Photo: Michael Gebhardt / Environmental Research Station Schneefernerhaus

# High above the Clouds?

No – right in the middle is the place to be! This is because both the global climate and local weather events are extremely dependent on cloud formation. Located just under the peak of the Zugspitze mountain and frequently cloaked in dense cloud, the Schneefernerhaus provides the perfect conditions for scientists of the Max Planck Institute for Dynamics and Self-Organization to study clouds from a direct and immediate perspective. Operating as a hotel until the early 1990s, the Schneefernerhaus is now Germany's highest environmental research station. Here, the researchers from Göttingen aim to measure how, in the turbulent flows of a cloud, tiny droplets of water collide with one another before combining to form larger droplets and, ultimately, rain. It is precisely this phase of droplet formation that is very difficult to reproduce in laboratory conditions or to numerically simulate.

After four years of preparatory work, 6.5 tons of equipment were transported from Göttingen to Garmisch-Partenkirchen, at the foot of the Alps, and, using a special heavy-load helicopter, installed on the tower terrace of the Schneefernerhaus. The heart of the measurement apparatus is the "seesaw," which basically allows a sled to "ride along" in the main flow of a passing cloud. Four high-speed cameras photograph the cloud particles, which are illuminated with a powerful laser. This makes it possible to track the path of a single droplet over a relatively long time interval.

In the high-pressure wind tunnel in the laboratory in Göttingen, the scientists can generate models of virtually any type of turbulent flows, while their work on the Zugspitze allows them to precisely observe natural turbulences. It is hoped that the combination of these approaches will help unlock the secret of clouds – for a better understanding of these nebulous beauties that are so important for the climate.

https://www.youtube.com/watch?v=Y4KFgg4OMQY