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Global view of the main patterns of fire activity variability from 1996 to 2006 using screened ESA World Fire Atlas data

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Biomass burning has been acknowledged as an environmental process of global scale, significantly contributing to changes in the chemical composition of the troposphere through atmospheric emissions, and having profound ecological and climatic impacts. However, considerable uncertainties remain, especially concerning intra and inter-annual variability of fire incidence. The main goals of our study were: 1. to characterise spatial-temporal patterns of global fire activity; 2. to identify broad geographical areas with similar vegetation fire dynamics; and 3. to analyse the relationship between fire activity and climate indices such as the El Niño-Southern Oscillation. This study relies on 10 years (mid 1996 – mid 2006) of screened European Space Agency World Fire Atlas data produced from the Along Track Scanning Radiometer (ATSR) and Advanced ATSR (AATSR) imagery. Recent methodological advances in dimensionality reduction are applied to the original dataset to extract the most significant patterns. Regions of homogeneous fire dynamics were identified with cluster analysis and further interpreted based on their eco-climatic characteristics. The impact of 1997-98 El Nino 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 detailed spatial-temporal fire variability. Also, this confirms the usefulness of the screened WFA for global fire bioclimatology related research.