MONITORING LAND COVER CHANGES OVER NATIONAL PARKS WITH EO TO IDENTIFY ECOSYSTEM FUNCTIONS, SERVICES AND ASSIST BIODIVERSITY CONSERVATION

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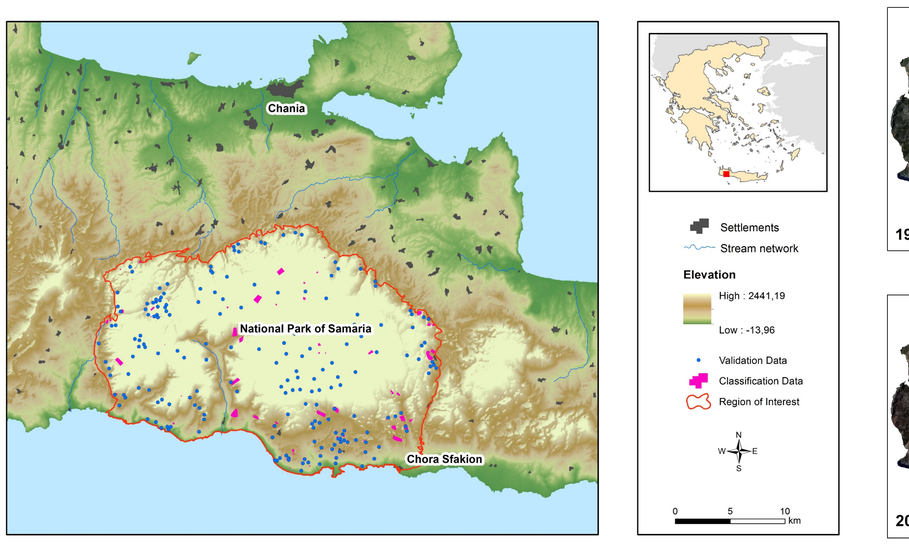
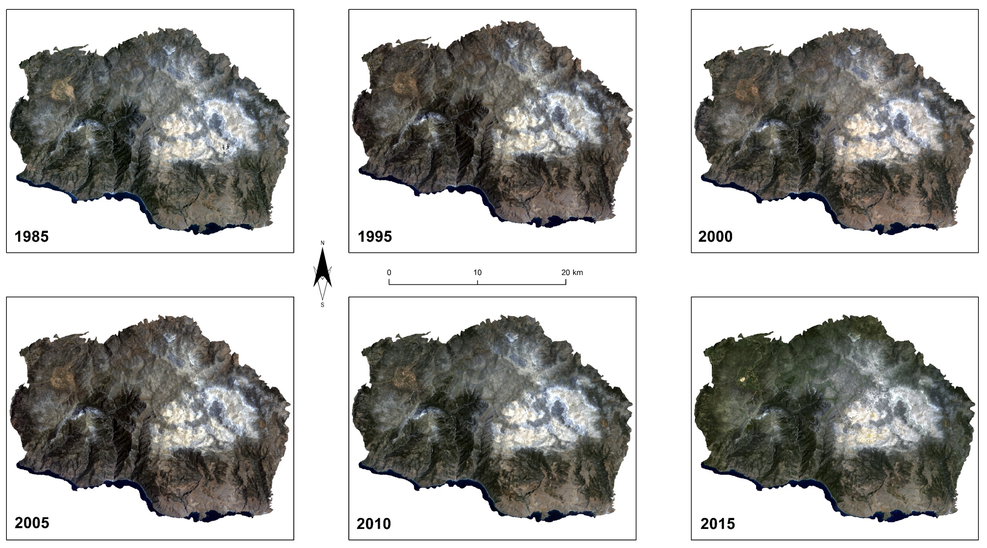
INTRODUCTION

Land cover information is important in order to **support** policy decision makers regarding environmental **sustainability** and biological **conservation**. Up to date and accurate land cover information as well as time series data analysis useful for proper land resources management and habitat conservation. Especially for Protected Areas, land cover data represent key **information** for biodiversity **conservation** and **alterations** of cover and structure over time, allowing for the assessment of their impact on **changes** in the **biodiversity**. Samaria National Park is located on the Southwest part of island of Crete (Greece, East Mediterranean). It was designated a National Park via a Royal Decree in 1962. It is a mulidesignated area and specifically a National Park, Landscape of Outstanding Beauty, Natura 2000 site (SCI and SPA codes GR 4340008 and GR4340014) a UNESCO Biosphere Reserve (MAB) and has been awarded the European Diploma of protected areas by the Council of Europe. It is characterized by **high** mountains (more than 50 peaks over 2000 m. a.s.l) with **subalpine** zones covered by snow for a long period, **forests** of pine and cypress species, **pastoral** areas, temporal **cultivations**, various **shrubland** types, several **gorges** and **karstic** phenomena and an extended coastline, on a predominantly **limestone** substrate. The **objective** of this work, in the framework of ECOPOTENTIAL H2020 project, is to detect **changes** in land cover of the Samaria National Park since 1982 and to **identify** potential causes (desertification, overgrazing, urbanization, climate change, natural hazards and alterations due to change of land use).

STUDY AREA AND DATA



Study area and input data

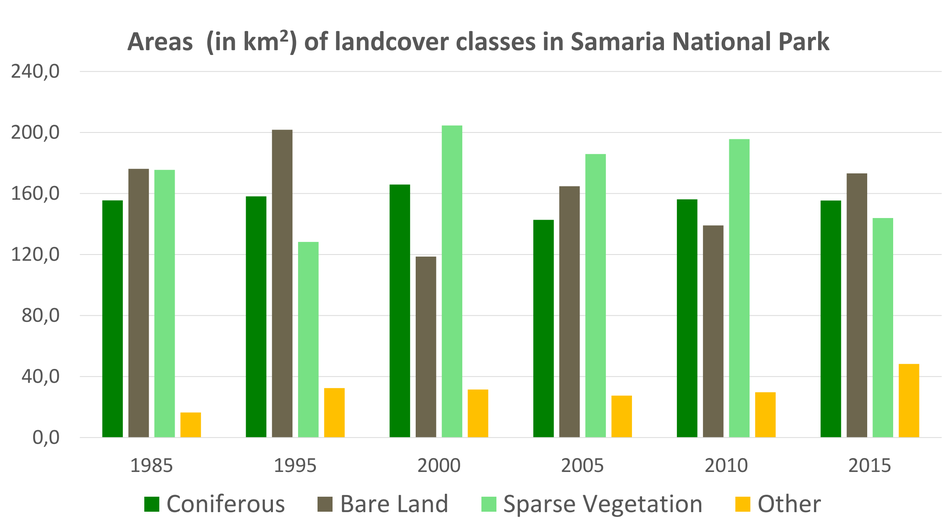


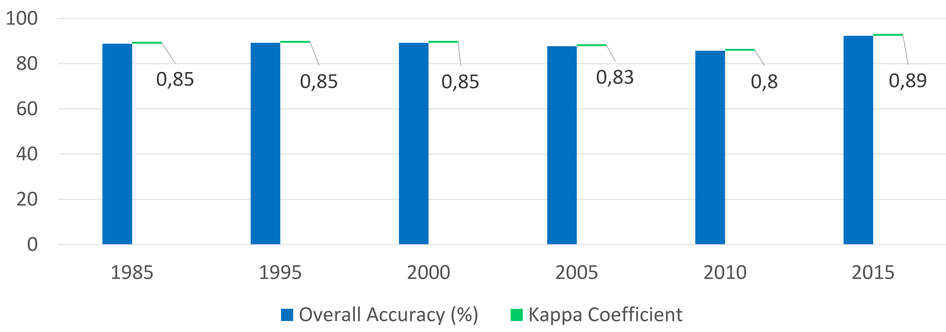
Landsat Images from 1985 to 2015

Input Data - Details

- **Landsat** Images (May – June period)
  - LT5 1985, 1995, 2000, 2005, 2010
  - LC8 2015
    - 1985, 2010, 2015 from USGS **ESPA** System (***Surface Reflectance***)
    - 1995, 2000, 2005 LT5 from ESA **EOLI-SA** System.
    - **NDVI, SAVI** and **NDWI** used as extra bands.
- 4 classes – spectrally separated:
  - **Bare Land** (included NPV)
  - **Coniferous**
  - **Low / Sparse vegetation**
  - **Other** (cultivations, abandoned fields)

RESULTS





CONCLUSIONS

- Coniferous forests in the Samaria National Park appear stable in both spatial extend and altitudinal zonation. No changes (shifting) are visible in the timber line.
- Sparse vegetation and bare land have a dynamic interchange over time. This could be due to human activities, water availability and the variability of Non-Photosynthetic Vegetation (NPV) in the periods satellite images have been acquired. Denser time series analysis will provide an insight to this issue.
- Cultivations and other spectrally similar areas have increase spatially.
- The potential of Copernicus Sentinel2 exploitation in landcover analysis for the protected area is substantial, due to high spatial and spectral resolution as well as the temporal resolution. Changes attributed to Climate Change could be possible to be identified (transposition of the timber line, desertification, etc).

REFERENCES

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- Gómez, C., White, C. J. and M. A. Wulder. 2016. Optical remotely sensed time series data for land cover classification: A review. ISPRS J. Photogramm. Remote Sens, 116, 55-72.

ECOPOTENTIAL received funding under contract No 641762
Website: http://www.ecopotential-project.eu/