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MAPPING POST-FIRE VEGETATION RECOVERY AT DIFFERENT LITHOLOGIES OF TAYGETOS Mt (GREECE) WITH MULTI-TEMPORAL REMOTE SENSING DATA

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Mt Taygetos (2407m), located at southern Peloponnese (Greece) suffered a large fire during the summer of 2007. The fire burned approximately 45% of the area covered by the endemic Greek fir (Abies cephalonica) and Black Pine (Pinus nigra) forest ecosystems. The aim of the current study is to examine the potential differences on post-fire vegetation recovery imposed by the lithology as well as the geomorphology of the given area over sites of the same climatic and landscape conditions (elevation, aspect, slope etc.). The main lithologies consist of carbonate, permeable, not easily erodible formations (limestones and marbles) and clastic, impermeable (schists, slate and flysch) erodible ones.

A time-series of high spatial resolution satellite images were interpreted, analyzed and compared in order to detect changes in vegetation coverage which could prioritize areas of interest for fieldwork campaigns. The remote sensing datasets were acquired before (Ikonos-2), a few months after (Quickbird-2) and some years after (Worldview-3) the 2007 fire. High resolution Digital Elevation Model was used for the ortho-rectification and co-registration of the remote sensing data, but also for the extraction of the mountainous landscape characteristics.

The multi-temporal image dataset was analyzed through GEographic-Object Based Image Analysis (GEOBIA). Objects corresponding to different vegetation types through time were identified through spectral and textural features. The classification results were combined with basic layers such as lithological outcrops, pre-fire vegetation, landscape morphology etc., supplementing a spatial geodatabase used for classifying burnt areas with varying post-fire plant community recovery.

We validated the results of the classification during fieldwork and found that at a local scale, where the landscape features are quite similar, the bedrock type proves to be an important factor for vegetation recovery, as it clearly defines the soil generation along with its properties. Plant species recovery seems to be controlled by the local lithology as it was found weaker in plots overlying limestones and marbles, comparing to that observed over schists, even for the same species. In conclusion, post-fire vegetation recovery seems to be a complex process controlled not only from species biology, but also from the geological features.