Submitted Abstract

ID IMC22-FSAbstr- 324

First Author First Name Last Name	 Marius Levin (1) Thomas
Submitting Author First Name Last Name	 Marius Levin Thomas
Correspondence	mlthomas@uni-mainz.de
Co-Authors **>> E-Mails will be not listed**	Wirth, Volkmar (1); Piotrowski, Zbigniew (2)
Organisations	1: Johannes Gutenberg University, Mainz, Germany 2: Jülich Supercomputing Centre, Jülich, Germany

Country	Germany
Region	Western Europe
Title	What Flow Conditions Are Conducive To Banner Cloud Formation At Mt. Matterhorn?
Keywords	Large Eddy Simulation, Atmospheric Boundary Layer, Mountain Meteorology, Orographic Clouds
Type	List Of Focus Session
Focus Session ID	82

Abstract

Banner clouds are clouds that appear to be attached on the leeward side of a steep mountain or ridge on otherwise cloud-free days. The current work considers fundamental questions associated with the formation of this type of clouds using large-eddy simulations. Previous work was based on an idalized model configuration with pyramid-shaped orography; there, it was shown that the shear of the oncoming flow plays a key role for the geometry of the lee-side vortex and, hence, for the shape of the banner cloud.
In the current work, the scope is extended from an idealized pyramid to the realistic orography of Mt Matterhorn. The simulations show that the wind shear of the oncoming flow is less essential than before, because the underlying rough orography creates "its own" flow profile by the time the flow reaches the windward side of the mountain. By contrast, the wind speed turns out to be quite relevant, because large windspeed is associated with strong turbulence, turbulence reduces stratification, and reduced stratification promotes the formation of uplift regions at Mt Matterhorn. However, the flow field for realistic Matterhorn orography makes it much harder to identify a coherent lee vortex to be associated with the banner cloud.