

## **Observational evidence for links between increased drought severity and land-cover change**

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### **Abstract**

During the past millennium man has significantly changed the land-surface vegetation. Land-cover change by man has occurred since prehistoric times, but has accelerated over the past decades. Model studies indicate that changes in land cover affect climate, e.g., models indicate in the Sahel a causal link between reduction of vegetation and increased drought severity in the Amazon triggered by extensive deforestation.

Here we present observational evidence for land-cover change at the global scale and a subsequent link with the intensification of drought. We analyse global climate data, data on historic land use and satellite data indicating vegetation height (ICESAT / GLAS) and amount of solar radiation absorbed for photosynthesis (AVHRR / SeaWiFS). Analysis of these data indicates that vegetation height and the amount of solar radiation absorbed for photosynthesis are reduced in regions of the world where vegetation is significantly altered by humans. These reductions in vegetation appear the most severe in some regions in the tropics and sub tropics. Moreover, we find that droughts are significantly more severe in areas where vegetation has changed, both in regions where vegetation growth is limited by precipitation as well as in regions where vegetation growth is limited by temperature.

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