud bottom level	%
pres_avehct	pressure high cloud top level	%
pres_avelcb	pressure low cloud bottom level	%
pres_avelct	pressure low cloud top level	%
pres_avemcb	pressure middle cloud bottom level	%
pres_avemct	pressure middle cloud top level	%
prescnvclb	pressure at convective cloud bottom level	pa
prescnvclt	pressure at convective cloud top level	pa
pressfc	surface pressure	Pa
pwat	atmos column precipitable water	kg/m**2
qrain	nsst sensible heat flux due to rainfall	w/m2
rhonewsn	precipitation ice density	kg m^-3
sbsno_ave	Sublimation (evaporation from snow)	W/m**2
sfcrr	surface roughness	m
sfexc	Exchange Coefficient	kg/m2/s
shdmax	maximum fractional coverage of green vegetation	XXX
shdmin	minimum fractional coverage of green vegetation	XXX
shtfl	instantaneous surface sensible heat net flux	W/m**2
shtfl_ave	surface sensible heat flux	w/m**2

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
sltyp	surface slope type	XXX
snoalb	maximum snow albedo in fraction	XXX
snod	surface snow depth	m
snohf	Snow Phase Change Heat Flux	W/m**2
snowc_ave	snow cover - GFS lsm	%
soill1	liquid soil moisture at layer-1	xxx
soill2	liquid soil moisture at layer-2	xxx
soill3	liquid soil moisture at layer-3	xxx
soill4	liquid soil moisture at layer-4	xxx
soilm	total column soil moisture content	kg/m**2
soilt1	soil temperature unknown layer 1	K
soilt2	soil temperature unknown layer 2	K
soilt3	soil temperature unknown layer 3	K
soilt4	soil temperature unknown layer 4	K
soilw1	volumetric soil moisture unknown layer 1	fraction
soilw2	volumetric soil moisture unknown layer 2	fraction
soilw3	volumetric soil moisture unknown layer 3	fraction
soilw4	volumetric soil moisture unknown layer 4	fraction
sotyp	soil type in integer 1-9	number
spfh2m	2m specific humidity	kg/kg
spfh_hyblev1	layer 1 specific humidity	kg/kg
spfhmax_max2m	maximum specific humidity	kg/kg
spfhmin_min2m	minimum specific humidity	kg/kg
ssrun_acc	Accumulated surface storm water runoff	kg/m**2
sunsd_acc	Sunshine Duration	s
tcdc_avebndcl	boundary layer cloud layer total cloud cover	%
tcdc_aveclm	atmos column total cloud cover	%
tcdc_avehcl	high cloud level total cloud cover	%
tcdc_avelcl	low cloud level total cloud cover	%
tcdc_agemcl	mid cloud level total cloud cover	%
tcdccnvcl	convective cloud layer total cloud cover	%
tg3	deep soil temperature	K
tisfc	surface temperature over ice fraction	K
tmax_max2m	max temperature at 2m height	K
tmin_min2m	min temperature at 2m height	K
tmp2m	2m temperature	K
tmp_avehct	temperature high cloud top level	K
tmp_avelct	temperature low cloud top level	K
tmp_agemct	temperature middle cloud top level	K
tmp_hyblev1	layer 1 temperature	K
tmpsfc	surface temperature	K
tprcp	total time-step precipitation	m
trans_ave	transpiration	W/m**2
tref	nsst reference or foundation temperature	K
tsnowp	accumulated surface snow	kg/m**2
tsnowpb	accumulated surface snow in bucket	kg/m**2
u-gwd_ave	surface zonal gravity wave stress	N/m**2
uflx_ave	surface zonal momentum flux	N/m**2
ugrd10m	10 meter u wind	m/s
ugrd_hyblev1	layer 1 zonal wind	m/s
ulwrf	instantaneous surface upward longwave flux	W/m**2

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
ulwrf_ave	surface upward longwave flux	W/m**2
ulwrf_avetoa	top of atmos upward longwave flux	W/m**2
uswrf	instantaneous surface upward shortwave flux	W/m**2
uswrf_ave	averaged surface upward shortwave flux	W/m**2
uswrf_avetoa	top of atmos upward shortwave flux	W/m**2
v-gwd_ave	surface meridional gravity wave stress	N/m**2
vbdsf_ave	Visible Beam Downward Solar Flux	W/m**2
vddsf_ave	Visible Diffuse Downward Solar Flux	W/m**2
veg	vegetation fraction	fraction
vflx_ave	surface meridional momentum flux	N/m**2
vgrd10m	10 meter v wind	m/s
vgrd_hyblev1	layer 1 meridional wind	m/s
vtype	vegetation type in integer	number
w0	nsst coefficient3 to calculate d(tz)/d(ts)	n/a
wa_acc	total water storage in aquifer	kg/m**2
watr_acc	total water runoff	kg/m**2
wd	nsst coefficient4 to calculate d(tz)/d(ts)	n/a
weasd	surface snow water equivalent	kg/m**2
wilt	wilting point (volumetric)	Proportion
xs	nsst salinity content in diurnal thermocline layer	n/a
xt	nsst heat content in diurnal thermocline layer	k*m
xtts	nsst d(xt)/d(ts)	m
xu	nsst u-current content in diurnal thermocline layer	m2/s
xv	nsst v-current content in diurnal thermocline layer	m2/s
xz	nsst diurnal thermocline layer thickness	m
xzts	nsst d(xt)/d(ts)	m/k
zc	nsst sub-layer cooling thickness	m

## sfg\*\_control

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
time_iso	valid time	N/A
lon	T-cell longitude	degrees east
lat	T-cell latitude	degrees north
clwmr	cloud water mixing ratio	kg/kg
delz	height thickness	m
dpres	pressure thickness	pa
dzdt	vertical wind	m/sec
grle	graupel mixing ratio	kg/kg
hgtsfc	surface geopotential height	gpm
icmr	cloud ice mixing ratio	kg/kg
nicp	cloud ice water number concentration	/kg
ntmc	rain number concentration	/kg
o3mr	ozone mixing ratio	kg/kg
pressfc	surface pressure	pa
rwmr	rain water mixing ratio	kg/kg
snmr	snow water mixing ratio	kg/kg
spfh	specific humidity	kg/kg
tmp	temperature	K
ugrd	zonal wind	m/sec
vgrd	meridional wind	m/sec

## fv3\_increment6.nc

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
o3mr_inc	Ozone Increment	Kg/Kg
sphum_inc	Specific humidity increment	Kg/Kg
T_inc	temperature incmeent	T
u_inc	zonal wind increment	m/s
v_inc	meridional wind increment	m/s
delp_inc	pressure thickness increment	Pa
delz_inc	geometric thickness increment	m

## **mom6\_increment.nc**

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
pt_inc	Potential Temperature increments	K
s_inc	Salinity increments	PPT
h_fg	Background layer thickness	m/s
u_inc	Zonal velocity increments	m/s
v_inc	Meridional velocity increment	m/s

## ww3\_\*.nc

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
MAPSTA	status map	N/A
crs	N/A	N/A
uwnd	eastward_wind	m s-1
vwnd	northward_wind	m s-1
ice	sea ice area fraction	1
hs	significant height of wind and swell waves	m
t02	mean period T02	s
t01	mean period T01	s
fp	wave peak frequency	s-1
dir	wave mean direction	degree
dp	peak direction	degree
phs0	wave significant height partition 0	m
phs1	wave significant height partition 1	m
phs2	wave significant height partition 2	m
ptp0	peak period partition 0	s
ptp1	peak period partition 1	s
ptp2	peak period partition 2	s
pdir0	wave mean direction partition 0	degree
pdir1	wave mean direction partition 1	degree
pdir2	wave mean direction partition 2	degree



## GFSFLX\*Grb2

Variable name	Long name	Units
ACONDsfc	surface Aerodynamic conductance	m/s
ALBDOsfc	surface Albedo	%
CDUVBsfc	surface Clear sky UV-B Downward Solar Flux	W/m <sup>2</sup>
CNWATsfc	surface Plant Canopy Surface Water	kg/m <sup>2</sup>
CPOFPsfc	surface Percent frozen precipitation	%
CPRATsfc	surface Convective Precipitation Rate	kg/m <sup>2</sup> /s
CSDLFsfc	surface Clear Sky Downward Long Wave Flux	W/m <sup>2</sup>
CSDSFsfc	surface Clear Sky Downward Solar Flux	W/m <sup>2</sup>
CSULFsfc	surface Clear Sky Upward Long Wave Flux	W/m <sup>2</sup>
CSULFtoa	top of atmosphere Clear Sky Upward Long Wave Flux	W/m <sup>2</sup>
CSUSFsfc	surface Clear Sky Upward Solar Flux	W/m <sup>2</sup>
CSUSFtoa	top of atmosphere Clear Sky Upward Solar Flux	W/m <sup>2</sup>
CWORKclm	entire atmosphere (considered as a single layer) Cloud Work Function	J/kg
DLWRFavesfc	surface Downward Long-Wave Rad. Flux	W/m <sup>2</sup>
DLWRFsfc	surface Downward Long-Wave Rad. Flux	W/m <sup>2</sup>
DSWRFavesfc	surface Downward Short-Wave Radiation Flux	W/m <sup>2</sup>
DSWRFtoa	top of atmosphere Downward Short-Wave Radiation Flux	W/m <sup>2</sup>
DSWRFsfc	surface Downward Short-Wave Radiation Flux	W/m <sup>2</sup>
DUVBsfc	surface UV-B Downward Solar Flux	W/m <sup>2</sup>
EVBSsfc	surface Direct Evaporation from Bare Soil	W/m <sup>2</sup>
EVCWsfc	surface Canopy water evaporation	W/m <sup>2</sup>
FDNSSTMPsfc	surface Foundation Sea-Surface Temperature	K
FLDCPsfc	surface Field Capacity	Fraction
FRICVsfc	surface Frictional Velocity	m/s
GFLUXavesfc	surface Ground Heat Flux	W/m <sup>2</sup>
GFLUXsfc	surface Ground Heat Flux	W/m <sup>2</sup>
HCDChcll	high cloud layer High Cloud Cover	%
HGTsfc	surface Geopotential Height	gpm
HGThy1	1 hybrid level Geopotential Height	gpm
HPBLsfc	surface Planetary Boundary Layer Height	m
ICECsfc	surface Ice Cover	Proportion
ICETKsfc	surface Ice Thickness	m
LANDSfc	surface Land Cover (0=sea, 1=land)	Proportion
LCDClcll	low cloud layer Low Cloud Cover	%
LHTFLavesfc	surface Latent Heat Net Flux	W/m <sup>2</sup>
LHTFLsfc	surface Latent Heat Net Flux	W/m <sup>2</sup>
MCDCmcll	middle cloud layer Medium Cloud Cover	%
NBDSFsfc	surface Near IR Beam Downward Solar Flux	W/m <sup>2</sup>
NDDSFsfc	surface Near IR Diffuse Downward Solar Flux	W/m <sup>2</sup>
PEVPRavesfc	surface Potential Evaporation Rate	W/m <sup>2</sup>
PEVPRsfc	surface Potential Evaporation Rate	W/m <sup>2</sup>
PRATEsfc	surface Precipitation Rate	kg/m <sup>2</sup> /s
PRESlclb	low cloud bottom level Pressure	Pa

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
PRESlclt	low cloud top level Pressure	Pa
PRESmclb	middle cloud bottom level Pressure	Pa
PRESmclt	middle cloud top level Pressure	Pa
PRESlclb	high cloud bottom level Pressure	Pa
PRESlclt	high cloud top level Pressure	Pa
PRESsfc	surface Pressure	Pa
PREScllb	convective cloud bottom level Pressure	Pa
PRESclt	convective cloud top level Pressure	Pa
PWATclm	entire atmosphere (considered as a single layer) Precipitable Water	kg/m <sup>2</sup>
QMAX2m	2 m above ground Maximum specific humidity at 2m	kg/kg
QMIN2m	2 m above ground Minimum specific humidity at 2m	kg/kg
SBSNOsfc	surface Sublimation (evaporation from snow)	W/m <sup>2</sup>
SFCRsfc	surface Surface Roughness	m
SFEXCsfc	surface Exchange Coefficient	(kg/m <sup>3</sup> )(m/s)
SHTFLavesfc	surface Sensible Heat Net Flux	W/m <sup>2</sup>
SHTFLsfc	surface Sensible Heat Net Flux	W/m <sup>2</sup>
SLTYPsfc	surface Surface Slope Type	Index
SNODsfc	surface Snow Depth	m
SNOHFsf	surface Snow Phase Change Heat Flux	W/m <sup>2</sup>
SNOWCsfc	surface Snow Cover	%
SOILL0_10cm	0-0.1 m below ground Liquid Volumetric Soil Moisture (non Frozen)	Proportion
SOILL10_40cm	0.1-0.4 m below ground Liquid Volumetric Soil Moisture (non Frozen)	Proportion
SOILL40_100cm	0.4-1 m below ground Liquid Volumetric Soil Moisture (non Frozen)	Proportion
SOILL100_200cm	1-2 m below ground Liquid Volumetric Soil Moisture (non Frozen)	Proportion
SOILW0_10cm	0-0.1 m below ground Volumetric Soil Moisture Content	Fraction
SOILW10_40cm	0.1-0.4 m below ground Volumetric Soil Moisture Content	Fraction
SOILW40_100cm	0.4-1 m below ground Volumetric Soil Moisture Content	Fraction
SOILW100_200cm	1-2 m below ground Volumetric Soil Moisture Content	Fraction
SOILM0_200cm	0-2 m below ground Soil Moisture	kg/m <sup>3</sup>
SOTYPsfc	surface Soil Type	-
SPFH2m	2 m above ground Specific Humidity	kg/kg
SPFHhy1	1 hybrid level Specific Humidity	kg/kg
SSRUNsfc	surface Storm Surface Runoff	kg/m <sup>2</sup>
SUNSDsfc	surface Sunshine Duration	s
TCDCclm	entire atmosphere (considered as a single layer) Total Cloud Cover	%
TCDCblcll	boundary layer cloud layer Total Cloud Cover	%
TCDCccll	convective cloud layer Total Cloud Cover	%
TMAX2m	2 m above ground Maximum Temperature	K
TMIN2m	2 m above ground Minimum Temperature	K
TMPicl	low cloud top level Temperature	K
TMPmclt	middle cloud top level Temperature	K
TMPPhclt	high cloud top level Temperature	K
TMPsfc	surface Temperature	K
TMP2m	2 m above ground Temperature	K
TMPHy1	1 hybrid level Temperature	K

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
TRANSsfc	surface Transpiration	W/m <sup>2</sup>
TSOIL0_10cm	0-0.1 m below ground Soil Temperature	K
TSOIL10_40cm	0.1-0.4 m below ground Soil Temperature	K
TSOIL40_100cm	0.4-1 m below ground Soil Temperature	K
TSOIL100_200cm	1-2 m below ground Soil Temperature	K
UGWDsfc	surface Zonal Flux of Gravity Wave Stress	N/m <sup>2</sup>
UFLXsfc	surface Momentum Flux, U-Component	N/m <sup>2</sup>
UGRD10m	10 m above ground U-Component of Wind	m/s
UGRDhy1	1 hybrid level U-Component of Wind	m/s
ULWRFavesfc	surface Upward Long-Wave Rad. Flux	W/m <sup>2</sup>
ULWRFtoa	top of atmosphere Upward Long-Wave Rad. Flux	W/m <sup>2</sup>
ULWRFsfc	surface Upward Long-Wave Rad. Flux	W/m <sup>2</sup>
USWRFavesfc	surface Upward Short-Wave Radiation Flux	W/m <sup>2</sup>
USWRFtoa	top of atmosphere Upward Short-Wave Radiation Flux	W/m <sup>2</sup>
USWRFsfc	surface Upward Short-Wave Radiation Flux	W/m <sup>2</sup>
VGWDsfc	surface Meridional Flux of Gravity Wave Stress	N/m <sup>2</sup>
VBDSFsfc	surface Visible Beam Downward Solar Flux	W/m <sup>2</sup>
VDDSFsfc	surface Visible Diffuse Downward Solar Flux	W/m <sup>2</sup>
VEGsfc	surface Vegetation	%
VFLXsfc	surface Momentum Flux, V-Component	N/m <sup>2</sup>
VGRD10m	10 m above ground V-Component of Wind	m/s
VGRDhy1	1 hybrid level V-Component of Wind	m/s
VGTYPsfc	surface Vegetation Type	Integer(0-13)
WATRsfc	surface Water Runoff	kg/m <sup>2</sup>
WEASDsfc	surface Water Equivalent of Accumulated Snow Depth	kg/m <sup>2</sup>
WILTsfc	surface Wilting Point	Fraction
var20233sfc	surface desc	unit
var20235avesfc	surface desc	unit
var20235sfc	surface desc	unit
var20236sfc	surface desc	unit
var20237sfc	surface desc	unit
var20238sfc	surface desc	unit
var20239sfc	surface desc	unit

not all variables are available  
in the FH00 file

## GFSPRS\*Grb2

Variable name	Long name	Units
no4LFTXsfc	surface Best (4 layer) Lifted Index	K
ABSVprs	(1000 975 950 925 900.. 10 7 4 2 1) Absolute Vorticity	1/s
ACPCPsfc	surface Convective Precipitation	kg/m <sup>2</sup>
ALBDOsfc	surface Albedo	%
APCPsfc	surface Total Precipitation	kg/m <sup>2</sup>
APTMP2m	2 m above ground Apparent Temperature	K
BRTMPtoa	top of atmosphere Brightness Temperature	K
CAPEsfc	surface Convective Available Potential Energy	J/kg
CAPE180_0mb	180-0 mb above ground Convective Available Potential Energy	J/kg
CAPE90_0mb	90-0 mb above ground Convective Available Potential Energy	J/kg
CAPE255_0mb	255-0 mb above ground Convective Available Potential Energy	J/kg
CDUVBsfc	surface Clear sky UV-B Downward Solar Flux	W/m <sup>2</sup>
CFRZRavesfc	surface Categorical Freezing Rain	-
CFRZRsfsc	surface Categorical Freezing Rain	-
CICEPavesfc	surface Categorical Ice Pellets	-
CICEPsfc	surface Categorical Ice Pellets	-
CINsfc	surface Convective Inhibition	J/kg
CIN180_0mb	180-0 mb above ground Convective Inhibition	J/kg
CIN90_0mb	90-0 mb above ground Convective Inhibition	J/kg
CIN255_0mb	255-0 mb above ground Convective Inhibition	J/kg
CLMRprs	(1000 975 950 925 900.. 150 125 100 70 50) Cloud Mixing Ratio	kg/kg
CLMRhy1	1 hybrid level Cloud Mixing Ratio	kg/kg
CNWATsfc	surface Plant Canopy Surface Water	kg/m <sup>2</sup>
CPOFPsfc	surface Percent frozen precipitation	%
CPRATavesfc	surface Convective Precipitation Rate	kg/m <sup>2</sup> /s
CPRATsfc	surface Convective Precipitation Rate	kg/m <sup>2</sup> /s
CRAINavesfc	surface Categorical Rain	-
CRAINsfc	surface Categorical Rain	-
CSNOWavesfc	surface Categorical Snow	-
CSNOWsfc	surface Categorical Snow	-
CWATclm	entire atmosphere (considered as a single layer) Cloud Water	kg/m <sup>2</sup>
CWORKclm	entire atmosphere (considered as a single layer) Cloud Work Function	J/kg
DLWRFsfc	surface Downward Long-Wave Rad. Flux	W/m <sup>2</sup>
DPT2m	2 m above ground Dew Point Temperature	K
DPT30_0mb	30-0 mb above ground Dew Point Temperature	K
DSWRFsfc	surface Downward Short-Wave Radiation Flux	W/m <sup>2</sup>
DUVBsfc	surface UV-B Downward Solar Flux	W/m <sup>2</sup>
DZDTprs	(1000 975 950 925 900.. 10 7 4 2 1) Vertical Velocity (Geometric)	m/s
FLDCPsfc	surface Field Capacity	Fraction
FRICVsfc	surface Frictional Velocity	m/s
FROZRsfc	surface Frozen Rain	kg/m <sup>2</sup>
FRZRsfc	surface Freezing Rain	kg/m <sup>2</sup>
GFLUXsfc	surface Ground Heat Flux	W/m <sup>2</sup>

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
GRLEprs	(1000 975 950 925 900.. 150 125 100 70 50) Graupel	kg/kg
GRLEhy1	1 hybrid level Graupel	kg/kg
GUSTsfc	surface Wind Speed (Gust)	m/s
HDCDcavehcll	high cloud layer High Cloud Cover	%
HDCDchcll	high cloud layer High Cloud Cover	%
HGTsfc	surface Geopotential Height	gpm
HGTprs	(1000 975 950 925 900.. 10 7 4 2 1) Geopotential Height	gpm
HGT0p5pv	PV=5e-07 (Km <sup>2</sup> /kg/s) surface Geopotential Height	gpm
HGTneg0p5pv	PV=-5e-07 (Km <sup>2</sup> /kg/s) surface Geopotential Height	gpm
HGT1pv	PV=1e-06 (Km <sup>2</sup> /kg/s) surface Geopotential Height	gpm
HGTneg1pv	PV=-1e-06 (Km <sup>2</sup> /kg/s) surface Geopotential Height	gpm
HGT1p5pv	PV=1.5e-06 (Km <sup>2</sup> /kg/s) surface Geopotential Height	gpm
HGTneg1p5pv	PV=-1.5e-06 (Km <sup>2</sup> /kg/s) surface Geopotential Height	gpm
HGT2pv	PV=2e-06 (Km <sup>2</sup> /kg/s) surface Geopotential Height	gpm
HGTneg2pv	PV=-2e-06 (Km <sup>2</sup> /kg/s) surface Geopotential Height	gpm
HGTtop0C	highest tropospheric freezing level Geopotential Height	gpm
HGTceil	cloud ceiling Geopotential Height	gpm
HGT0C	0C isotherm Geopotential Height	gpm
HGTmwl	max wind Geopotential Height	gpm
HGTtrop	tropopause Geopotential Height	gpm
HINDEXsfc	surface Haines Index	Numeric
HLCY3000_0m	3000-0 m above ground Storm Relative Helicity	m <sup>2</sup> /s <sup>2</sup>
HLCY1000_0m	1000-0 m above ground Storm Relative Helicity	m <sup>2</sup> /s <sup>2</sup>
HPBLsfc	surface Planetary Boundary Layer Height	m
ICAHTmwl	max wind ICAO Standard Atmosphere Reference Height	m
ICAHTtrop	tropopause ICAO Standard Atmosphere Reference Height	m
ICECsfc	surface Ice Cover	Proportion
ICEG_10m	10 m above mean sea level Ice Growth Rate	m/s
ICETKsfc	surface Ice Thickness	m
ICETMPsfc	surface Ice Temperature	K
ICMRprs	(1000 975 950 925 900.. 150 125 100 70 50) Ice Water Mixing Ratio	kg/kg
ICMRhy1	1 hybrid level Ice Water Mixing Ratio	kg/kg
LANDsfc	surface Land Cover (0=sea, 1=land)	Proportion
LCDCavelcll	low cloud layer Low Cloud Cover	%
LCDCiclcll	low cloud layer Low Cloud Cover	%
LFTXsfc	surface Surface Lifted Index	K
LHTFLsfc	surface Latent Heat Net Flux	W/m <sup>2</sup>
MDCDCavemcll	middle cloud layer Medium Cloud Cover	%
MDCDCmcll	middle cloud layer Medium Cloud Cover	%
MNTSF320K	320 K isentropic level Montgomery Stream Function	m <sup>2</sup> /s <sup>2</sup>
MSLETmsl	mean sea level MSLP (Eta model reduction)	Pa
NCPCPsfc	surface Large-Scale Precipitation (non-convective)	kg/m <sup>2</sup>
O3MRprs	(1000 975 950 925 900.. 10 7 4 2 1) Ozone Mixing Ratio	kg/kg
PEVPRsfc	surface Potential Evaporation Rate	W/m <sup>2</sup>
PLI30_0mb	30-0 mb above ground Parcel Lifted Index (to 500 hPa)	K

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
PLPL255_0mb	255-0 mb above ground Pressure of level from which parcel was lifted	Pa
POTsig995	0.995 sigma level Potential Temperature	K
PRATEavesfc	surface Precipitation Rate	kg/m <sup>2</sup> /s
PRATEsfc	surface Precipitation Rate	kg/m <sup>2</sup> /s
PRESlclb	low cloud bottom level Pressure	Pa
PRESlclt	low cloud top level Pressure	Pa
PRESmclb	middle cloud bottom level Pressure	Pa
PRESmclt	middle cloud top level Pressure	Pa
PRESlclb	high cloud bottom level Pressure	Pa
PRESlclt	high cloud top level Pressure	Pa
PRESsfc	surface Pressure	Pa
PRES80m	80 m above ground Pressure	Pa
PRES0p5pv	PV=5e-07 (Km <sup>2</sup> /kg/s) surface Pressure	Pa
PRESneg0p5pv	PV=-5e-07 (Km <sup>2</sup> /kg/s) surface Pressure	Pa
PRES1pv	PV=1e-06 (Km <sup>2</sup> /kg/s) surface Pressure	Pa
PRESneg1pv	PV=-1e-06 (Km <sup>2</sup> /kg/s) surface Pressure	Pa
PRES1p5pv	PV=1.5e-06 (Km <sup>2</sup> /kg/s) surface Pressure	Pa
PRESneg1p5pv	PV=-1.5e-06 (Km <sup>2</sup> /kg/s) surface Pressure	Pa
PRES2pv	PV=2e-06 (Km <sup>2</sup> /kg/s) surface Pressure	Pa
PRESneg2pv	PV=-2e-06 (Km <sup>2</sup> /kg/s) surface Pressure	Pa
PREScllb	convective cloud bottom level Pressure	Pa
PREScllt	convective cloud top level Pressure	Pa
PRESmwl	max wind Pressure	Pa
PREStrop	tropopause Pressure	Pa
PRMSLmsl	mean sea level Pressure Reduced to MSL	Pa
PVORT320K	320 K isentropic level Potential Vorticity	Km <sup>2</sup> /kg/s
PWAT30_0mb	30-0 mb above ground Precipitable Water	kg/m <sup>2</sup>
PWATclm	entire atmosphere (considered as a single layer) Precipitable Water	kg/m <sup>2</sup>
REFCclm	entire atmosphere (considered as a single layer) Composite reflectivity	dB
REFD4000m	4000 m above ground Reflectivity	dB
REFD1000m	1000 m above ground Reflectivity	dB
REFDhy1	1 hybrid level Reflectivity	dB
REFDhy2	2 hybrid level Reflectivity	dB
RHprs	(1000 975 950 925 900.. 10 7 4 2 1) Relative Humidity	%
RH2m	2 m above ground Relative Humidity	%
RHsg330_1000	0.33-1 sigma layer Relative Humidity	%
RHsg440_1000	0.44-1 sigma layer Relative Humidity	%
RHsg720_940	0.72-0.94 sigma layer Relative Humidity	%
RHsg440_720	0.44-0.72 sigma layer Relative Humidity	%
RHsig995	0.995 sigma level Relative Humidity	%
RH30_0mb	30-0 mb above ground Relative Humidity	%
RH60_30mb	60-30 mb above ground Relative Humidity	%
RH90_60mb	90-60 mb above ground Relative Humidity	%
RH120_90mb	120-90 mb above ground Relative Humidity	%
RH150_120mb	150-120 mb above ground Relative Humidity	%
RH180_150mb	180-150 mb above ground Relative Humidity	%
RHclm	entire atmosphere (considered as a single layer) Relative Humidity	%
RHtop0C	highest tropospheric freezing level Relative Humidity	%
RH0C	0C isotherm Relative Humidity	%
RWMRprs	(1000 975 950 925 900.. 150 125 100 70 50) Rain Mixing Ratio	kg/kg
RWMRhy1	1 hybrid level Rain Mixing Ratio	kg/kg

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
SDENsfc	surface Snow Density	kg/m <sup>3</sup>
SFCRsfc	surface Surface Roughness	m
SHTFLsfc	surface Sensible Heat Net Flux	W/m <sup>2</sup>
SNMRprs	(1000 975 950 925 900.. 150 125 100 70 50) Snow Mixing Ratio	kg/kg
SNMRhy1	1 hybrid level Snow Mixing Ratio	kg/kg
SNODsfc	surface Snow Depth	m
SOILL0_10cm	0-0.1 m below ground Liquid Volumetric Soil Moisture (non Frozen)	Proportion
SOILL10_40cm	0.1-0.4 m below ground Liquid Volumetric Soil Moisture (non Frozen)	Proportion
SOILL40_100cm	0.4-1 m below ground Liquid Volumetric Soil Moisture (non Frozen)	Proportion
SOILL100_200cm	1-2 m below ground Liquid Volumetric Soil Moisture (non Frozen)	Proportion
SOILW0_10cm	0-0.1 m below ground Volumetric Soil Moisture Content	Fraction
SOILW10_40cm	0.1-0.4 m below ground Volumetric Soil Moisture Content	Fraction
SOILW40_100cm	0.4-1 m below ground Volumetric Soil Moisture Content	Fraction
SOILW100_200cm	1-2 m below ground Volumetric Soil Moisture Content	Fraction
SOTYPsfc	surface Soil Type	-
SPFHprs	(1000 975 950 925 900.. 10 7 4 2 1) Specific Humidity	kg/kg
SPFH2m	2 m above ground Specific Humidity	kg/kg
SPFH80m	80 m above ground Specific Humidity	kg/kg
SPFH30_0mb	30-0 mb above ground Specific Humidity	kg/kg
SPFH60_30mb	60-30 mb above ground Specific Humidity	kg/kg
SPFH90_60mb	90-60 mb above ground Specific Humidity	kg/kg
SPFH120_90mb	120-90 mb above ground Specific Humidity	kg/kg
SPFH150_120mb	150-120 mb above ground Specific Humidity	kg/kg
SPFH180_150mb	180-150 mb above ground Specific Humidity	kg/kg
SUNSDsfc	surface Sunshine Duration	s
TCDCaveclm	entire atmosphere (considered as a single layer) Total Cloud Cover	%
TCDCblcll	boundary layer cloud layer Total Cloud Cover	%
TCDCprs	(1000 975 950 925 900.. 150 125 100 70 50) Total Cloud Cover	%
TCDCclm	entire atmosphere (considered as a single layer) Total Cloud Cover	%
TCDCccll	convective cloud layer Total Cloud Cover	%
TMAX2m	2 m above ground Maximum Temperature	K
TMIN2m	2 m above ground Minimum Temperature	K
TMPicl	low cloud top level Temperature	K
TMPmcl	middle cloud top level Temperature	K
TMPhcl	high cloud top level Temperature	K
TMPsfc	surface Temperature	K
TMPprs	(1000 975 950 925 900.. 10 7 4 2 1) Temperature	K
TMP_305m	305 m above mean sea level Temperature	K
TMP_457m	457 m above mean sea level Temperature	K
TMP_610m	610 m above mean sea level Temperature	K
TMP_914m	914 m above mean sea level Temperature	K
TMP_1829m	1829 m above mean sea level Temperature	K
TMP_2743m	2743 m above mean sea level Temperature	K
TMP_3658m	3658 m above mean sea level Temperature	K
TMP_4572m	4572 m above mean sea level Temperature	K
TMP2m	2 m above ground Temperature	K
TMP80m	80 m above ground Temperature	K
TMP100m	100 m above ground Temperature	K
TMPsig995	0.995 sigma level Temperature	K
TMP320K	320 K isentropic level Temperature	K
TMP30_0mb	30-0 mb above ground Temperature	K

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
TMP60_30mb	60-30 mb above ground Temperature	K
TMP90_60mb	90-60 mb above ground Temperature	K
TMP120_90mb	120-90 mb above ground Temperature	K
TMP150_120mb	150-120 mb above ground Temperature	K
TMP180_150mb	180-150 mb above ground Temperature	K
TMP0p5pv	PV=5e-07 (Km <sup>2</sup> /kg/s) surface Temperature	K
TMPneg0p5pv	PV=-5e-07 (Km <sup>2</sup> /kg/s) surface Temperature	K
TMP1pv	PV=1e-06 (Km <sup>2</sup> /kg/s) surface Temperature	K
TMPneg1pv	PV=-1e-06 (Km <sup>2</sup> /kg/s) surface Temperature	K
TMP1p5pv	PV=1.5e-06 (Km <sup>2</sup> /kg/s) surface Temperature	K
TMPneg1p5pv	PV=-1.5e-06 (Km <sup>2</sup> /kg/s) surface Temperature	K
TMP2pv	PV=2e-06 (Km <sup>2</sup> /kg/s) surface Temperature	K
TMPneg2pv	PV=-2e-06 (Km <sup>2</sup> /kg/s) surface Temperature	K
TMPmwl	max wind Temperature	K
TMPtrop	tropopause Temperature	K
TOZNEclm	entire atmosphere (considered as a single layer) Total Ozone	DU
TSNOWPsfc	surface Total Snow Precipitation	kg/m <sup>2</sup>
TSOIL0_10cm	0-0.1 m below ground Soil Temperature	K
TSOIL10_40cm	0.1-0.4 m below ground Soil Temperature	K
TSOIL40_100cm	0.4-1 m below ground Soil Temperature	K
TSOIL100_200cm	1-2 m below ground Soil Temperature	K
UGWDsfc	surface Zonal Flux of Gravity Wave Stress	N/m <sup>2</sup>
UFLXsfc	surface Momentum Flux, U-Component	N/m <sup>2</sup>
UGRDprs	(1000 975 950 925 900.. 10 7 4 2 1) U-Component of Wind	m/s
UGRD_305m	305 m above mean sea level U-Component of Wind	m/s
UGRD_457m	457 m above mean sea level U-Component of Wind	m/s
UGRD_610m	610 m above mean sea level U-Component of Wind	m/s
UGRD_914m	914 m above mean sea level U-Component of Wind	m/s
UGRD_1829m	1829 m above mean sea level U-Component of Wind	m/s
UGRD_2743m	2743 m above mean sea level U-Component of Wind	m/s
UGRD_3658m	3658 m above mean sea level U-Component of Wind	m/s
UGRD_4572m	4572 m above mean sea level U-Component of Wind	m/s
UGRD10m	10 m above ground U-Component of Wind	m/s
UGRD20m	20 m above ground U-Component of Wind	m/s
UGRD30m	30 m above ground U-Component of Wind	m/s
UGRD40m	40 m above ground U-Component of Wind	m/s
UGRD50m	50 m above ground U-Component of Wind	m/s
UGRD80m	80 m above ground U-Component of Wind	m/s
UGRD100m	100 m above ground U-Component of Wind	m/s
UGRDsig995	0.995 sigma level U-Component of Wind	m/s
UGRD320K	320 K isentropic level U-Component of Wind	m/s
UGRD30_0mb	30-0 mb above ground U-Component of Wind	m/s
UGRD60_30mb	60-30 mb above ground U-Component of Wind	m/s
UGRD90_60mb	90-60 mb above ground U-Component of Wind	m/s
UGRD120_90mb	120-90 mb above ground U-Component of Wind	m/s
UGRD150_120mb	150-120 mb above ground U-Component of Wind	m/s
UGRD180_150mb	180-150 mb above ground U-Component of Wind	m/s
UGRD0p5pv	PV=5e-07 (Km <sup>2</sup> /kg/s) surface U-Component of Wind	m/s
UGRDneg0p5pv	PV=-5e-07 (Km <sup>2</sup> /kg/s) surface U-Component of Wind	m/s
UGRD1pv	PV=1e-06 (Km <sup>2</sup> /kg/s) surface U-Component of Wind	m/s
UGRDneg1pv	PV=-1e-06 (Km <sup>2</sup> /kg/s) surface U-Component of Wind	m/s



<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
UGRD1p5pv	PV=1.5e-06 (Km <sup>2</sup> /kg/s) surface U-Component of Wind	m/s
UGRDneg1p5pv	PV=-1.5e-06 (Km <sup>2</sup> /kg/s) surface U-Component of Wind	m/s
UGRD2pv	PV=2e-06 (Km <sup>2</sup> /kg/s) surface U-Component of Wind	m/s
UGRDneg2pv	PV=-2e-06 (Km <sup>2</sup> /kg/s) surface U-Component of Wind	m/s
UGRDpbl	planetary boundary layer U-Component of Wind	m/s
UGRDmwl	max wind U-Component of Wind	m/s
UGRDtrop	tropopause U-Component of Wind	m/s
ULWRFsfc	surface Upward Long-Wave Rad. Flux	W/m <sup>2</sup>
ULWRFtoa	top of atmosphere Upward Long-Wave Rad. Flux	W/m <sup>2</sup>
USTM6000_0m	6000-0 m above ground U-Component Storm Motion	m/s
USWRFsfc	surface Upward Short-Wave Radiation Flux	W/m <sup>2</sup>
USWRFtoa	top of atmosphere Upward Short-Wave Radiation Flux	W/m <sup>2</sup>
VGWDsfc	surface Meridional Flux of Gravity Wave Stress	N/m <sup>2</sup>
VEGsfc	surface Vegetation	%
VFLXsfc	surface Momentum Flux, V-Component	N/m <sup>2</sup>
VGRDprs	(1000 975 950 925 900.. 10 7 4 2 1) V-Component of Wind	m/s
VGRD_305m	305 m above mean sea level V-Component of Wind	m/s
VGRD_457m	457 m above mean sea level V-Component of Wind	m/s
VGRD_610m	610 m above mean sea level V-Component of Wind	m/s
VGRD_914m	914 m above mean sea level V-Component of Wind	m/s
VGRD_1829m	1829 m above mean sea level V-Component of Wind	m/s
VGRD_2743m	2743 m above mean sea level V-Component of Wind	m/s
VGRD_3658m	3658 m above mean sea level V-Component of Wind	m/s
VGRD_4572m	4572 m above mean sea level V-Component of Wind	m/s
VGRD10m	10 m above ground V-Component of Wind	m/s
VGRD20m	20 m above ground V-Component of Wind	m/s
VGRD30m	30 m above ground V-Component of Wind	m/s
VGRD40m	40 m above ground V-Component of Wind	m/s
VGRD50m	50 m above ground V-Component of Wind	m/s
VGRD80m	80 m above ground V-Component of Wind	m/s
VGRD100m	100 m above ground V-Component of Wind	m/s
VGRDsig995	0.995 sigma level V-Component of Wind	m/s
VGRD320K	320 K isentropic level V-Component of Wind	m/s
VGRD30_0mb	30-0 mb above ground V-Component of Wind	m/s
VGRD60_30mb	60-30 mb above ground V-Component of Wind	m/s
VGRD90_60mb	90-60 mb above ground V-Component of Wind	m/s
VGRD120_90mb	120-90 mb above ground V-Component of Wind	m/s
VGRD150_120mb	150-120 mb above ground V-Component of Wind	m/s
VGRD180_150mb	180-150 mb above ground V-Component of Wind	m/s
VGRD0p5pv	PV=5e-07 (Km <sup>2</sup> /kg/s) surface V-Component of Wind	m/s
VGRDneg0p5pv	PV=-5e-07 (Km <sup>2</sup> /kg/s) surface V-Component of Wind	m/s
VGRD1pv	PV=1e-06 (Km <sup>2</sup> /kg/s) surface V-Component of Wind	m/s
VGRDneg1pv	PV=-1e-06 (Km <sup>2</sup> /kg/s) surface V-Component of Wind	m/s
VGRD1p5pv	PV=1.5e-06 (Km <sup>2</sup> /kg/s) surface V-Component of Wind	m/s
VGRDneg1p5pv	PV=-1.5e-06 (Km <sup>2</sup> /kg/s) surface V-Component of Wind	m/s
VGRD2pv	PV=2e-06 (Km <sup>2</sup> /kg/s) surface V-Component of Wind	m/s
VGRDneg2pv	PV=-2e-06 (Km <sup>2</sup> /kg/s) surface V-Component of Wind	m/s
VGRDpbl	planetary boundary layer V-Component of Wind	m/s
VGRDmwl	max wind V-Component of Wind	m/s
VGRDtrop	tropopause V-Component of Wind	m/s
VISsfc	surface Visibility	m

<b>Variable name</b>	<b>Long name</b>	<b>Units</b>
VRATEpbl	planetary boundary layer Ventilation Rate	m <sup>2</sup> /s
VSTM6000_0m	6000-0 m above ground V-Component Storm Motion	m/s
VVELprs	(1000 975 950 925 900.. 10 7 4 2 1) Vertical Velocity (Pressure)	Pa/s
VVELsig995	0.995 sigma level Vertical Velocity (Pressure)	Pa/s
VWSH0p5pv	PV=5e-07 (Km <sup>2</sup> /kg/s) surface Vertical Speed Shear	1/s
VWSHneg0p5pv	PV=-5e-07 (Km <sup>2</sup> /kg/s) surface Vertical Speed Shear	1/s
VWSH1pv	PV=1e-06 (Km <sup>2</sup> /kg/s) surface Vertical Speed Shear	1/s
VWSHneg1pv	PV=-1e-06 (Km <sup>2</sup> /kg/s) surface Vertical Speed Shear	1/s
VWSH1p5pv	PV=1.5e-06 (Km <sup>2</sup> /kg/s) surface Vertical Speed Shear	1/s
VWSHneg1p5pv	PV=-1.5e-06 (Km <sup>2</sup> /kg/s) surface Vertical Speed Shear	1/s
VWSH2pv	PV=2e-06 (Km <sup>2</sup> /kg/s) surface Vertical Speed Shear	1/s
VWSHneg2pv	PV=-2e-06 (Km <sup>2</sup> /kg/s) surface Vertical Speed Shear	1/s
VWSHtrop	tropopause Vertical Speed Shear	1/s
WATRsfc	surface Water Runoff	kg/m <sup>2</sup>
WEASDsfc	surface Water Equivalent of Accumulated Snow Depth	kg/m <sup>2</sup>
WILTsfc	surface Wilting Point	Fraction
var20233sfc	surface desc	unit

3d variables are on the following pressure surfaces: 1000 975 950 925  
900 875 850 825 800 775 750 725 700 675 650 625 600 575 550 525  
500 475 450 425 400 375 350 325 300 275 250 225 200 175 150 125  
100 70 50 40 30 20 15 10 7 5 3 2 1 7 4 2 1 0.7 0.4 0.2 0.1 hPa

not all variables are available in the FH00 file