EGU21-16196
https://doi.org/10.5194/egusphere-egu21-16196
EGU General Assembly 2021

Characterization of Alpine peatlands based on remote sensing of vegetation and water content

Sonia Silvestri and Alessandra Borgia
Universita' di Bologna, BiGeA, Italy (sonia.silvestri5@unibo.it)

Storing up to 70 kg of carbon per cubic meter, peatlands are among the most carbon-dense environments in the world. If in pristine conditions, peatlands support a number of ecosystem services as for example water retention and mitigation of droughts and floods, water purification, water availability to wildlife. Their preservation is one of the main goals of the EU policy and of other initiatives around the world.

Despite their importance, Alpine peatlands have been rarely studied and their presence is not even included in the EU maps, as for example the JRC Relative Cover of Peat Soils map, and only some sites are included in the Corine Land Cover map. The precise localization of peatland sites and the assessment of their extent is the first fundamental step for the implementation of adequate conservation policies. To this end, satellite remote sensing is the ideal instrument to provide adequate spatial resolution to detect and characterize Alpine peatlands at the regional scale. In this study, we use Sentinal-2 satellite data combined with 2m spatial resolution digital elevation model (from LiDAR data) to detect and quantify the extent of peatlands in the Trentino - Alto Adige region, an area of about 12,000 sq km located in the heart of the Italian Alpine region. Ground truth data include 71 peatlands that cover a total surface of more than 2,000 sq m. Field campaigns and lab analyses on some selected sites show that, on average, the sampled peatlands have depth of about 1m, Bulk Density of 0.128 g cm^{-3} and LOI of 63%, hence indicating that the organic carbon content by soil volume is high, being on average 0.04 g cm^{-3}. Satellite data analysis allowed us to detect a large number of peatland sites with high accuracy, thus confirming the importance of Alpine peatlands as carbon stock sites for the region. Moreover, thanks to the correlation between two indices (NDVI and NDWI) we could characterize the water content of these sites, hence analyzing its seasonal variation and inferring possible future scenarios linked to climate change effects.