**New satellite technology tested in the Schnalstal/Senales valley to measure the thermal conductivity of snow and monitor water resources**

**In the past few days, a small Cessna aircraft carrying an experimental technology flew over the Senales Valley in South Tyrol between Vernagt /Vernago Lake and Grawand /Croda delle Cornacchie. Over the course of two flights, over a clearly defined path, a sensor measured the heat exchange between snow and air. On the ground, along the same routes, eight teams led by Eurac Research experts measured snow depth with scaled rods and weighed the snow to determine its type. If analysis of the data collected proves the technology is reliable and the measurements match those taken on the ground, it could go on to be mounted on satellites to help monitor how snow depth changes over the course of the season more accurately, and how much melted snow slides downhill as a result.**

**The study came about through a collaboration between Eurac Research, Milano Bicocca University and the Italian space agency (ASI), with the participation of the Office for Hydrology and Dams of the Autonomous Province of Bolzano, the foresters of Naturns/Naturno, ARPA Valle d'Aosta (Regional Environmental Protection Agency) and the CNR IRPI (National Research Council), and the support of the Alpin Arena Schnals Senales.**

The first flight arrived in the valley around 7 a.m., the second around 1 p.m. During each flight the Cessna zigzagged over the area at an altitude of 5,000 meters for about 40 minutes. For the research team, having the same flight at different times of the day was critical. “Until now, to monitor snow we have used satellite images that measure direct properties such as depth and density,” explains Carlo Marin, a remote sensing engineer at Eurac Research. “Instead, this technique developed by University Milano Bicocca measures how the snow breathes, that is, the heat exchange between the snow and the air. From this information we can gauge properties such as density and type of snow. In the early morning flight, the temperature is cooler, and in the warmer hours of the day, the surface layer of snow is warmer due to higher temperatures and sunlight. The difference in temperature relates to how different types of snow exchange heat with their surroundings. In addition, the experimental sensor images promise very high resolution.”

As the small Cessna plane flew along 12 strips technically known as “transects”, 22 people were in place on the ground to measure the depth of the snow and its weight at three-meter intervals. And by doing so, were able to determine the snow density: the wetter being heavier, the lighter, powdery and finer. Some research teams were not far from lifts, but others had to reach remote spots, such as the Teufelsegg peak, in below the Weisskugel/Palla Bianca (3,738 m), by trekking for hours with skis, ski skins and backpacks loaded with equipment. One team was also accompanied by technicians carrying the same type of sensor as the one mounted on the plane to further corroborate the measurements from the ground.

In the coming months, the research team will cross-reference the measurement results and test whether the technology is mature enough to be installed on a satellite and become operational.

“In light of the climate crisis making water an increasingly scarce and valuable commodity, carefully calculating the presence of snow, especially at high altitudes, will become increasingly important in more accurately estimating the availability of water for the summer season and as such, give support to those who have to administer this resource,” concludes Marin.

Bolzano, 06.04.2023

***Contact****:* Valentina Bergonzi, valentina.bergonzi@eurac.edu, Tel. 0471 055 038, 347 9767336