



## **The relative importance of topography and land use on the Veluwe rainfall maximum in The Netherlands**

**H.W. ter Maat** (1), E.J. Moors (1), R.W.A. Hutjes (1), R. Janssen (1), A.J. Dolman (2)

(1) Earth System Science-Climate Change, Alterra - Wageningen UR, Wageningen, The Netherlands, (2) Faculty of Earth and Life Sciences, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands (herbert.termaat@wur.nl / Phone: +31 317 486429)

Is it possible that even in an area relatively flat as The Netherlands with a marine climate precipitation patterns are influenced by orography and land use? This question will be addressed using a limited area model (RAMS) coupled to a detailed land-surface model (SWAPS) to quantify the contribution of land-use and topography to rainfall patterns above the forested and elevated Veluwe area located in the centre of The Netherlands with a maximum altitude of 100 m.

The Veluwe exhibits an average yearly precipitation sum which is 75-100 mm higher than the rest of the country, a difference of around 20 % per year. These differences change seasonally with larger values in the winter months. The cause of this maximum will be investigated by comparing a control simulation to two scenarios in RAMS: NoTopo- and NoForest-scenarios. In the NoTopo-scenario it is assumed that the Veluwe is converted to flat land with an altitude of 0 m. The NoForest-scenario uses a land cover with the Veluwe area converted from forest to grassland. The simulations cover two separate months: February 2000 and May 2005 to be able to point any differences between wintertime and summertime.

By comparing the results from the control simulation with station observations it is shown that the model is able to simulate realistic amounts of precipitation. The control-simulations also show that the percentual difference between Veluwe and non-Veluwe areas is realistically simulated. In analyzing the spatial differences between the NoTopo and NoForest scenarios on the one hand and the control simulation on the other hand we try to quantify the contribution of land-use and topography to regional

precipitation and other meteorological variables related to that. Tentative results show that even the modest topography of the Veluwe area has a strong but spatially restricted effect on the rainfall excess, whereas the forest cover also enhance precipitation, but in a wider area downwind of the Veluwe. Possible causal mechanisms will be discussed.