

## SUPPORTING INFORMATION:

Please refer to the following paper for information about this data product:

Moore C, Kampf S, Stone B, Richer E. 2014. A GIS-based method for defining snow zones: application to the western United States. Geocarto International, DOI 10.1080/10106049.2014.885089.

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## General Summary:

These files were created by Cara Moore ([cara.christine.moore@gmail.com](mailto:cara.christine.moore@gmail.com)) and Brandon Stone ([bhstone@rams.colostate.edu](mailto:bhstone@rams.colostate.edu)) under the guidance of Stephanie Kampf at Colorado State University ([stephanie.kampf@colostate.edu](mailto:stephanie.kampf@colostate.edu)) in July, 2012. Please feel free to contact the above mentioned people if you have any questions regarding the files. The files were created with NASA MODIS/Terra Snow Cover 8-Day L3 Global 500m Grid, Version 5 (Product code MOD10A2) and NASA MODIS/Terra Land Surface Temperature and Emissivity 8-Day L3 Global 1km product (Product code MOD11A2) for 2000-2010. For each 8-day image, all MODIS tiles were mosaicked and reprojected to Albers Equal Area

Conic NAD83 to produce a 2000-2010 time series of snow covered area (SCA) and land surface temperature (LST) for the western U.S. We calculated the snow cover index (SCI), an index of snow climatology, for each 8-day image from 2000-2010 as  $SCI = S/(n - C)$  where S is the number of pixels classified as snow, n is the total number of pixels, and C is the number of pixels classified as cloud. We then calculate snow persistence (SP) as the average value of SCI from January 1 - July 3, which encompasses the time period of peak snow accumulation through complete snow ablation in most parts of the western U.S. This integrative variable captures the dominant tendency of an area to be snow covered or snow-free. We produce two SP data products, one with a cloud threshold that excludes pixels with cloud cover in greater than 30% of the time period from 2000-2010 (SCI\_SP\_Avg30cc.tif), and one without a cloud threshold (SCI\_SP\_Avg0cc.tif). We created shapefiles for 4 different snow zones based on snow persistence: the intermittent snow zone (ISZ) with an SP of 25-50% (ISZ\_0cc.shp for 0% cloud threshold and ISZ\_30cc.shp for 30% cloud threshold); the transitional seasonal snow zone (TSZ) with an SP of 50-75% (TSZ\_0cc.shp for 0% cloud threshold and TSZ\_30cc.shp for 30% cloud threshold); the persistent snow zone (PSZ) with an SP of 75%-100% (PSZ\_0cc.shp for 0% cloud threshold and PSZ\_30cc.shp for 30% cloud threshold); and the seasonal snow zone (SSZ), which is the combination of the TSZ and the PSZ with an SP of 50-100% (SSZ\_0cc.shp for 0% cloud threshold and SSZ\_30cc.shp for 30% cloud threshold). We also include a shapefile for the areas excluded by the 30% cloud threshold (CC\_30cc.shp). Within the SSZ, for each 8-day period we calculate 2000-2010 average LST for each pixel, which is then averaged from January 1 - March 29 (LST\_in\_SSZ.tif).

#### SUMMARY OF FILES:

##### Snow persistence:

SCI\_SP\_0cc.tif: Snow persistence (SP; 2000-2010 SCI averaged from Jan 1 – Jul 3) without a cloud threshold; NO DATA = -1; SP as ratio from 0 to 1

SCI\_SP\_30cc.tif: Snow persistence (SP; 2000-2010 SCI averaged from Jan 1 – Jul 3) with 30% cloud threshold; CLOUD = -2; NO DATA = -1; SP as ratio from 0 to 1

##### Land surface temperature:

LST\_in\_SSZ.tif: Jan 1 – Mar 29 2000-2010 average land surface temperature (LST) NO DATA = -99.

Units degrees C.

Snow zones:

ISZ\_0cc.shp: Intermittent snow zone (ISZ) without a cloud threshold

ISZ\_30cc.shp: Intermittent snow zone (ISZ) with 30% cloud threshold

TSZ\_0cc.shp: Transitional snow zone (TSZ) without a cloud threshold

TSZ\_30cc.shp: Transitional snow zone (TSZ) with 30% cloud threshold

PSZ\_0cc.shp: Persistent snow zone (PSZ) without a cloud threshold

PSZ\_30cc.shp: Persistent snow zone (PSZ) with a cloud threshold

SSZ\_0cc.shp: Seasonal snow zone (SSZ) without a cloud threshold

SSZ\_30cc.shp: Seasonal snow zone (SSZ) with 30% cloud threshold

CC\_30cc.shp: Areas with any 8-day snow cover index (SCI) that contains > 30% cloud cover

MISSING DATA:

SCA

Day 001, 2000

Day 009, 2000

Day 017, 2000

Day 025, 2000

Day 033, 2000

Day 041, 2000

Day 049, 2000

Day 169, 2001

Day 177, 2001

Day 081, 2002

Day 113, 2008

LST

Day 001, 2000

Day 009, 2000

Day 017, 2000

Day 025, 2000

Day 033, 2000

Day 041, 2000

Day 049, 2000

Day 361, 2000

Day 001, 2001

Day 009, 2001

Day 017, 2001

Day 089, 2001

Day 169, 2001

Day 177, 2001

Day 153, 2007