

The Role of Landscape Processes within the Climate System [Revised] May 7 2007

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The role of landscape process within the climate system has been mostly ignored except in terms of how carbon assimilation is affected. However, the role of vegetation and soils is much more than that and includes effects on water and heat storage and fluxes, as well as on a variety of other gases and aerosols.

The talk will overview the perspective of the climate system as an integration of physical, biological, and chemical effects associated with land, atmosphere, ocean, and continental ice interactions. The current IPCC focus on the radiative forcing of the well-mixed greenhouse gases will be shown to be an unnecessarily narrow perspective. This narrow view will not properly address the diverse effect of the human disturbance of the climate system.

Examples will be presented to document the role of landscape processes on the local, regional, and global scales. This role ranges from long-term land-use/land-cover change due to deliberate land management, to biogeochemical effects from CO₂, to air pollution effects such as nitrogen deposition. The talk will conclude with a recommendation to evaluate the risks to important societal and environmental resources using a bottom-up, vulnerability framework.