

## New particle formation around the globe: From laboratory experiments to the Everest Base Camp and beyond

**Federico Bianchi**

Institute for Atmospheric and Earth System Research, University of Helsinki

Atmospheric aerosols affect the climate directly by absorbing or scattering incoming radiation and also indirectly by acting as cloud condensation nuclei (CCN) changing therefore the cloud albedo. A major fraction of these CCN comes from gas to particle conversion (nucleation). During the last decade, several nucleation studies have been published based on field observations, however most of them in the planetary boundary layer. Therefore, only little information is available about the free troposphere. The aim of this seminar is to elucidate the last findings about what species contribute to new particle formation (NPF) at high altitude.

In the last years, we have used state-of-the-art instruments, first at the Swiss high alpine research station Jungfraujoch (3580 m asl) and then at the Himalayan Nepal Climate Observatory Pyramid (NCO-P) site on the southern slope of the Himalayas, not far from Everest base camp (5079 m asl). Previous studies have already showed that at both of these locations NPF takes place frequently. However, no chemical information of the vapours was retrieved.

In this presentation, in addition to present the results of these studies, I will also compare them with laboratory experiments (i.e. CLOUD experiment at CERN). I will present a detailed analysis of the particle evolution during nucleation and also the chemical composition of the small clusters measured with advanced mass spectrometers. I will also show that these processes are potentially very interesting in order to understand the aerosol conditions in the pre-industrial era where information are really scarce. At the end of the seminar I will also give some insight regarding present project above the Amazon and as well above the Alps.