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Remote sensing monitoring of anthropogenic climatic changes effects on forested areas

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The climate system responds in complex ways to changes in forcing that may be natural (e.g., variations in the magnitude of solar radiation reaching the top of the atmosphere) or human-induced (e.g., changing atmospheric concentrations of greenhouse gases).Climate-induced changes at the land surface (e.g., through more intense and higher frequency droughts) may in turn feed back on the climate itself, for example, through changes in soil moisture, vegetation, radiative characteristics, and surface-atmosphere exchanges of water vapor. This paper presents the analysis of anthropogenic climatic changes effects on a forested vegetation system. Thresholding based on biophysical variables derived from time trajectories of satellite data is a new approach to classifying forest land cover via remote sensing.This approach is attractive because it is much simpler than conventional alternatives. Further, it operates on biophysical variables and thus should be more robust than more data dependent techniques. The input data are composite values of the Normalized Difference Vegetation Index (NDVI). Associated with these values are radiances in three thermal bands that are used to estimate surface temperature. The classification algorithm, accepts mean growing-season NDVI, mean growing-season near-infrared radiance, NDVI amplitude and surface temperature as input parameters for the composite NDVI and surface temperature data. The units recognized are broad life-form vegetation classes, such as evergreen needle leaf forest, evergreen broadleaf forest, shrubs, etc. They are compared to a ground truth map of an area using Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper (ETM) as well as SAR imagery for a test forested area in the Eastern part of Bucharest town, Romania.Classification accuracies are variable, depending on the class and the comparison method as well as function of season of the year. Our analysis indicates a potentially application of threshold techniques to

land-cover classification and changes analysis due to climatic effects as well as for forest biomass assessment.

Specific aim of this paper is to assess, forecast, and mitigate the risks of climatic changes on forest systems and its biodiversity as well as on adjacent environment areas and to provide early warning strategies on the basis of spectral information derived from satellite data regarding atmospheric effects of forest biome degradation .