

## **ABSTRACT**

Data from RADARSAT2 satellite mission are used for improving the estimate of land variables such as soil moisture and forest biomass. The paper investigates on possible improvement regarding information at regional scale on soil moisture in bare and grassland covered soil. The topography of mountainous regions is also considered in the inversion procedure. The potential of having available different polarizations and synergy with ALOS L-band data are additional issues addressed by the study. Investigations on the estimation of vegetation biomass from polarimetric data and vegetation stratification procedures is also considered as well as the possibility of assimilating the estimated biophysical parameters into hydrological models. The Mazia valley, located in South Tyrol (Northern Italy), is the test site for the study.