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LUCHS - an approach to introduce Land Use Changes in a regional climate models by using EO data

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Changes in the albedo are influencing climate simulations, which is shown by the results of e.g.: Pongratz et al. (2009), Preuschmann and Jacob (2008), Rechid and Jacob (2006), Vamborg et al. (2011). To investigate the land atmosphere interaction for regional aspects, the lower boundary description for climate models should be able to represent a realistic seasonal cycle of the physical attributed parameters, as albedo, Leaf Area Index and vegetation ratio. The description of the lower boundary for the REgional MOdel REMO has discrepancies for the albedo seasonal cycle. In comparison to satellite observation data, the amplitude and phase of the albedo climatology are showing a too homogeneous pattern. Additionally in case of land use change studies, the parametrization scheme is mixing different constant data sets. Changes in one of them can lead to unexpected values. These aspects are demanding a new approach instead of an adaptation of representing the lower boundary for REMO.

A new approach called Land Use CHaracter Shifts (LUCHS), combines techniques of remote sensing techniques and climate modelling techniques. Land cover maps derived from satellite data, are used to get information for each land cover type. Therefore a characteristic albedo climatology gets extracted for every land cover type, which reflects exactly the regional dependent amplitude, phase and level of the seasonal albedo cycle. The extracted information is used as a master information. It is transferalbe onto areas, which are defined as extension areas. To keep regional specific conditions, an autochthonous information is integrated within the character shifting method. It results in a albedo distribution, which reflects characteristics of the transferred land cover type, and accounts implicitly to regional floral, soil and cultural specifications. LUCHS is not free of assumptions and uncertainties, but by using observations, it is reflects a realistic albedo. The observed information on characteristics is regionally specific but persistent in time. Therefore it is transferable through space and at least for $\pm$50 years in time.

Pongratz, J., T. Raddatz,
C. H. Reick, M. Esch and M. Claussen (2009). Radiative forcing from anthropogenic land cover change since AD 800. Geophysical Research Letters, 36, L02709.

Vamborg, F. S. E., V. Brovkin and M. Claussen (2011). The effect of a dynamic background albedo scheme on Sahel/Sahara precipitation during the mid-Holocene. Climate Of The Past, 7(1), 117–131.

Preuschmann, S. and D. Jacob (2008). Sensitivity study for parameterization of woods in the regional climate model REMO. In Geophysical Research Abstracts, Vol. 10, EGU2008-A-08618, 2008 SRef-ID: 1607-7962/gra/EGU2008-A-08618 EGU General Assembly 2008.