Introduction
The objective of the analysis was to evaluate continuity among the MODIS and VIIRS snow cover data products to determine if they provide a snow cover extent data record suitable for research on snow cover climatology e.g., snow cover duration, and snow cover start and end dates.

Data Products and Method.
Three regions were studied, 1) the Northwestern US, 1–11 March 2021, 2) the Sierra Nevada region 1 December 2022–31 January 2023, and 3) the Buffalo, NY, US region 1 December 2022–31 January 2023. Comparisons of snow cover extent (SCE) among the MODIS Terra and Aqua, and VIIRS SNPP and JPSS1 daily cloud-gap-filled (CGF) products MOD10A1F, MYD10A1F, VNP10A1F, and VJ110A1F, respectively were done. The MODIS and VIIRS CGF products provide a daily “cloud free” view of SCE.

The NDSI snow cover data layer in a product was converted to binary SCE by defining snow cover as an NDSI snow cover value in the 10–100 data range. Snow cover extent is the total area of SCE observed on a day, calculated as the number of cells with snow cover multiplied by cell area.

Northwestern US
The SCE maps among the MOD10A1F, MYD10A1F, VNP10A1F, and VJ110A1F products are very similar region over 1–11 March 2021. Large differences or inconsistencies in SCE among the four SCE products are not visually apparent in the SCE maps 1–2 March 2021, days with lesser cloud cover, and the SCE areas are very similar over the period of 1–11 March. There were no snow events during this time period thus the SCE area is nearly constant day-to-day with a gradual decrease over time which is attributable to snow cover ablation.

Sierra Nevada Region
Between 1 December 2022 and 31 January 2023, there were days with clear views of the surface interspersed with days of cloud cover in the region. We think that the cloud-gap filled SCE products are adequately representing the changing snow conditions in this Sierra Nevada region study area. In the beginning of the time series, from 1-4 December there was an overnight snow event 1-2 December that deposited snow on the mountains and valleys. It is likely that the more conservative Aqua cloud mask erroneously mapped much of that snow as cloud thus snow was not mapped by Aqua and subsequent days of cloud cover over the region interfered with a return to close agreement in SCE among the three products. The Terra MODIS and NPP VIIRS data products did not have that same problem with the cloud masking and thus mapped snow from 1-4 December.

Buffalo, NY Region
Lake effect snow events occur frequently in this region and cloud cover conditions can change between the morning and afternoon satellite overpasses. Between 1 December 2022 and 31 January 2023, there were very few clear views of the surface. Additionally, a few lake effect snowstorms and ablation events occurred thus we do not expect that the CGF SCE products can adequately capture the rapidly-changing snow conditions in this area of western New York state at this time of year.