

## Change in the Andes Mountains Snow Cover from 2000 to 2014

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**Abstract.** The Andes is the world's highest mountain range outside of Asia and has a wide variety of climates across more than 7,000 km. Changes in snow cover in the Andes mountains have not been studied in detail due to sparse and unevenly distributed climate data. Remote sensing offers the opportunity to document snow cover change throughout the region in the last 15 years. To track these changes, we used the Moderate Resolution Imaging Spectroradiometer (MODIS) satellite sensors, which provide 500m, 8-day maximum snow cover extent. We calculated annual snow persistence (SP), which represents the fraction of time with snow cover for each year, and we ran Mann-Kendall trend analyses to identify areas of decrease, increase, or no change of SP from 2000-2014. The results show limited changes in SP between 8-27°S and a significant decrease in SP (1-3% yearly) between latitudes 27°S – 36°S. These decreases in SP are were at elevations over 5,000 m at latitude 27°S and over 2,000 m at latitude 36°S. The East side of the Andes has a larger area of decreasing SP than the West side. Patterns of declining SP correspond with a significant decrease in precipitation over this time period. The MODIS-based product developed is an initial template for defining areas most sensitive to changing climate in the Andes Mountains, but cloud cover in the southern Andes limits the application of this method to areas south of 36°S.