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INVITATION

WHAT CAN WE LEARN FROM SHORT – AND LONG – TERM OBSERVATIONS IN TALL TOWERS?

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On **17th February 2014** at **9:00 am** in a large meeting room

of **Global Change Research Centre AS CR, v. v. i.**; Brno, Bělidla 986/4a

Jordi Vilà is one of the leading experts in the vegetation-atmosphere interaction and their role in the carbon dioxide budget.

Abstract

We will present and discuss several cases where tall tower measurements have provided essential information to improve our understanding of the land-atmosphere system. These situations have been collected at the 213-meter at Cabauw (The Netherlands). This sites is operated since 1972 by the Royal Netherlands Meteorological Institute (KNMI) and since 2002 seven other institutes joined at the same location under the consortium CESAR (www.cesar-observatory.nl).

At the diurnal scales, the complete surface and upper air measurements were intensively used to select and characterize a representative day to study the interaction between vegetation and cloud formation. I will show the necessity to have a comprehensive data set in order to validate all the components of the land-atmosphere system. More specifically the combination of biological controlled fluxes (photosynthesis and carbon dioxide soil fluxes) and turbulent surface fluxes (sensible and latent heat fluxes) as well as upper-air measurements of temperature, wind, specific humidity and boundary layer height were key variables to determine the feedbacks between vegetation and shallow cumulus formation.

The representation of clouds in regional and global models is still one of the largest uncertainties associated to the understanding of the energy, water and carbon cycles near the surface. To improve in this representation, the ten-year continuous observations at Cabauw enable us to show differences in the radiative and surface energy budget compared to a fine-scale (2 x 2 km^2) and semi-climatological simulation carried out with the numerical weather prediction model WRF (Weather Research Forecasting) system. For the radiative budget, the 10-years analysis of the WRF results and observations (2001-2010) show difference due to clouds, albedo and the temperature/water vapor at higher levels (200 meter). The long-term observed surface energy budget show also residual that are 20% of the available energy. This discussion is completed by showing differences in the cloudiness between the long-term observations and WRF results above Cabauw.

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