

**MONITORING FOREST FIRE SEVERITY USING TIME SERIES  
OF LANDSAT DATA – A CASE STUDY OF LAGO EPUYÉN  
IN PATAGONIA, ARGENTINA**

**ÜBERWACHUNG DES SCHWEREGRADES VON WALDBRÄNDEN ANHAND  
VON LANDSAT-ZEITREIHEN – EINE FALLSTUDIE DES LAGO EPUYÉN  
IN PATAGONIEN, ARGENTINIEN**

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**SUMMARY**

Human caused forest fires are increasingly commonplace across much of Patagonia, with partially catastrophic consequences on landscapes and for people living in them. The impact and severity of wildfires in times of climate and land use change is constantly increasing. Global change and fire will be two key actors influencing the future development of landscapes and will challenge environmental as well as forest management strategies. Studies on fire or burn-severity over Patagonia, especially integrating ground truth are scarce. The study area of Lago Epuyén has been strongly affected by forest fires over the past few decades. In order to fill the current research gap of forest fire severity assessment of Lago Epuyén, this research processed available satellite time-series from 1985 to 1987 and 1998 to 2020 to extract the burnt area (BA), calculate important indices, namely dNBR (delta Normalized Burn Ratio (dNBR) and NDVI (Normalized Difference Vegetation Index) and perform a time series analysis using Holt's linear trend model to simulate the trend of fire development. Our major results show that (1) BA of 1987, 1999, 2013, 2016, 2019 and 2020 are higher than those of other years, and BA may continue to increase in future; (2) dNBR showed that fireseverity reached the highest level in 1986-1987, but future development of dNBR is difficult to predict as forests which were severely damaged have high restoration potential; (3) Post-fire NDVI values were very low in the BA zones, indicating that severe fires cause strong vegetation degradation. This study provides baseline information on fire frequency and severity which is essential to support sustainable future forest and fire management as well as restoration and recovery activities in Patagonia.

**Keywords:** Burned Area (BA), Normalized Burn Ratio (NBR), Delta Normalized Burn Ratio (dNBR), *Nothofagus dombeyi*, *Austrocedrus chilensis*