Template to submit abstract for Oral presentation

Authors: Pace. G; HenriqueS R., Cassio F., Pascoal C.

Title (maximum 20 words): Remote sensing in post-fire impact assessment and vegetation recovery monitoring

Theme: 1. Data, methods and approaches in climate change adaptation and disaster risk reduction

Sub-theme (max 3):
1.2 Detection and attribution of observed impacts and risks
1.6 Monitoring, reporting and evaluation

Keywords (max 5): Fire severity, time series, breakpoint, seasonality, FAPAR

Abstract of presentation (400 words):

Although wildfires are considered an integral part of many terrestrial ecosystems, their regimes have been altered by human activities. With the increased occurrence of droughts, resulting from climate change, the frequency and intensity of fires are expected to increase in many areas, making our capacity to manage them more difficult in the near future. From an ecological perspective, fires can be considered as repetitive and common disturbances leading to a complete transformation of the ecosystem, particularly in its floristic composition. In addition, fires can affect a large variety of ecosystem processes, altering the ecological cycling of nutrients, affecting the natural cycle of vegetation succession and altering organic matter turnover. However, the impacts of fires on ecological processes and local biodiversity vary greatly among regions, with implications for management and restoration. Precise information about the extent and type of fire and also on the post-fire vegetation recovery is, therefore, required for the estimation of ecological and economic losses. Satellite observations are a valuable tool for the monitoring of dynamic processes occurring at the earth surface because of their synoptic coverage and regular temporal sampling. However, classical methods for change detection are often not capable of detecting land cover changes within time series that are heavily influenced by seasonal climatic variations.
In this study, we mapped wildfires (occurring from 2009 till 2011) at the Cávado River basin (NE Portugal) and analyzed vegetation recovery in a Landsat time series acquired from 2004 to 2015. We focused our attention on the dynamics of vegetation recovery using FAPAR vegetation Index representing the fraction of incoming solar radiation in the photosynthetically active radiation that is absorbed by the green parts of the canopy. Specifically, we assessed: 1) the fire severity and effect, detecting changes within the trend and seasonal components of time series; 2) the vegetation recovery based on Recovery Trend Index and Cumulative Relative Recovery Index. Our findings show the importance of remote sensing data series in the assessment of the fire severity and evaluation of the degree of post-fire recovery. Furthermore, the use of remote sensing improved our ability to i) assess post-fire impacts accurately, ii) identify the territory segments at risk from exposure, and iii) develop and plan novel mitigation strategies to reduce potential wildfire impacts that might be used to promote vegetation recovery and conserve regional biodiversity.