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The hydrological component of the Cabauw Experimental Site for Atmospheric Research (CESAR)

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It is well recognized in the weather and climate modelling community that over shorter time scales (rainfall, surface runoff) and over longer time scales (latent heat flux, soil moisture storage) the parameterisation of the exchange processes from the atmosphere to the land surface and vice versa still needs considerable improvement. Over the past decade the atmospheric research site at Cabauw has already served as one of the prominent sites in intercomparison studies of land-atmosphere interactions (PILPS, AMIP). From the latter study it was concluded that next to clouds and radiation interactions, the consistent description of the interactions between the atmospheric and terrestrial hydrologic processes remains to be achieved. However long-term time series of measurements of all the terms of the terrestrial water budget around validation sites are in general lacking. To further expand the opportunities at Cabauw for testing and validating land-atmosphere parameterisations, extra efforts are being put in the hydrological component. Ultimately, this will increase the confidence in the realism of such parameterisations.

Our goal is to improve the parameterisation of the hydrological component of land surface - atmosphere exchanges in regional climate models through: 1) monitoring the water budget of two nested polder areas around the Cabauw tower that are representative for the region; 2) upscaling of the hydrologic processes and their parameterisations to the scale of regional climate models, taking into account subgrid variability. In this contribution, we focus on the former. The concrete question we address is: Are we able to close the water budget for two selected areas around Cabauw? Since 1.5 years, we have been observing the components of the water budget in two nested areas of approximately 0.3 and 0.5 km2 around the Cabauw tower. We employ a combination of in situ measurements (groundwater level from divers, soil moisture storage from time domain reflectometry, water intake and discharge from weirs, evapotran-

spiration by eddy covariance and precipitation from rain gauges) and remotely sensed observations (scintillometry, weather surveillance radar). Here we present an analysis of the data collected thus far.

Our work is part of a larger effort, called the Cabauw Experimental Site for Atmospheric Research (CESAR). The CESAR observatory is located near the village of Cabauw, approximately 20 km SW of Utrecht (http://www.cesar-observatory.nl) and is operated by a consortium of major universities and research institutes. The overall purpose of CESAR is to enhance the possibilities of the Cabauw site and to set-up and operate an observational facility with a comprehensive set of remote sensing and in situ equipment for studies on atmospheric and land surface processes, monitoring of long-term tendencies in climate parameters, the development of new measurement techniques, the validation of satellite observations and climate models, and the training of young scientists.