

COPERNICUS SENTINEL DATA FOR LOCAL SCALE CONSERVATION ACTIVITIES

The use of Sentinel-2 data, combined with landscape factors provides insights of the distribution of the endemic lizard Podarcis cretensis.

The challenge

Local scale processes shape species distributions. Mountainous areas provide a multifarious terrain where microclimate refugia shape ecological niches at local scales for animals and plants. Also, mountainous areas host endemic and rare elements of biodiversity, acting as islands of biodiversity. These processes can be identified by using high resolution data, based either on satellite or airborne observations. Both approaches have their limitations; satellite data have high frequency but low spatial resolution, whilst airborne data have high spatial resolution but costly high temporal data collection.

The space based solution

Copernicus Sentinel-2 constellation (Sentinel-2A/B) fills this gap, by providing data of high spatial resolution with an adequate temporal resolution (10 m pixel size every 5 days). In addition, Sentinel-1 constellation (Sentinel-1A/B) can provide terrain data (e.g. Digital Elevation Model) and related topographic parameters describing the geodiversity after the analysis within the open access ESA SNAP toolbox.

Products from Sentinel-1 and -2, combined with species observations in the framework of species distribution modelling, are a powerful tool in the arsenal of conservation ecology and planning. The high temporal frequency data of Sentinel-2 provide information on landscape dynamics, such as the vegetation growth and changes in landcover, whilst Sentinel-1 data give access to extracted information like elevation, aspect, and slope but also information relating to the incoming solar radiation and the terrain openness (e.g. Sky View Factor parameter). Lizards are dependent on the availability of sun for their needs, thus terrain parameters as well as vegetation dynamics are related to their ecophysiological demands.

Benefits to Citizens

The conservation and protection of biodiversity is a fundamental activity of protected areas like Samaria National Park, where the endemic lizard *Podarcis cretensis* is found. The conservation of the habitat provides a valuable cultural ecosystem service, appreciated by tourists. The use of Copernicus Sentinel data has great potential as it reduces costs for planned fieldwork activities which can be focused on targeted areas whilst the use of Sentinel-2 data makes the monitoring of certain areas easier, even without spending resources for fieldwork campaigns. Sentinel-2 data are also used for monitoring illegal activities (e.g. logging, illegal fires) within the protected area, thus optimising the Park's management resources and supporting law enforcement. Open access satellite data allow the reduction of the cost of surveys in remote areas, which are abundant inside the national park, reducing the costs of public administrations (municipality, forest police, park authorities) and thus benefitting citizens.



The endemic Cretan lizard, *Podarcis cretensis* is found mainly in West Crete

Thematic Area



BIODIVERSITY AND ENVIRONMENTAL PROTECTION

Region of Application



CRETE

Sentinel mission used



S1
S2

Copernicus Service used



-

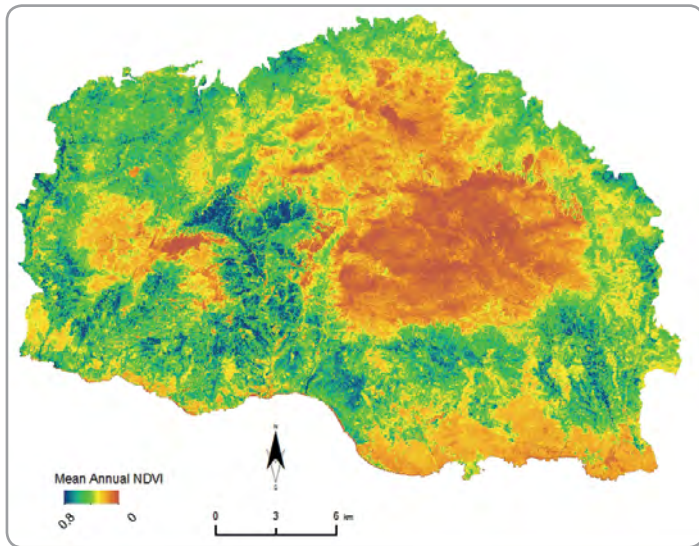
Usage Maturity Level



3

Outlook to the future

Protected areas require multiple tools for their daily activities. Sentinel-2 data as Analysis Ready Data (ARD) via online platforms for use by non-experts in Remote Sensing are more than welcome. A fully operational online Sentinel 1/2 system which will provide data-ready-to-use will benefit the technical staff of local authorities and parks as they will be able to use updated information without having the technical expertise to process remote sensing data. To this end, the H2020 ECOPOTENTIAL works side-by-side with 24 protected areas across Europe and beyond in providing the tools and models that make use of Sentinel data for addressing this specific monitoring need (amongst others).



Mean annual NDVI for 2017, calculated using Sentinel-2A and -2B data over Samaria National Park.

Credit: Contains modified Copernicus Sentinel data [2017]

“The use of Copernicus Sentinels for conservation and environmental monitoring provide us with new ways of working.”

*Antonis Tsakirakis,
Samaria National Park*

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ABOUT COPERNICUS4REGIONS

This Copernicus User Story is extracted from the publication “**The Ever Growing use of Copernicus across Europe's Regions: a selection of 99 user stories by local and regional authorities**”, 2018, Edited by NEREUS, the European Space Agency and the European Commission.

The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains. The views expressed in the Copernicus User Stories are those of the Authors and can in no way be taken to reflect the official opinion of the European Space Agency or of the European Commission.

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