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Global fire activity patterns (1996–2006) and climatic influence: an analysis using the World Fire Atlas

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Abstract. Vegetation fires have been acknowledged as an environmental process of global scale, which affects the chemical composition of the troposphere, and has profound ecological and climatic impacts. However, considerable uncertainty remains, especially concerning intra and inter-annual variability of fire incidence. The main goals of our global-scale study were to characterise spatial-temporal patterns of fire activity, to identify broad geographical areas with similar vegetation fire dynamics, and to analyse the relationship between fire activity and the El Niño–Southern Oscillation. This study relies on 10 years (mid 1996–mid 2006) of screened European Space Agency World Fire Atlas (WFA) data, obtained from Along Track Scanning Radiometer (ATSR) and Advanced ATSR (AATSR) imagery. Empirical Orthogonal Function analysis was used to reduce the dimensionality of the dataset. Regions of homogeneous fire dynamics were identified with cluster analysis, and interpreted based on their eco-climatic characteristics. The impact of 1997–1998 El Niño is clearly dominant over the study period, causing increased fire activity in a variety of regions and ecosystems, with variable timing. Overall, this study provides the first global decadal assessment of spatial-temporal fire variability and confirms the usefulness of the screened WFA for global fire ecoclimatology research.

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