Geophysical Research Abstracts,
Vol. 10, EGU2008-A-12507, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-12507
EGU General Assembly 2008

Cloud and rainfall formation in a tropical mountain rain forest of South Ecuador - idealized simulations of underlying atmospheric processes

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Diurnal precipitation dynamics in a tropical mountain rain forest have been investigated over the past six years. Measurements from a K-band rain-radar profiler reveal an early morning maximum of rainfall, which is related to mesoscale atmospheric instabilities over the Peruvian Amazon basin. These instabilities are traced back to a Mesoscale Convective System (MCS) south east of the research area. The current working hypothesis ascribes the formation of these instabilities to a con uence of cold drainage air from the Andean valleys connected with the concavity of the Andes. A convergence of cold katabatic ows and the Andean warm air pool generating a local cold front with deep convection and the formation of a MCS. An interaction with a nocturnal Low-Level Jet maintains and enhances the low-level buoyancy, which intensifies these processes. In order to verify this hypothesis a mesoscale gridbox model is implemented to compute the nocturnal ows and the formation of a MCS. Ideal high-resolution scenarios shall demonstrate katabatic ows along a slope as well as the con uence in the Amazon basin. To simulate the MCS the ideal case simulations shall finally be assimailated into real scenarios. First results from the ideal high-resolution windfield simulations with the nocturnal downslope and its con uence due to a concave topography will be presented.