Reconstructing Past Fire Regimes: Applications and Relevance to Fire Management

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Abstract

Nowadays, forest fires have increased significantly around the world, in size, frequency, and intensity. Hence, anticipating future forest-fire regimes under a changing climate requires that scientists and natural resource managers understand the factors that control fire across space and time. Fire scars – proxy records of fires, formed in the growth rings of long-lived trees – provide an annually accurate window into past low-severity fire regimes. The Mexican forest experiences recurring forest fires, especially during El Niño years. In Mexico, the El Niño Southern Oscillation (ENSO) is a climate-forcing mechanism that has been shown to affect precipitation and the occurrence of fires. Linkages between ENSO and the occurrence of forest fires have been recognised at scales ranging from local to regional. La Niña winters (ENSO cool phase) in northwestern Mexico are typically hot and dry, and fires are more likely to burn during these years. In southern Mexico, however, El Niño winters (ENSO warm phase) are dry and fire-prone. However the government efforts for fire prevention are still insufficient to reduce both fire frequency and fire intensity. Nevertheless, Mexico needs to develop fire prevention strategies with high efficiency in order to avoid the loss of natural resources and to protect the reforestation efforts. As any other natural disaster, fires have always provoked important biotic and abiotic changes. However, not all ecosystems are adapted to the increasing frequency and sizes of forest fire. The objective of this presentation is to illustrate the significance and, as far as possible, to ascertain the quantitative importance of forest fires and how they can threaten reforestation efforts of Mexican agencies in charge of the natural resources. These data also offer crucial reference information on fire as a dynamic landscape process for use in ecosystem management, especially when managing for forest structure.

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