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The LifeWatch ERIC Biodiversity & Ecosystem eScience Conference

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Threats and challenges to biodiversity and ecosystem conservation from an eScience perspective

LifeWatch ERIC

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AGENCIA DE MEDIO AMBIENTE Y AGUA DE ANDALUCÍA

UNIVERSIDAD DE SEVILLA

A review of volunteered geographic information projects for ecosystem and habitat mapping

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INDALO project: SCIENTIFIC INFRASTRUCTURES FOR THE MONITORING AND ADAPTATION TO GLOBAL CHANGE IN ANDALUSIA

Introduction: VGI as a source of data for ecosystem and habitat mapping

Volunteered Geographic Information (VGI)

"The harnessing of tools to create, assemble, and disseminate geographic data provided voluntarily by individuals" Goodchild (2007).

VGI can be used as a georeferenced type of citizen science

VGI for citizen science and biodiversity projects

Citizen Science refers to scientific activities in which non-professional scientists volunteer to participate in data collection, analysis and dissemination of a scientific Project.

There is a long-established tradition of volunteers contributing geographic information on species occurrences and population numbers and trends over the decades.

Introduction: VGI issues and its integration with SDI as a solution

VGI (Volunteer Geographic Information)

-Lacks official support or quality assurance

-Expert approach for non-experts

-Flexible and dynamic character

SDI (Spatial Data Infrastructures)

-Institutional initiatives

-Experts orientated using desktop GIS

-Rigid and static character

Great potential for combination

Combining the regulatory structure and the characteristics associated with SDIs (metadata, service catalogue) with the flexibility of the VGI and its orientation to the entire public has great potential to offer accessible, more agile information, but with sufficient quality to contribute to analysis and decision making.

Purpose of the study

- **Identifiying of VGI projects** related to ecosystem and habitat mapping

- **Description and analysis** of their main features including:

  - ✓ Type of initiative (promoting entity)

  - ✓ Scope (number of records, spatial scale)

  - ✓ Technology (used technology, base map)

  - ✓ Characteristics associated with VGI

 - ✓ Characteristics associated with SDI

Collaborative web maps projects

PURPOSE	NAME OF THE PROJECT	URL WEBSITE
Report of environmental conflicts	EJAtlas –Global Atlas of Environmental Justice	ejatlas.org/
	Mapa de los conflictos mineros en América Latina	mapa.conflictosmineros.net/ocmal_db-v2/
	Mapa conflictos socioambientales en Chile	mapaconflictos.indh.cl/
	Mapa de los conflictos del agua en Andalucía	redandaluzaagua.org/mapa/
	iWitness Polution Map	map.labucketbrigade.org/
Environmental crises	Typhoon Haiyan	haiyan.crowdmap.com/
	Incidencias Nevada Filomena	aavvmadrid.org/incidencias-nevada-filomena/
	PhotoMappers: Crowdsourced disaster photo mapping	experience.arcgis.com/experience/d61a17e1e24c4bcc9d61dd4615616042/
	FireMappers: Wildfire Early Notification Project	gis-fema.hub.arcgis.com/apps/napsg::firemappers-wildfire-early-notification-web-app-5ff0e/

| PURPOSE	NAME OF THE PROJECT	URL WEBSITE
Citizen science related with environmental projects	Citclops: Citizen's Observatory for Coast and Ocean Optical Monitoring	citclops.eu/ eyeonwater.org/search/
	CoastSnap: Community Beach Monitoring	coastsnap.com/map
	Birdability Map: accessibility features of birding locations	gis.audubon.org/birdability/
	Biomodelos: modelos de distribución de las especies existentes en Colombia	biomodelos.humboldt.org.co/
	Mapa colaborativo de regadíos históricos de Granada y Almería	regadiohistorico.es/espacios-de-regadio
	First Known Photographs of Living Specimens	inaturalist.org/projects/first-known-photographs-of-living-specimens
	Biodiversity of the Anacostia River	inaturalist.org/projects/biodiversity-of-the-anacostia-river
	Denver EcoFlora Project	inaturalist.org/projects/denver-ecoflora-project
	Found Feathers: using found feathers as observations as reference specimens	inaturalist.org/projects/found-feathers
	IdroGEO: Italian landslide and flood hazard	idrogeo.isprambiente.it/app/
	NASA Landslide Viewer	maps.nccs.nasa.gov/arcgis/apps/webappviewer/index.html?id=824ea5864ec8423fb985b33ee6bc05b7
	FloodCitySense	floodcitisense.eu/
	eBird: Cornell Lab of Ornithology	ebird.org/

Theme and initiative of the projects

- 22 active web maps analyzed

- 5 web maps focused on reporting environmental conflicts

- 4 web maps focused on reporting environmental crises

- 13 web maps focused on citizen science applied to environmental projects
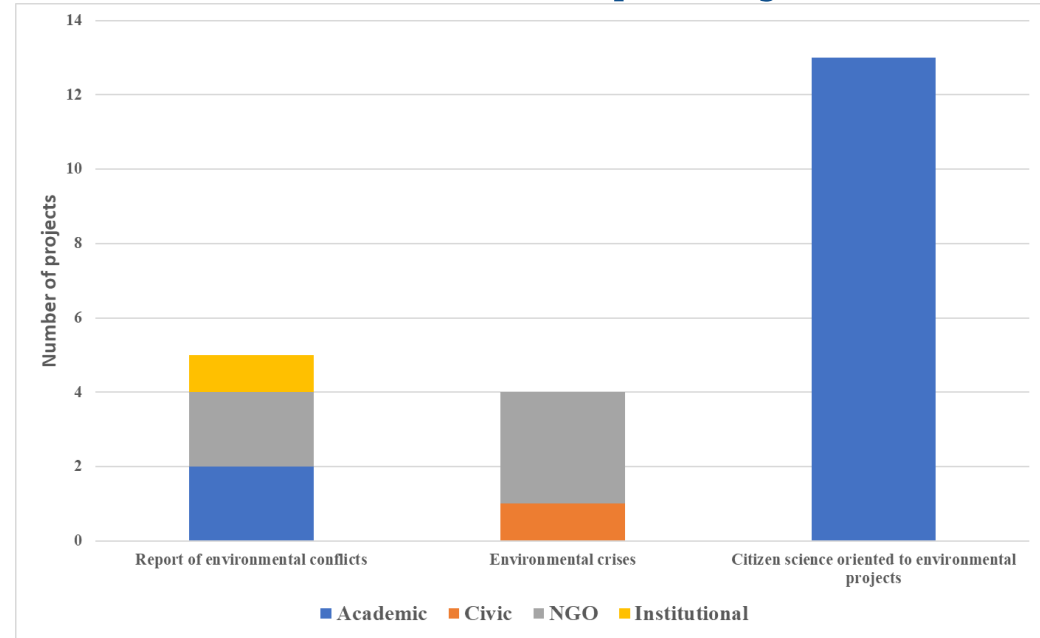
Scope and technology used in the projects

- The web maps with the largest number of records are mainly the citizen science projects (usually they have thousands of records, in rare cases they exceed 10,000 records)

- Web maps that report environmental conflicts tend to be created using open-source tools. Citizen science projects tend to use proprietary license software
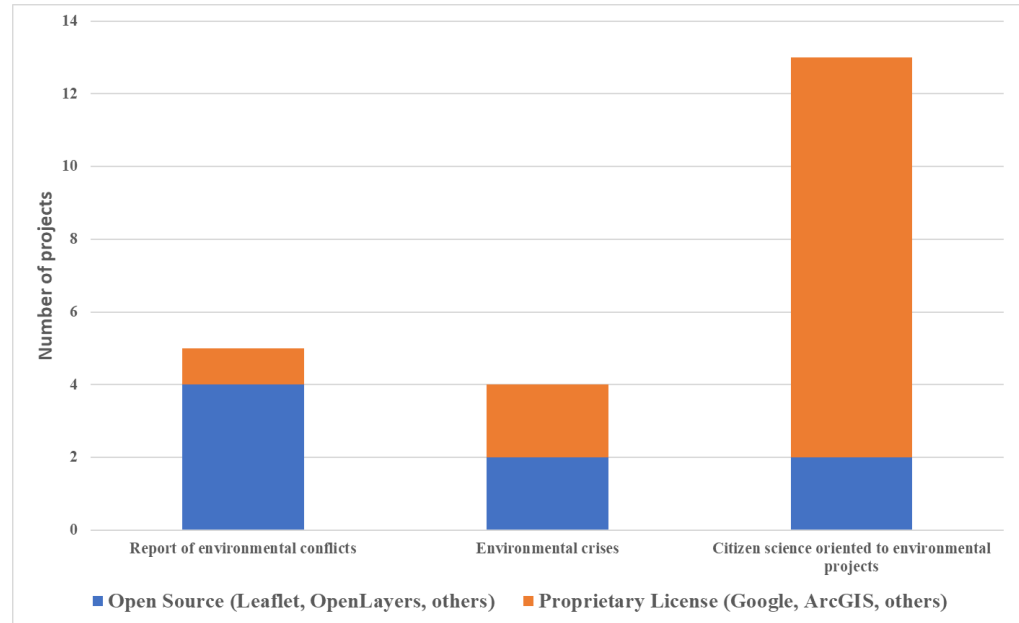
Analysis of the characteristics associated with SDI

- Only 2 web maps (Biomodelos, and EjAtlas) allow sharing data through standard OGC services. 4 other ArcGIS-based portals (PhotoMappers, FireMappers, IdroGeo, Nasa Landslide Viewer) present data sharing and reuse services, but are not OGC

- Only 8 maps have metadata (EjAtlas, Conflictos del agua en Andalucía, iWitness Polution Map, PhotoMappers, FireMappers, Biomodelos, NASA Landslide Viewer, eBird).

- Only 3 web maps (Mapa de conflictos socio-ambientales en Chile, NASA Landslide Viewer, eBird) have spatial, temporal or thematic data search tools

- 10 geoportals present at least two of these filters, only 4 are made with open source

- The thematic filter is present in 15 cases, the spatial one in 9, and the temporal one in 12

- Of the 12 maps that present data download tools, only 5 allow the download of geographic data (Typhoon Haiyan, PhotoMappers, Biomodelos, IdroGEO, NASA Landslide Viewer)

Analysis of the characteristics associated with VGI

- The main way to upload data is through forms supervised by maintenance teams
- Only 2 maps (QuakeMap and NASA Landslide Viewer) offer the possibility for the user to generate their information directly on the map
- 12 of the analyzed web maps allow the download of data
- The main data download format is .xml or .csv files (Google maps offer .kml)
- Citizen science web maps present a low degree of accessibility and a more complex interaction
- 10 web maps have the possibility of commenting on the records of other users
- Most of these maps require a prior registration and user identification process

Conclusions

- There is still work to be done to integrate VGI and SDI projects
- Two types of projects: (i) web maps created with previously built platforms that do not have the development of an SDI as a priority (the user is limited to collecting data on a map), and (ii) maps made with open-source libraries (more complex development, the effort is focused on getting a functional map, so the establishment of standard services is set aside)
- Complex range of highly differentiated functions between the different study maps
- The main challenges consist of the integration of OGC services and metadata
- We must continue working on technological solutions that favor sharing, viewing, consulting and reusing data
- Need for greater institutional lead

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Thank you! | www.lifewatch.eu/bees-2023