Snow_L2

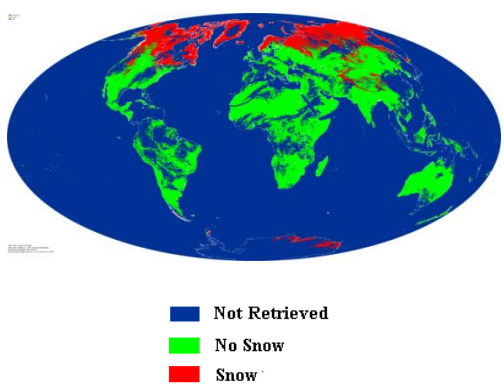
NPP_VSCM_L2

The VIIRS Snow Cover suite of products includes the Snow Cover Binary Map (VSCM) and the Snow Cover Fraction Map (VCSD). The Snow Cover Binary Map is a swath product. It will be produced at 375m maximum spatial resolution in the daytime. Snow will be identified only in pixels defined as confidently clear. The requirement for this EDR is 90% probability of correct typing. The input data will consist of a two-dimensional grid of surface pixels for each of three VIIRS imagery resolution bands in the form of geolocated TOA reflectance, supplied by the VIIRS EV_375M SDR.

VSCM algorithm heritage is the MODIS snow cover algorithm, a normalized-difference snow index (NDSI) based algorithm that screens for snow detection errors. It is limited to NDSI range of 0.4-1.0 for snow detection. The VIIRS cloud mask (VCM) is used for cloud masking. Quality flags (QF) are set for input data quality, cloud information, and scene conditions. QFs are extracted for quality assessment and to make thematic maps of snow cover extent (i.e include clouds, water bodies on the map).

The 'Thermal Threshold Exceeded' screen will probably exclude a large fraction of snow cover on mountain ranges in late spring through summer. Problems with surface temperature screening has been documented in MODIS C5 snow maps (modis-snow-ice.gsfc.nasa.gov/?c=collection6). Accuracy estimates are based on visual interpretation, comparison to ground station snow depth data, and comparison to MODIS snow cover maps.

Snow Map



Dimensions:

Along_Track:SnowMap = 6144 ;
Along_Scan:SnowMap = 6400 ;

Variables

byte SnowCoverBinaryMap(Along_Track:SnowMap, Along_Scan:SnowMap)

FILL_VALUES:...NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254

ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

byte QF1_VIIRSSCDBINARYSNOWMAPEDR(Along_Track:SnowMap, Along_Scan:SnowMap)

FILL_VALUES:….NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

byte QF2_VIIRSSCDBINARYSNOWMAPEDR(Along_Track:SnowMap, Along_Scan:SnowMap)

FILL_VALUES:…NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

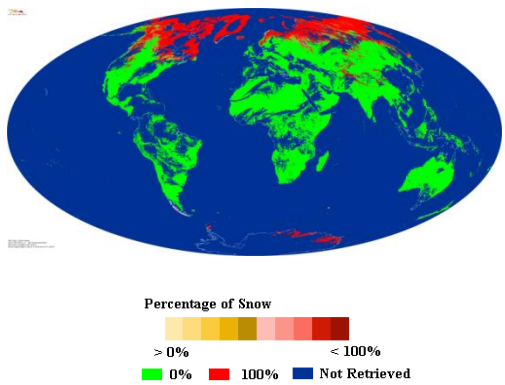
byte QF3_VIIRSSCDBINARYSNOWMAPEDR(Along_Track:SnowMap, Along_Scan:SnowMap)

FILL_VALUES:…NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

NPP_VSCD_L2

The Snow Cover Algorithm is based on the MODIS Snow Cover algorithm and produces a binary type map with values of " snow " or "no snow ". The algorithm primarily uses the surface reflectance in three VIIRS imagery bands to make the map. The input data for the snow cover fraction will consist of the binary snow cover map which will be aggregated to a fraction using a 2x2 aggregation of the imagery resolution snow binary map. Snow fraction computed using 2x2 aggregation of the binary snow mask, results in reporting of snow fraction in 25% increments.

Snow Cover Fraction



Dimensions:

Along_Track:SnowFraction = 2304 ;
Along_Scan:SnowFraction = 3200 ;

Variables:

short SnowCoverFraction(Along_Track:SnowFraction, Along_Scan:SnowFraction)

Scale = 1.5260885e-05f ;
Offset = 0.f ;

FILL_VALUES:...NA_UINT16_FILL = 65535
MISS_UINT16_FILL = 65534
ONBOARD_PT_UINT16_FILL = 65533
ONGROUND_PT_UINT16_FILL = 65532
ERR_UINT16_FILL = 65531
ELLIPSOID_UINT16_FILL = 65530
VDNE_UINT16_FILL = 65529
SOUB_UINT16_FILL = 65528

byte NumberOfAggregatedPixels(Along_Track:SnowFraction, Along_Scan:SnowFraction)

FILL_VALUES:...NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253

ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

byte QF1_VIIRSSCDBINARYSNOWFRACEDR(Along_Track:SnowFraction, Along_Scan:SnowFraction)

FILL_VALUES:…NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

byte QF2_VIIRSSCDBINARYSNOWFRACEDR(Along_Track:SnowFraction, Along_Scan:SnowFraction)

FILL_VALUES:…NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249
SOUB_UINT8_FILL = 248

byte QF3_VIIRSSCDBINARYSNOWFRACEDR(Along_Track:SnowFraction, Along_Scan:SnowFraction)

FILL_VALUES:…NA_UINT8_FILL = 255
MISS_UINT8_FILL = 254
ONBOARD_PT_UINT8_FILL = 253
ONGROUND_PT_UINT8_FILL = 252
ERR_UINT8_FILL = 251
ELLIPSOID_UINT8_FILL = 250
VDNE_UINT8_FILL = 249