



Formation of a katabatic induced cold front at the east Andean slopes

K. Trachte, T. Nauss, R. Rollenbeck, and J. Bendix

University of Marburg, Laboratory for Climatology and Remote Sensing, Marburg, Germany (trachtek@staff.uni-marburg.de)

Within the DFG research unit 816, climate dynamics in a tropical mountain rain forest in the national reserve of the Reserva Biósfera de San Francisco in South Ecuador are investigated. Precipitation measurements in the mountain environment of the Estación Científica de San Francisco (ECSF) with a vertical rain radar profiler have been made over the last seven years. They reveal unexpected constant early morning rainfall events. On the basis of cloud top temperatures from corresponding GOES satellite imageries, a Mesoscale Convective System could be derived. Its formation region is located south-east of the ECSF in the Peruvian Amazon basin. The generation of the MCS is assumed to result from an interaction of both local and mesoscale conditions. Nocturnal drainage air from the Andean slopes and valleys confluences in the Amazon basin due to the concave lined terrain. This cold air converges with the warm-moist air of the Amazon inducing a local cold front. This process yields to deep convection resulting in a MCS.

With the numerical model ARPS the hypothesized formation of a cloud cluster due to a katabatic induced cold front is shown in an ideal case study. Therefore an ideal terrain model representing the features of the Andes in the target area has been used. The simplification of the topography concerns a concave lined slope and a valley draining into the basin. It describes the confluence of the cold drainage air due to the shape of the terrain. Inside the basin the generation of a local cold front is shown, which triggers the formation of a cloud cluster.