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Changes in fire regime since the LGM: an assessment based on global syntheses and analyses of charcoal data

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Global fire regimes varied continuously since the last glacial maximum in response to long-term changes in global climate as well as shorter-term regional changes in climate, vegetation, and human land use. In this research we present a global synthesis of biomass burning since the LGM from stratigraphic charcoal records. . The global paleofire records are presented in 3000-year time slices as anomalies from present. In eastern and western North America and western Europe, charcoal records indicate lower-than-present fire activity from 21,000 to 9000 cal yr BP. Similarly, in southern South America, lower than present fire activity occurs from 21,000 to ∼11,000 cal yr BP. In contrast, the tropical latitudes of South America, Southeast Asia and Indonesia, as well as most sites from Australia indicate a pattern of higher than present fire activity from 18,000 to ∼13,000 cal yr BP. Records of fire activity from tropical South and Central America indicate a brief period of greater than present fire activity at 19,000 cal yr BP, then lower than present fire activity until after 10,000 cal yr BP. Most sites from around the globe indicate greater-than-present or near-modern conditions during the Holocene with the exception of Eastern North America from 8000 to 2000 cal yr BP, and in Southeast Asia and Indonesia from 11,000 to 4000 cal yr BP, where Holocene fire activity is lower than present. The global maps of fire activity indicate both spatial heterogeneity as well as cases of regional coherency. This newly created database is allowing a first examination of the broad-scale controls that may be driving global patterns in fire regimes during the last 21,000 cal yr BP. The paleofire data is

also playing a critical role in validating models that attempt to understand and predict future patterns of global biomass burning.