Spatial extent of snow has been declared as an essential climate variable. Accurate modeling of snow cover is crucial for the better prediction of snow water equivalent and, consequently, for the success of general circulation and weather forecasting models as well as climate change and hydrological studies. This presentation mainly focuses on the representation of the latest findings of our efforts in fractional snow cover mapping on MODIS images by data-driven machine learning methodologies. For this purpose, a dataset composed of 20 MODIS - Landsat 8 image pairs acquired between Apr 2013 and Dec 2016 over European Alps were employed. Artificial neural networks (ANN), multivariate adaptive regression splines (MARS), support vector regression (SVR) and random forest (RF) models were trained and tested by using reference FSC maps generated from higher spatial resolution Landsat 8 binary snow maps. ANN, MARS, SVR and RF models exhibited quite good performance with average R = 0.93, whereas the agreement between the reference FSC maps and the MODIS’ own product MOD10A1 (C5) was slightly poorer with R = 0.88.