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A new parameterization for deriving potential dust sources in the emission scheme of the global climate-aerosol model ECHAM6-HAM

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The original dust emission scheme implemented in the gobal aerosol-climate model ECHAM6-HAM follows Tegen et al. (2002). The emission scheme is coupled to the climate model and, as such, uses the prognostic wind speed at 10 meter above the surface and predicted hydrological fields. Tegen et al. (2002) derive preferential dust source areas from an explicit simulation of paleological lakes. Emissions of dust particles can also occur in non- or low- vegetated regions. These regions are identified using satellite-derived values of the fraction of absorbed photosynthetic active radiation. The extent of all regions potentially acting as dust source area is temporally constant over time.
However, during the last centuries the land cover has changed dramatically as a result of human activities, with some possible implications for source regions of dust. For quantifying the interrelations between anthropogenic land-use change and mineral dust emissions, we developed a new parameterization for defining potential dust source areas. We insure a full and interactive coupling between the terrestrial component JSBACH of ECHAM6 and the dust emission scheme. In particular, the properties (e.g., roughness length, LAI) of the different land classes are accounted for explicitly to compute dust emission fluxes more accurately and temporally varying in each model grid cell. In this poster, we will describe the new parameterization and present the extent to which using this new parameterization modifies the global dust emissions and distributions.