



Comunicação especial | Special communications

GISCV.ORG: an independent open-access geospatial data repository for biologists and ecologists studying species and the environment in Cabo Verde

Nuno de Santos Loureiro^{1, *}

¹ *Universidade do Algarve, Campus de Gambelas, 8005-139 FARO, Portugal*

* *Corresponding author e-mail: nlourei@ualg.pt*

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Geographical Information Systems (GIS) have become increasingly important tools in recent decades for biologists and ecologists studying species, biodiversity, and ecology in Cabo Verde. They have also facilitated the dissemination of research findings to the scientific community, policymakers, the general public, and other stakeholders (Longley *et al.* 2015). However, researchers frequently encounter difficulties in accessing fundamental baseline datasets and understanding key concepts and methodological aspects. To help address these challenges, a wide range of governmental, institutional, and independent online platforms now provide access to diverse geospatial datasets. Many of these resources are freely available, requiring only prior registration, and have greatly expanded access to geospatial data and technologies. However, for Cabo Verde specifically, the availability of online platforms offering such resources remains limited. The platform presented here is intended to help address this gap. This open-access geospatial

data repository, available at giscv.org, is an independent initiative designed to evolve over time. It adopts an open and collaborative approach, welcoming contributions from both the scientific community engaged in research in the Cabo Verde archipelago and the broader geospatial community involved in the production, management, and use of geospatial data.

At launch, giscv.org is organised into eight main sections: 1) Coordinate Reference Systems (CRS), 2) Mapping Grid Systems, 3) Geographical Boundaries of the Islands and Islets, 4) Digital Elevation and Bathymetric Models, 5) Climate Data, 6) Satellite Imagery Sources and Scene Mosaics, 7) Cartographic Aerial Photography: Dates, Scales, and Mosaics and 8) Historical Cartography.

Through giscv.org, users can access and download both Key Concept Sheets and geospatial datasets in vector and raster formats that are fully compatible with GIS software such as QGIS and ArcGIS Pro. The accompanying metadata identify the original

data source and specify the licence governing the reuse of all information made available through the repository. The following sections provide a brief overview of each component of the portal, highlighting the main characteristics of the information and datasets available.

Coordinate Reference Systems (CRS) - Three CRS are particularly suitable for use in Cabo Verde and can be classified according to two main criteria: the reference surface on which they are based and their spatial extent.

Table 1- CRS, Landsat WRS-2 Path / Row and Sentinel-2 Relative Orbit / Tile combinations most appropriate for Cabo Verde. **A)** Summary of the main Coordinate Reference Systems (CRS) recommended for use in Cabo Verde, including their classification (geographic or projected), spatial extent (global, regional, or national), EPSG codes, and typical applications in field data collection, spatial data storage and analysis, and GIS-based cartographic production. **B)** The scenes, i.e., the WRS-2 Path / Row combinations for the Landsat program, that fully or partially cover each of the islands and islets of the Cabo Verde archipelago; **C)** The scenes, i.e., the Relative Orbit / Tile combinations for the Sentinel-2 mission, that fully or partially cover each of the islands and islets of the Cabo Verde archipelago.

A)		CRS for Cabo Verde	
Geographic/projected	Spatial extent		
Geographic Coordinate System (unit: degree)	global	EPSG:4326 - WGS 84 - World Geodetic System 1984 (<i>main uses: field data collection and small-scale mapping</i>)	
Projected Coordinate System (unit: metre)	regional	EPSG:32626 - WGS 84 / UTM Zone 26N (for Santo Antão, São Vicente, Santa Luzia, Branco, Raso, São Nicolau, Fogo, Brava and Rombo, islands and islets located west of the 24°W Meridian) EPSG:32627 - WGS 84 / UTM Zone 27N (for Sal, Boa Vista, Maio and Santiago, islands and islets located east of the 24°W Meridian) (<i>main uses: detailed / island scale data analysis and mapping, and field data collection</i>)	
	national	EPSG:4826 - WGS 84 / Cabo Verde National (for the archipelago as a whole) (<i>main use: nationwide geospatial analysis and mapping; mandated as the official national CRS by the Decree-Law No. 35/2011, which establishes the legal framework for geodesy in Cabo Verde</i>)	

B)			Landsat WRS-2 Path / Row
Islands	Island fully covered	Island partially covered	
Santo Antão	211 / 048		
São Vicente	211 / 048		
Santa Luzia	211 / 048	210 / 048 & 210 / 049	
Branco	210 / 048 & 210 / 049 & 211 / 048		
Raso	210 / 049 & 211 / 048	210 / 048	
São Nicolau	210 / 049	210 / 048	
Sal	209 / 048 & 209 / 049	210 / 048	
Boa Vista	209 / 049		
Maio	209 / 050	209 / 049	
Santiago	210 / 049	210 / 050 & 209 / 050	
Fogo	210 / 050		
Rombo	210 / 050		
Brava	210 / 050		

C) Sentinel-2 Relative Orbit / Tile		
Islands	Island fully covered	Island partially covered
Santo Antão		066 / 26QPD & 066 / 26QPE & 066 / 26QQD & 066 / 26QQE & 109 / 26QPD & 109 / 26QPE 066 / 26QPD
São Vicente	066 / 26QQD	
Santa Luzia	066 / 26QQD	
Branco	066 / 26QQD	
Raso	066 / 26QQD	
São Nicolau		066 / 26QQD & 066 / 26QRD
Sal	023 / 27QTU & 066 / 27QTU	023 / 27QUU
Boavista		023 / 27PTT & 023 / 27PUT & 023 / 27QTU & 023 / 27QUU & 066 / 27PTT & 066 / 27QTU
Maio	023 / 27PTS	023 / 27PTT & 066 / 26PRB & 066 / 26PRC & 066 / 27PTS & 066 / 27PTT
Santiago	066 / 26PRB & 066 / 27PTS	023 / 27PTS & 066 / 26PRC & 066 / 27PTT
Fogo	066 / 26PQB	
Rombo	066 / 26PQB	
Brava	066 / 26PQB	

Mapping Grid Systems - Given the limited extent of the archipelago's land area, a grid composed of 5×5 km square cells (25 km² per cell) provides an appropriate spatial resolution for representing species distributions and environmental patterns. The number of grid

cells required to cover each island or islet varies according to the selected CRS, with the entire archipelago comprising 294 cells (Fig 1) when represented in EPSG:4826 and 296 cells when represented in EPSG:32626/32627.

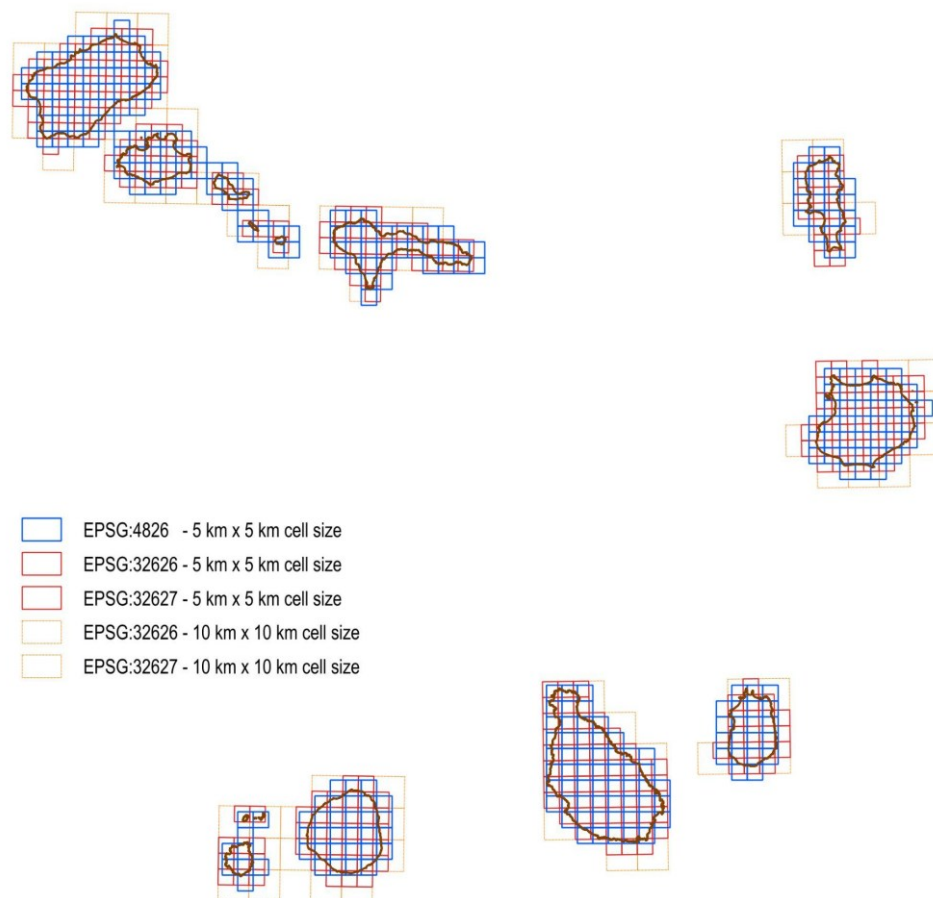


Fig. 1. Boundaries of the islands and islets of Cabo Verde and the spatial distribution of grids with different configurations, defined according to the selected EPSG codes and grid-cell size

Geographical boundaries of the Islands and Islets - The National Institute for Land Management / Instituto Nacional de Gestão do Território (INGT, ingt.gov.cv) is the official government authority responsible for the production, maintenance, and dissemination of this geospatial information. Consequently, it constitutes the original data source and is expected to ensure the highest levels of accuracy and reliability. They also currently provide two versions of the Spatial Data Infrastructure of Cabo Verde, a proprietary-based [visor](#) and an open-source [visor](#), which follows the standards defined by the Open Geospatial Consortium (OGC), alongside open-source platforms for [geoservices](#) and [metadata](#).

Digital Elevation and Bathymetric Models - The Copernicus Global Digital Elevation Model, released in 2019 at 30 and 90 m spatial resolutions, provides a high-quality digital surface model (DSM). The SRTM15+ V2.5.5 dataset (SRTM15+), with a spatial resolution of 5 arc-seconds, is a comprehensive open-access source of global bathymetric data. Copernicus GLO-30 represents one of the most suitable open-access elevation datasets for representing the terrestrial surface of Cabo Verde and combined with SRTM15+ enables the generation of a seamless topobathymetric model suitable for digital cartography and spatial analysis.

Climate Data - In the absence of official national climate datasets, derived datasets from the WorldClim database and the GloH2O Köppen–Geiger dataset were adopted. Although this approach inevitably reduces the precision and accuracy of the underlying data, it enables the climatic characterisation of Cabo Verde within a globally consistent classification framework.

Satellite Imagery - Numerous satellite missions currently provide Earth Observation (EO) data. Among these, Landsat and Sentinel-2 are particularly relevant due to their extensive spatial coverage, long-term data availability, open-data policies, and

widespread use in environmental studies. Tables 2A and 2B summarise the Landsat WRS-2 Path / Row and Sentinel-2 Relative Orbit / Tile combinations required for complete and partial coverage of the Cabo Verde islands and islets.

Other EO data sources that may be worth considering include Planet Labs and Pléiades, the latter providing imagery with a spatial resolution of 50 cm. Unlike the Landsat and the Sentinel-2, access to these sources is commercial. However, members of the academic community may apply for research programmes, under which a limited amount of data can be downloaded free of charge.

Cartographic Aerial Photography - Historical photogrammetric aerial surveys of Cabo Verde are known to have been conducted since the 1960s. The oldest products resulting from these surveys consist of medium-scale black-and-white imagery, while more recent acquisitions are available in colour.

Historical Cartography - Cabo Verde has a rich historical cartographic heritage, including topographic, agro-ecological, vegetation, geological, and soil maps. Among the most significant are the Topographic Map of Cabo Verde (Carta de Cabo Verde or Carta Militar de Portugal - Província de Cabo Verde) at a scale of 1:25,000, published between 1968 and 1979, and the Agro-Ecological Zoning and Vegetation Map of Cabo Verde (Carta de Zonagem Agro-Ecológica e da Vegetação de Cabo Verde) at a scale of 1:50,000 (1:25,000 for Brava), published between 1986 and 1999. Both remain valuable resources for spatial and environmental analyses. Another historical cartographic source that may be useful for biologists and ecologists is the Agricultural Map of Cape Verde, produced during the 1950s. Published by the IICT as the Carta Agrícola da Província de Cabo Verde on an island-by-island basis, generally at a scale of 1:100,000 (except for São Vicente, Santa Luzia, and Brava), it provides valuable evidence for reconstructing historical land-use patterns across the archipelago.

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