

EGU21-881

<https://doi.org/10.5194/egusphere-egu21-881>

EGU General Assembly 2021

© Author(s) 2023. This work is distributed under the Creative Commons Attribution 4.0 License.



Producing Daily Landsat Snow Cover Time-Series Data

Fatemeh Zakeri and Gregoire Mariethoz

University of Lausanne, Institute of Earth Surface Dynamics, Switzerland (fatemeh.zakeri@unil.ch)

Snow cover maps are critical for hydrological studies as well as climate change impacts assessment. Remote sensing plays a vital role in providing snow cover information. However, acquisition limitations such as clouds, shadows, or revisiting time limit accessing daily complete snow cover maps obtained from remote sensing. This study explores the generation of synthetic daily Landsat time-series data focusing on snow cover using available Landsat data and climate data for 2020 in the Western Swiss Alps (Switzerland).

Landsat surface reflectance is predicted using all available Landsat imagery from 1984 to 2020 and ERA5 reanalysis precipitation and air temperature daily data in this study. For a given day where there is no Landsat data, the proposed procedure computes a similarity metric to find a set of days having a similar climatic pattern and for which satellite data is available. These best match images constitute possible snow cover scenarios on the target day and can be used as stochastic input to impact models.

Visual comparison and quantitative assessment are used to evaluate the accuracy of the generated images. In both accuracy assessments, some real Landsat data are omitted from the searching data set, and synthetic images are compared visually with real Landsat images. In the quantitative evaluation, the RSME between the real and artificial images is computed in a cross-validation fashion. Both accuracy procedures demonstrate that the combination of Landsat and climate data can predict Landsat's daily reflectance focusing on snow cover.