

Modeling and valuation of ecological impacts of land cover and land use changes on Tenerife

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On account of its physical geographical characteristics, the island Tenerife is a popular destination for tourists, especially from European countries. Being in its infancy in the 1960s, the mass tourism increased from the middle of the 1970s from about 1,3 million to 5.3 million tourists nowadays. This development involved a social and economic change from an agrarian to a service based society. These changes in the socioeconomic system lead not only to an increasing expansion of infrastructure based on land cover and land use changes (LULC) but also to a spatial concentration of settlements. Moreover, the Canary Islands and especially the island of Tenerife are a hotspot of climate change with possible reorientation of atmospheric circulation which causes for example an increasing variability of precipitation and changes on elevation zones of ecosystems like laurel forest and in addition consequences caused by a sea level rise.

The research project follows the question how ecosystems like in special laurel forest or pinewood on Tenerife will be affected by, on the one hand, global impacts of climate change like an increasing variability of precipitation or changes on elevation zones of the ecosystems and on the other hand by local effects like increasing tourism, increasing fallow land and monocultures in future, and the spatial hot spots of their vulnerability? For this purpose existing time series of land cover and land use change (from 1978 and 2002), derived from medium spatial scaled remotely sensed data (LANDSAT 5), will be upgraded with regard to the spatial and temporal resolution. This provides a better and even more precise background for a further modeling of future LULC-scenarios. Therefore an object-based classification of a high spatial scaled satellite scenes (2003 and 2010) has to be done followed by a change-detection analysis on the basis of a post classification. Taking into account the different local and global driving forces for these changes the spatial future development of the most important land use processes like e.g. increase of agricultural land (monocultures) and fallow land will be simulated and visualized by use of agent-based models. Main advantage of these simulation-techniques is the spatial prediction of land use processes by inclusion of the complex dependencies between the several influencing factors under attention of their heterogenic characteristics (individual agents and their connections). Based on these results the impacts of these processes for different sensitive ecological areas, like for instance pinewood (*Pinus canariensis*) and laurisilva will finally be analyzed. The aim of this analysis is to detect the spatial hot spots, where a high impact for the ecosystems is given and to value the outcome for those sensitive areas

Short Abstract:

The research project follows the question how ecosystems like in special laurel forest or pinewood on Tenerife will be affected by, on the one hand, global impacts of climate change like an increasing variability of precipitation and on the other hand by local effects like increasing tourism or increasing fallow land, and where are the spatial hot spots of their vulnerability? For this purpose remote sensing based methods like object-based LULC and Change detection and GIS-based modelling techniques have to be applied in order to identify future land use processes which have high impacts for the ecosystems and to valuate the outcome for those sensitive areas.