



Catastrophic floods and tropical storms over the last 120 years on the Dak Bla River, Central Vietnam

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Catastrophic floods are a common natural disaster in the Central Highlands of Vietnam. Given the region's rapid economic development, including an expanding agricultural base and hydroelectric dams, it is important to understand past flood frequency and magnitude. Although mountainous, the highly weathered landscape is not conducive to significant preservation of slack water deposits. Thus, grain size, magnetic susceptibility and carbon/nitrogen ratios of sediment cores from two abandoned channels of the Dak Bla River were used to identify major flood events during the last 120 years. There is a notable increase in magnitude during the late 20th century, with the most pronounced flood occurring in 1972 during the Second Indochina (American-Vietnam) War. The dramatic increase in sediment deposition during the late 20th century is believed to result from anthropogenic alteration of the catchment, including deforestation by bombing during the Second Indochina War and conversion of forest to cropland.

Meteorological and river gauge data are rare in Vietnam and span only the last 40 years on the Dak Bla River. For the duration of these records, all major modern floods are triggered by tropical storms bringing excessive rain late in the wet season. Although non-conformable and young radiocarbon dates limit our ability to correlate earlier floods with known tropical storms, the number of direct typhoon strikes and floods during the last 120 years are similar suggesting a possible link beyond the instrumental record. From these data we propose that neither wet years (e.g strong monsoon years) or typhoons are individually responsible for major floods. Catastrophic flooding is a result of a direct tropical storm strike after a normal to wet monsoon season saturates the landscape. If this model is correct, it may be possible to create short-term predictions of flooding help mitigate large-scale disasters. The caveat is that the occurrence and tracks of tropical storms are difficult to predict. There is no correlation between tropical storms in the Central Highlands and ENSO events or global warming.