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A predictive model of spatial distribution of Biological Soil Crust in the Sahel from local to regional scale

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The Sahel region in West Africa is highly vulnerable facing soil degradation due to the harsh climatic conditions, with variable rainfall, and high anthropic pressure on land use. In Sahel, as in other arid environments, biological soil crusts are present over a large area.

The BIOCRUST project focuses on the use of BSC as an indicator of environmental quality in the context of climate change and human activities pressures and on providing useful informations for best management practices for the Sahelian environment.

To this end, a characterisation of BSC is required first at a local level based on the use of Very High Resolution satellite imagery. Two detailed field campaigns were undertaken to identify key variables indicative of the presence of biological soil crusts. A Statistic analysis ascertained that vegetation cover, land use, soil types and rainfall were the most significant variables to consider. From these, a predictive model of the spatial distribution of BSC was developed, based on a logistic regression. The extraction of the variables from the satellite imagery makes it possible to run the prediction model for 2 catchment areas of about 50km^2 each situated in Niger on a North South transect.

With a view to apply the prediction model to the central part of the Sahel scale, the same methodology was used with Medium Resolution satellite imagery and field data collected on a North South transect in Niger and Burkina Faso.

Preliminary results indicate that the model is applicable at regional scale and show the potential spatial distribution of BSCs over a large portion of the Central part of the Sahel region.