

# **Effect of seasonal dynamics of vegetation cover on land surface model: case study of noah over savanna farm land in eastern burkina faso, west africa**

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The sensitivity of the land surface model of the National Centers for Environmental Prediction (NCEP), the Oregon State University, the Air Force and the Hydrologic Research Lab (NOAH LSM) was evaluated with respect to the seasonal dynamics of the vegetation cover in the savanna area under intensive agriculture in the eastern part of Burkina Faso, West Africa.

The data collected during the first long-term measurement of the surface fluxes in this mentioned region was used for this purpose. The choice of NOAH LSM was motivated by the fact that it has already been tested in different environments in West Africa, especially in Ghana.

The sensitivity was tested by comparing the simulated surfaces fluxes using a fixed value of the roughness length for momentum as a standard in the model and the true seasonal value of this variable.

The results show that NOAH LSM was not sensitive to the change of the roughness length for momentum neither on a seasonal basis nor on a daily basis, which was found to be abnormal. The formulation of the coefficient ( $B_c$ ) coupling the dry canopy transpiration to the atmosphere was found to be the main reason for this. An improved formulation for this coefficient was given to solve this insensitivity and to improve the performance of the model.

Recommendations are also given to enhance the performance of the model in the West African savanna environment.