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| **Clear Cut Mapping Using Sentinel-2 and PRISMA Hyperspectral Imagery** |
| Forest ecosystems are increasingly vulnerable to a multitude of stressors, including droughts, wildfires, human activities, clear-cut and alterations in land use patterns. As such, safeguarding these ecosystems and enhancing their ecological functionalities are paramount imperatives delineated by the European forest and biodiversity strategies. Multispectral remote sensing data provide a means to comprehensively analyse the structure and functioning of forests and can be put into operational use for the continuous monitoring of forest harvests at country level.Hyperspectral remote sensing enhances the optical capability by expanding the number and preciseness of reflectance bands available in the VNIR and SWIR regions and providing the potential to detect biophysical processes of soil and vegetation such as wood degradation, and soil moisture. However, the reliability of these data is contingent upon various factors, such as scale, spectral and geometrical resolutions.This study aims to assess the added-value provided by hyperspectral products from the Italian Space Agency (ASI) PRISMA mission in characterizing active clear-cut areas taking operational state-of-the art multispectral data (Copernicus Sentinel-2) as a reference. Given the growing importance of monitoring such areas using state-of-the-art approaches, the hyperspectral images ready accessibility significantly enhances the ability to observe and understand the evolution of forest systems and provides an advanced perspective for the management of the latter. Three study sites were located in deciduous forests in Tuscany (Italy). Administrative ground-truth data about past harvest operations in forests were checked by photo interpretation and spatially located in each study site.Supervised machine learning models, trained and validated on ground-truth data were deployed on Sentinel-2 and ASI PRISMA products. Accuracy and precision of the two models in the identification of harvest areas was evaluated by comparing their RMSE and other measures of uncertainty. Results are discussed in the framework of the launch of the next generation of hyperspectral satellites (CHIME, PRISMA 2G, IRIDE) and the provision of harvest volume data in the commercial, political and forest governance at EU level. |