Geographic Information and Environment Law Enforcement within IGAMAOT

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GOVERNO DE PORTUGAL

IGAMAOT
Inspeção-Geral dos Ministérios do Ambiente, Ordenamento do Território e Energia e da Agricultura e do Mar

Agenda:

- **Complaints Records, Environment and Territorial Users (IGAMAOT – SDI / Spatial Data Infrastructure);**
  - **Data Visualization and Data Dissemination (SGI; SIG; Portal);**
- **Spatial Analysis and Conflict Detection Tools.**

Complaints Records | Environment Users | Territorial Users

IGAMAOT (new) Information Systems:

- Internet Portal,
- Internal Management System (SGI),
- Geographic Information System (GIS)

IGAMAOT Information Systems:

1. Complaints Records (Portal)
2. Environment Users
    - 2.1 Coordinates acquired by user, insertion and search in database (SGI)
3. Geographic Information System (GIS)
    - 3.1 Database visualization
    - 3.2 Coordinates Representation
    - 3.3 Spatial Data Infrastructure (Repositories)
    - 3.4 Thematic cartography
    - 3.5 Web Map Services
4. Viewer
    - 4.1 Layers (Internal | External)
    - 4.2 Tools
5. main errors identified

Complaints records
Internet Portal (to SGI)
Coordinates /form insertion

FORMULÁRIO DE DENÚNCIA

FORMULÁRIO DE DENÚNCIA

Identificação do Reclamante

Nome/Denominação

Identificação do Representante

Idade

Sexo

Seleccione uma opção

Residência/Sede

Contacto telefónico

E-mail

Distrito

Concelho

Identificação da Ocorrência

Data *

Hora

HH MM

Local

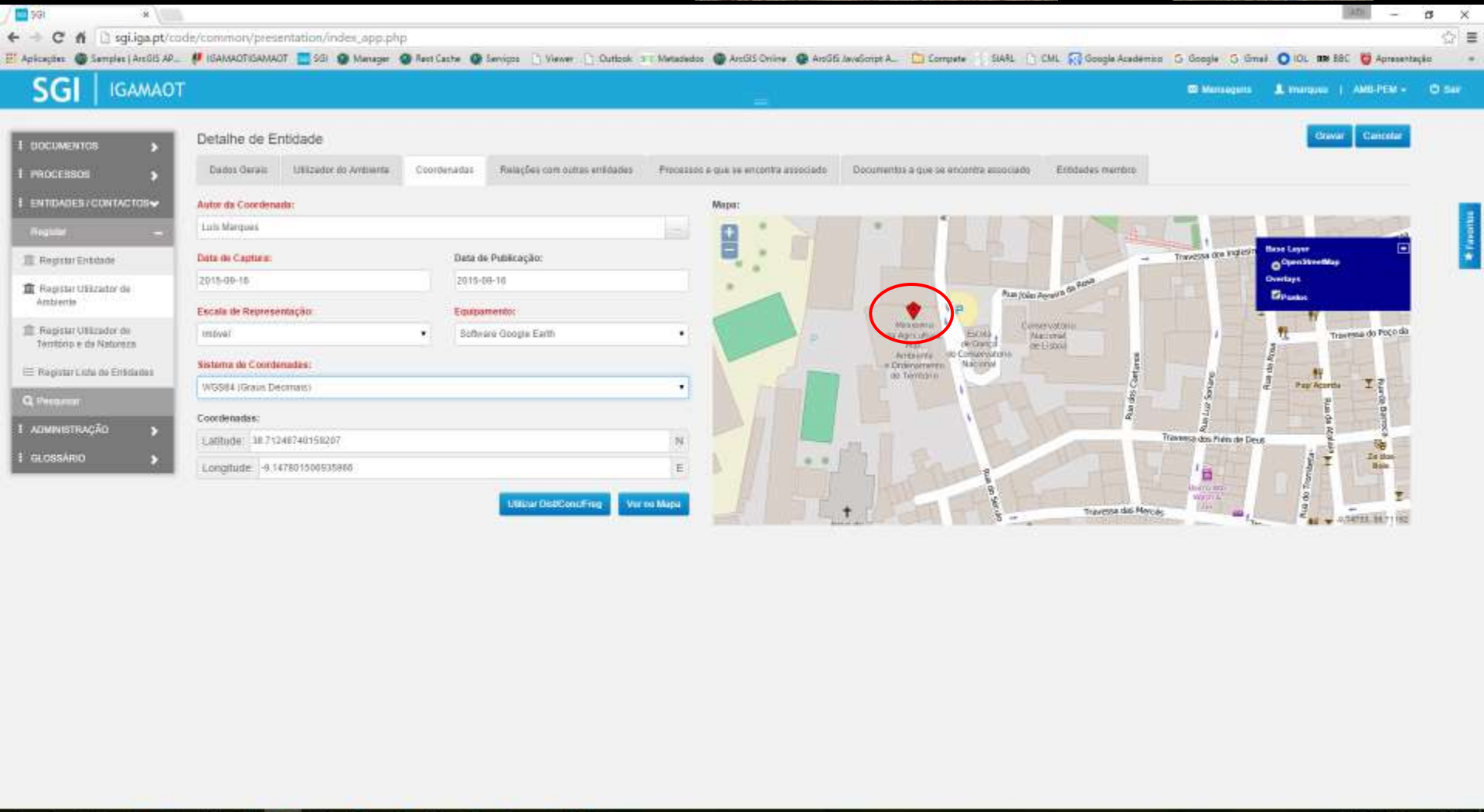
Área *

Seleccione uma opção

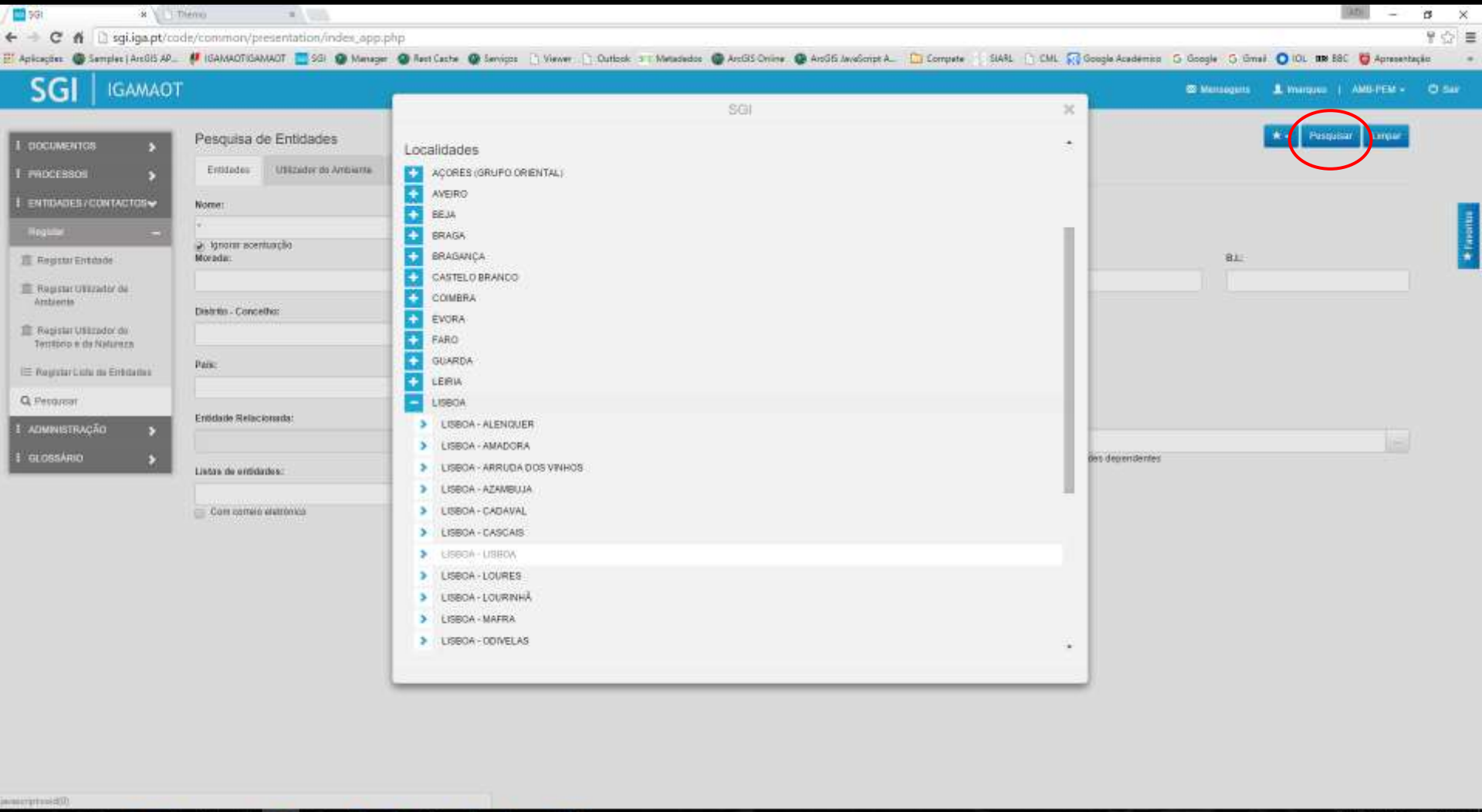
Autor(es)

Testemunha(s)

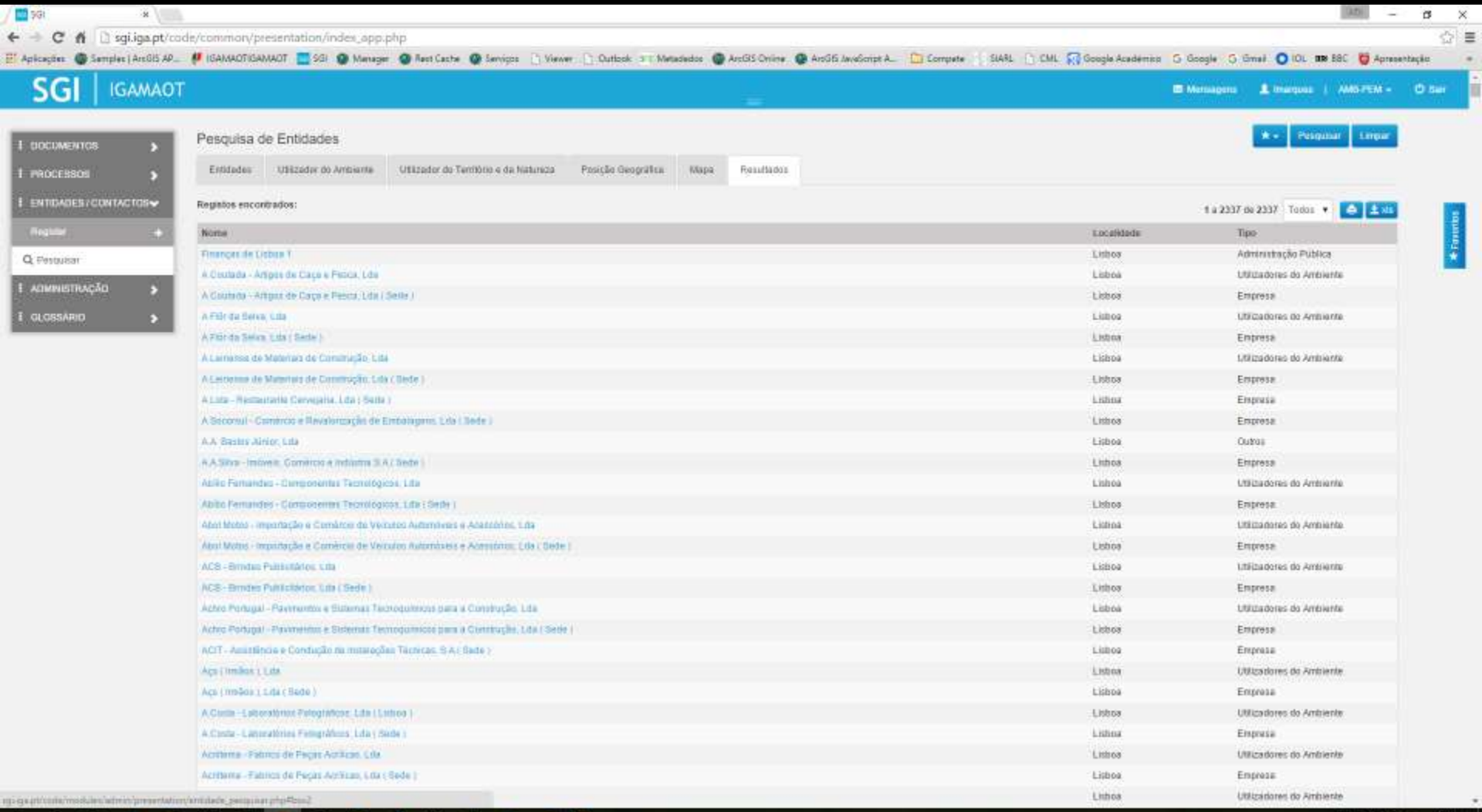
Environment/Territorial Users SGI - Database example Coordinates acquisition and insertion



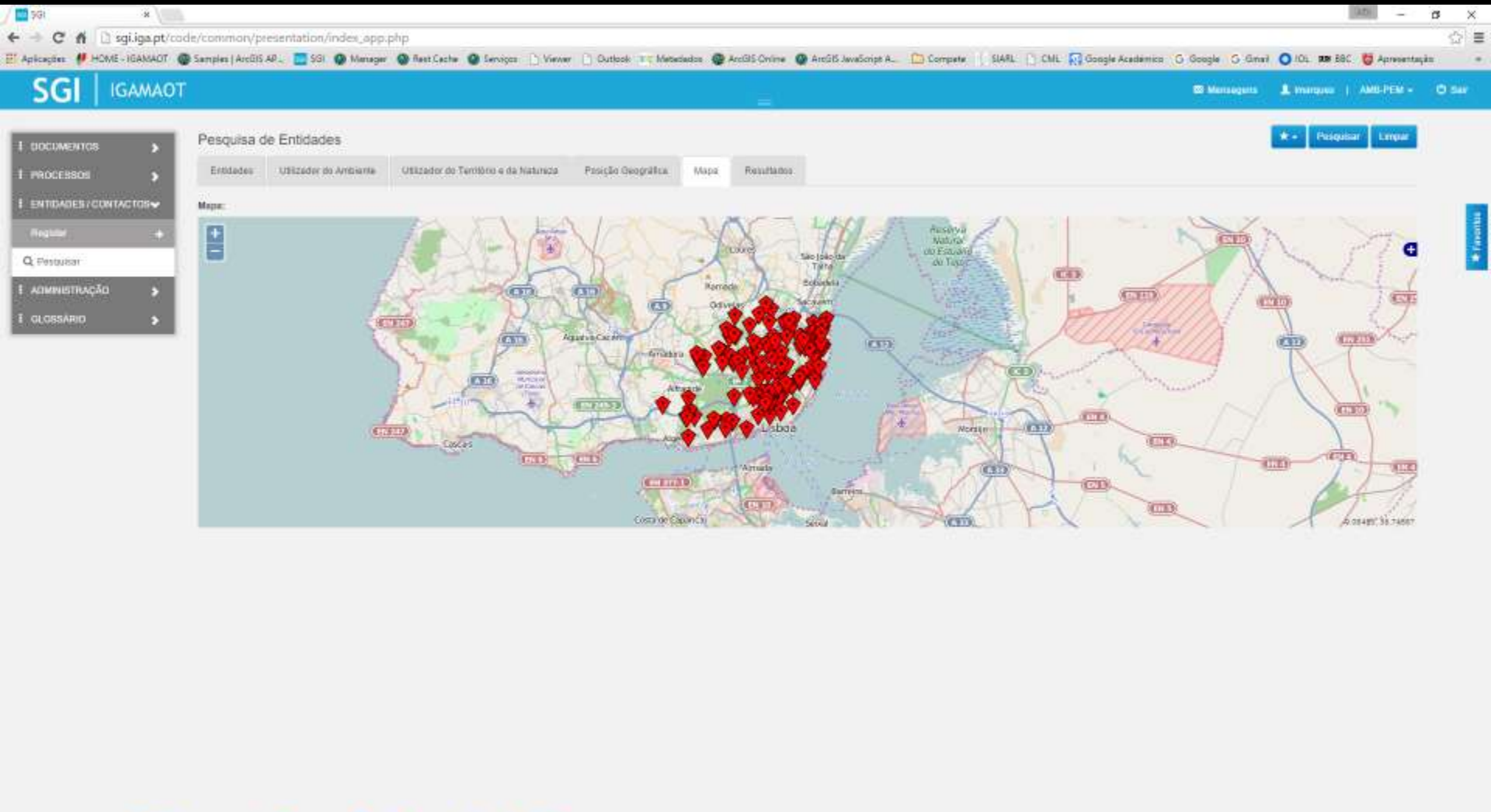
Environment/Territorial Users
SGI - Database example
Search process



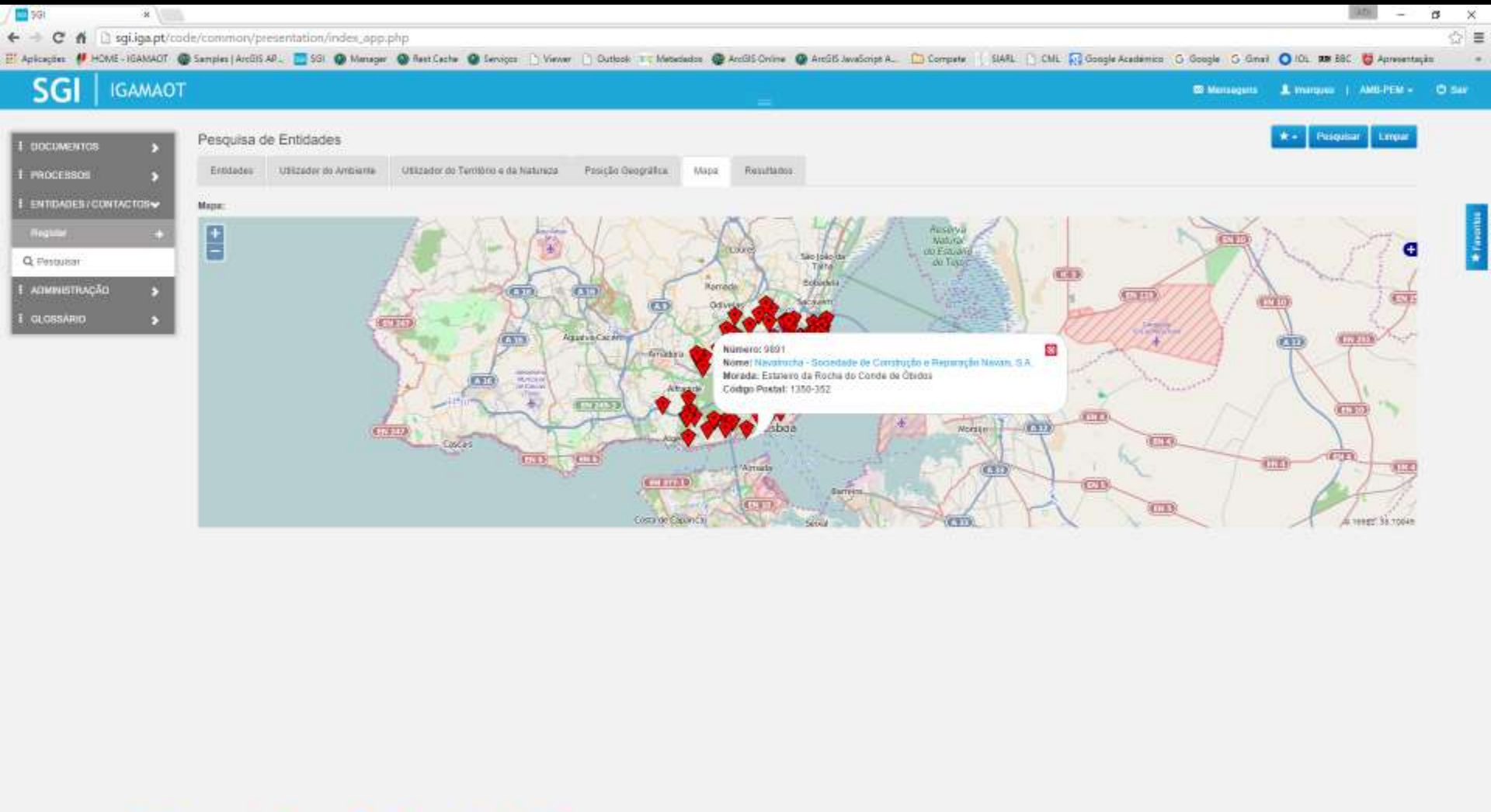
Environment/Territorial Users
SGI - Database example
Search results (list)



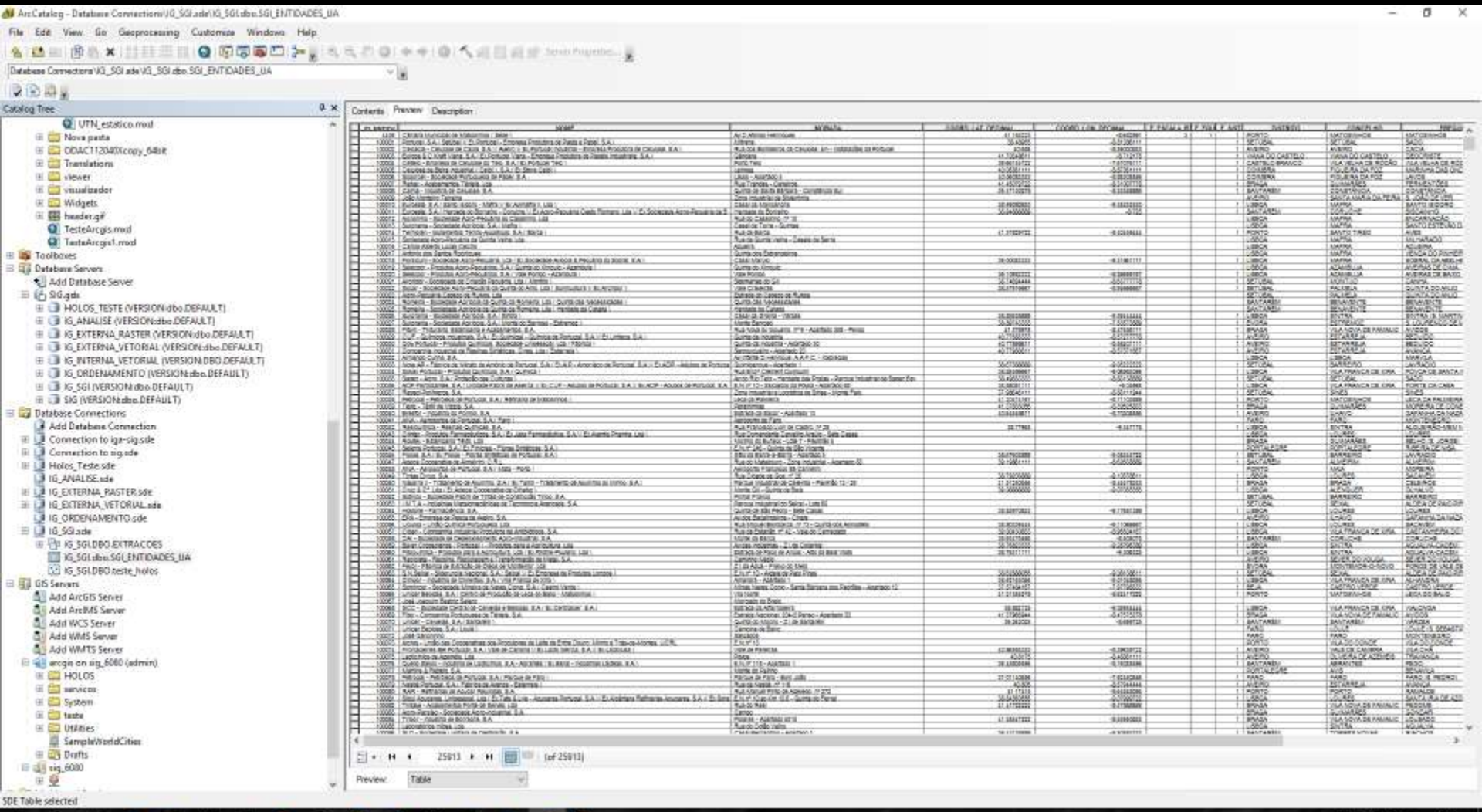
Environment/Territorial Users
SGI - Database example
Search results (map)



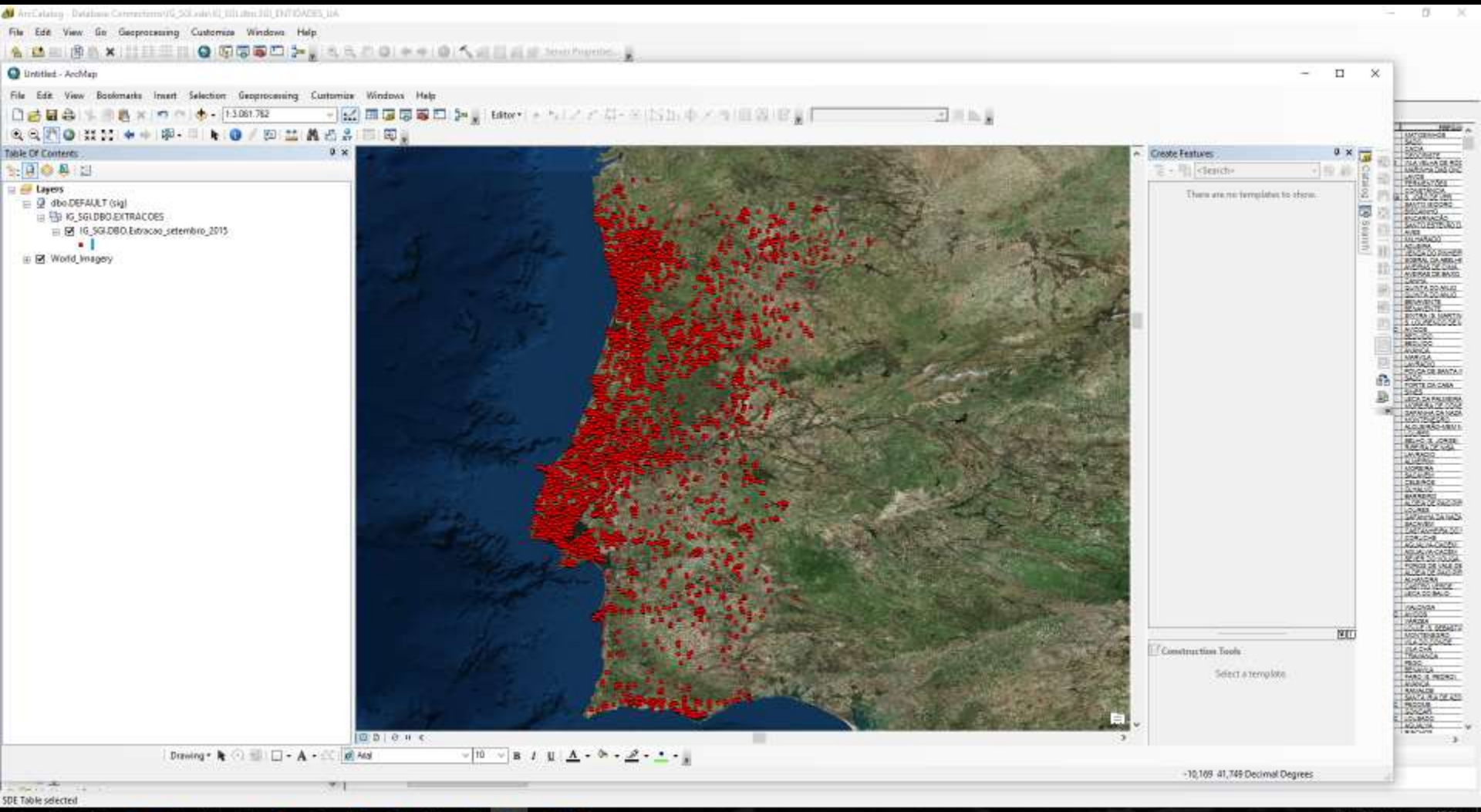
Environment/Territorial Users
SGI - Database example
Search results (map) - indentify



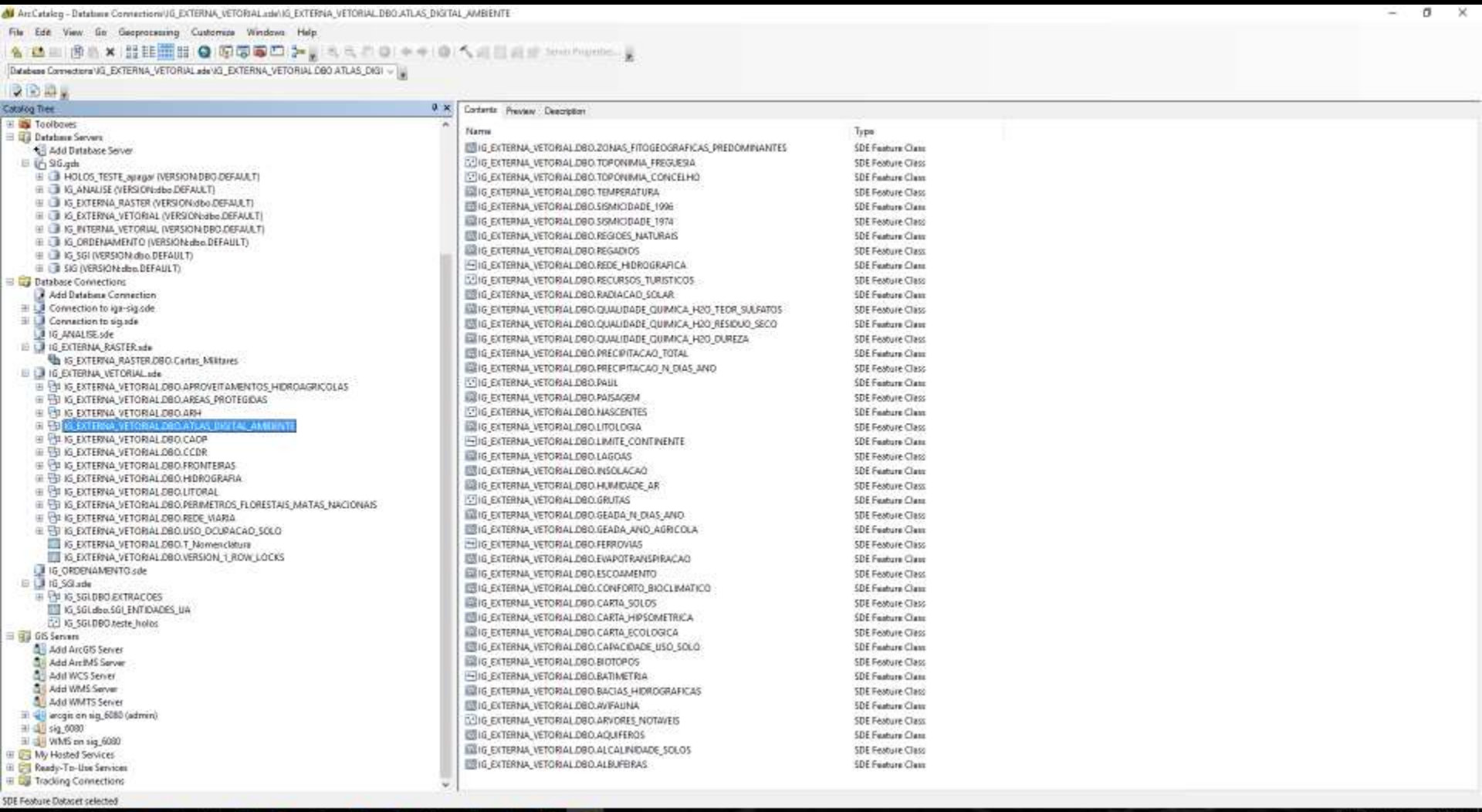
Geographic Information System (GIS)
ArcGIS
Database visualization - Table view (from SGI)



Geographic Information System (GIS)
ArcGIS
Coordinates representation



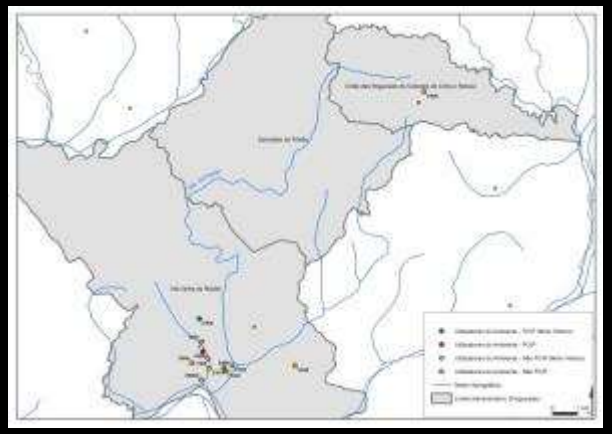
Geographic Information System (GIS)
ArcGIS for Server
Spatial Data Infrastructure (SDI) – Data repositories



Geographic Information System (GIS)
ArcGIS for Server
Spatial Data Infrastructure (SDI) – Data repositories

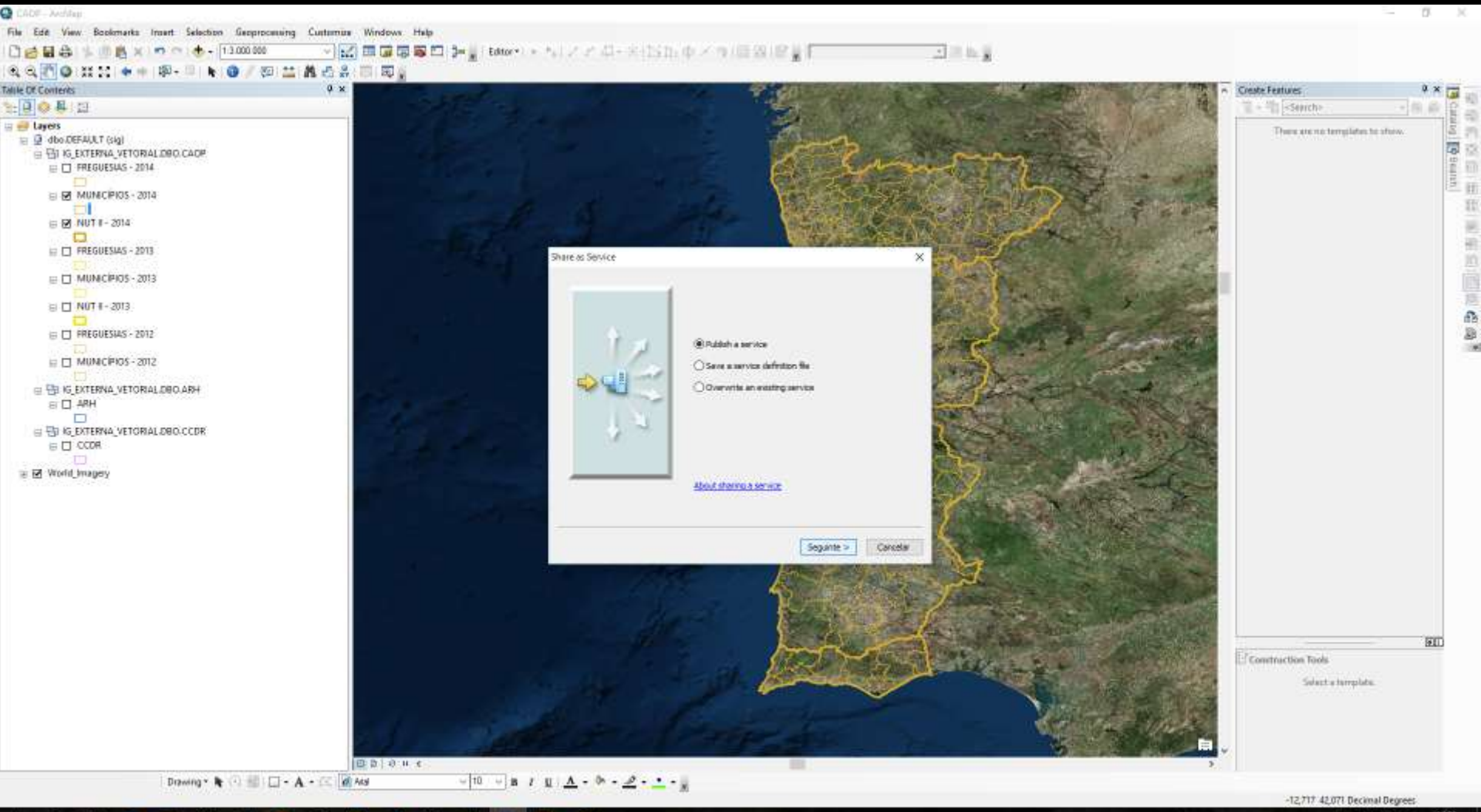
External Vector data
External Raster data
Internal data
SGI – Internal Management System
Land use management (AOTCN)

Geographic Information System (GIS)
ArcGIS
Thematic cartography production



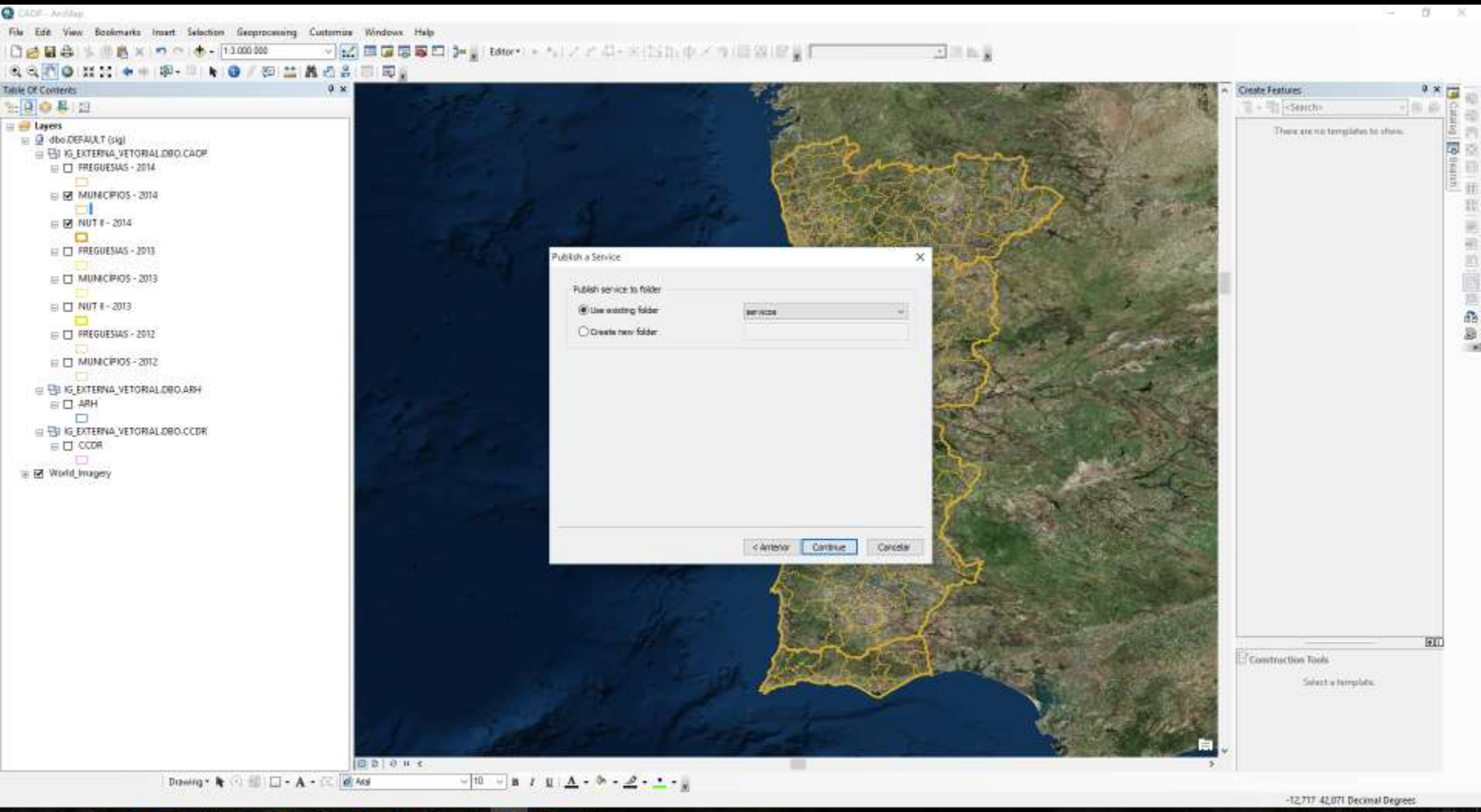
Geographic Information System (GIS)

Creating a Web Service



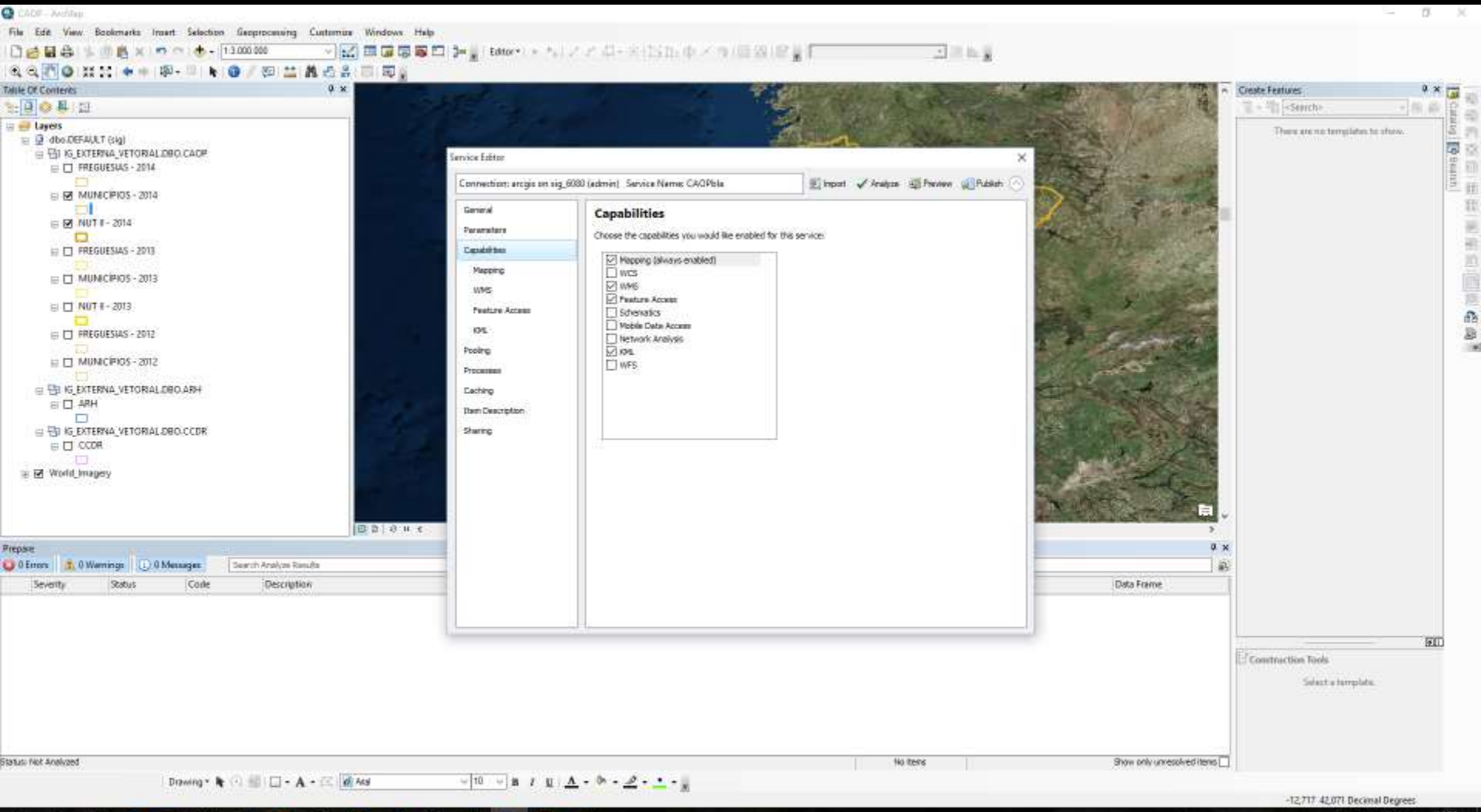
Geographic Information System (GIS)

Creating a Web Service

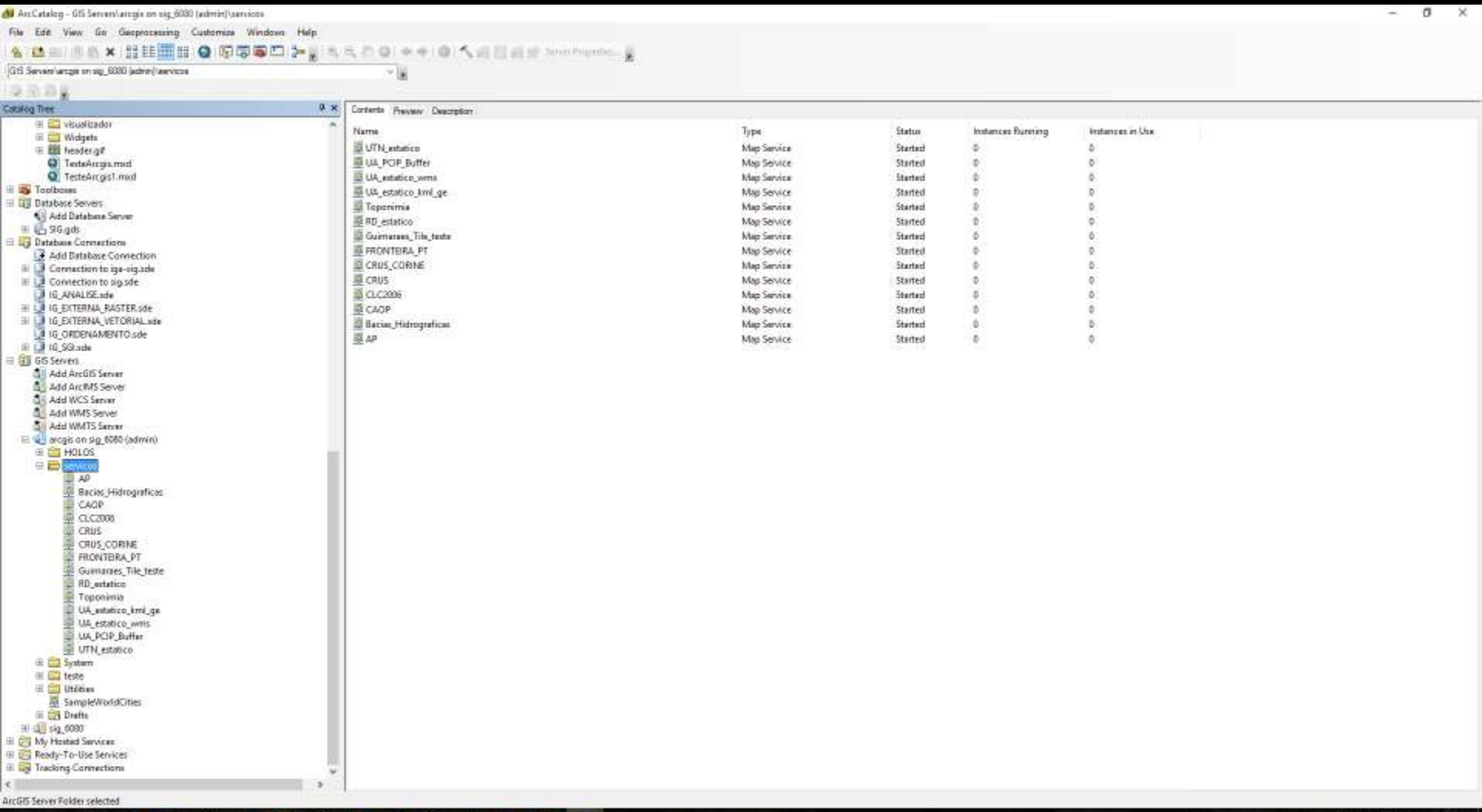


Geographic Information System (GIS)

Creating a Web Service



Geographic Information System (GIS)
Web Services
IGAMAOT Web Map resources



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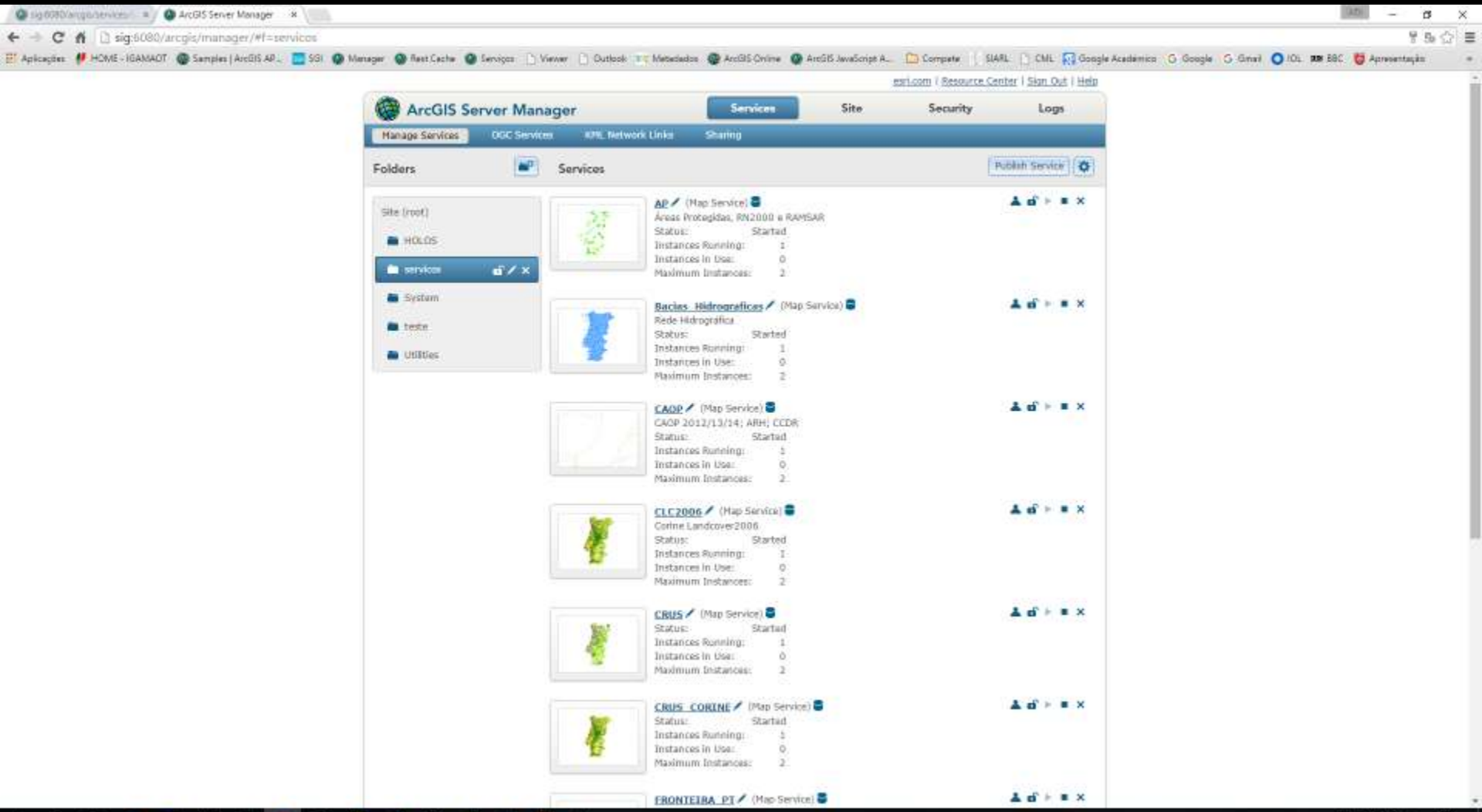
Web Services
IGAMAOT Web Map resources



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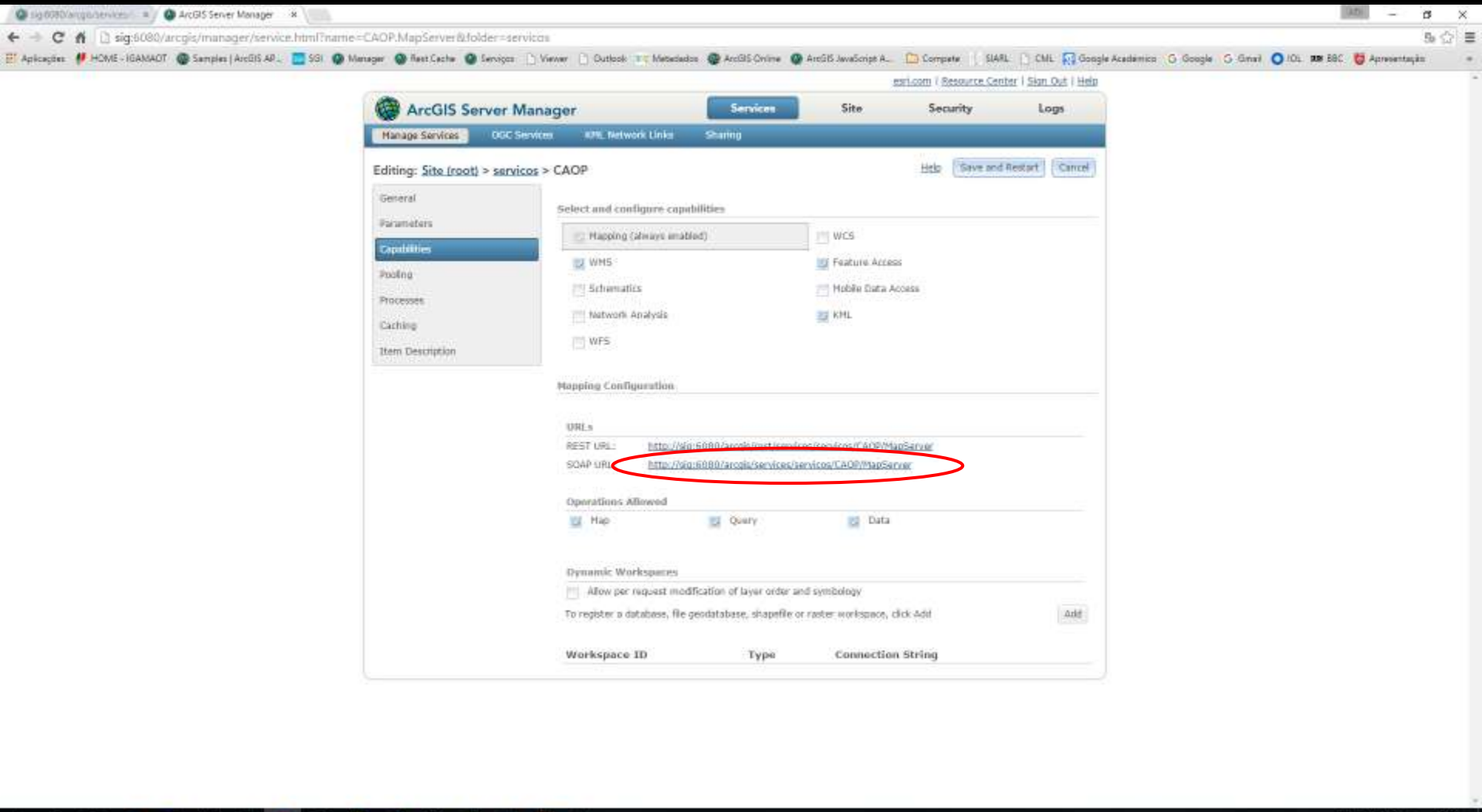
Web Services
IGAMAOT Web Map resources



Geographic Information System (GIS)
Web Services
IGAMAOT Web Map resources

Folder: servicos

sig:6080/arcgis/rest/services/servicos

ArcGIS REST Services Directory

Login

Home > services > servicos

Help | API Reference

JSON | SOAP

Folder: servicos

Current Version: 10.2

View Footprints In: ArcGIS.com Map

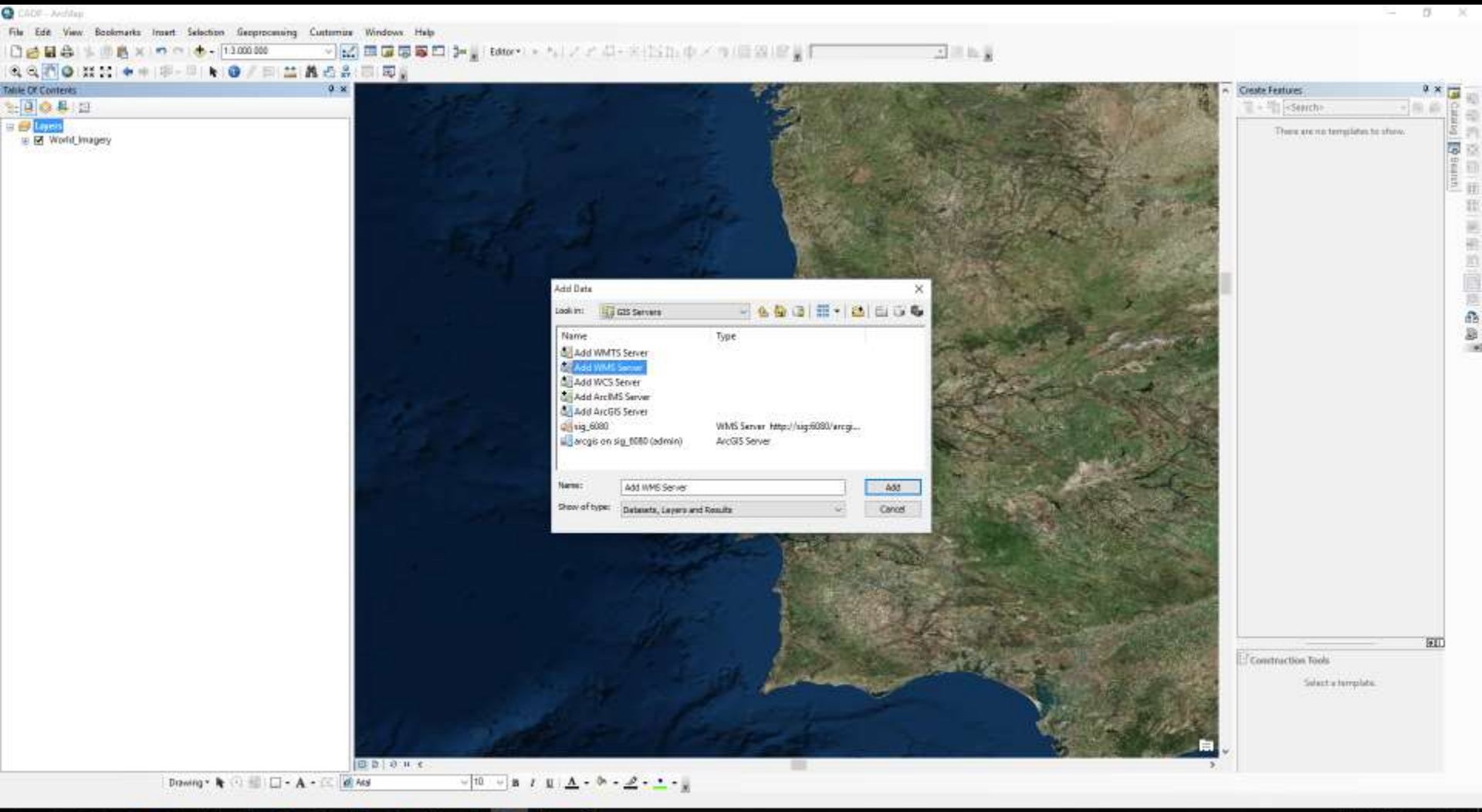
Services:

- servicos/AP (FeatureServer)
- servicos/AP (MapServer)
- servicos/Bacias_Hidrograficas (FeatureServer)
- servicos/Bacias_Hidrograficas (MapServer)
- servicos/CAOP (FeatureServer)
- servicos/CAOP (MapServer)
- servicos/CLC2006 (FeatureServer)
- servicos/CLC2006 (MapServer)
- servicos/CRUS_CORINE (FeatureServer)
- servicos/CRUS_CORINE (MapServer)
- servicos/CRUS (FeatureServer)
- servicos/CRUS (MapServer)
- servicos/FRONTEIRA_PT (FeatureServer)
- servicos/FRONTEIRA_PT (MapServer)
- servicos/Guimaraes_Tile_teste (MapServer)
- servicos/RD_estatico (FeatureServer)
- servicos/RD_estatico (MapServer)
- servicos/Toponimia (FeatureServer)
- servicos/Toponimia (MapServer)
- servicos/UA_estatico_kml_ge (FeatureServer)
- servicos/UA_estatico_kml_ge (MapServer)
- servicos/UA_estatico_wms (FeatureServer)
- servicos/UA_estatico_wms (MapServer)
- servicos/UA_PCIP_Buffer (MapServer)
- servicos/UTN_estatico (FeatureServer)
- servicos/UTN_estatico (MapServer)

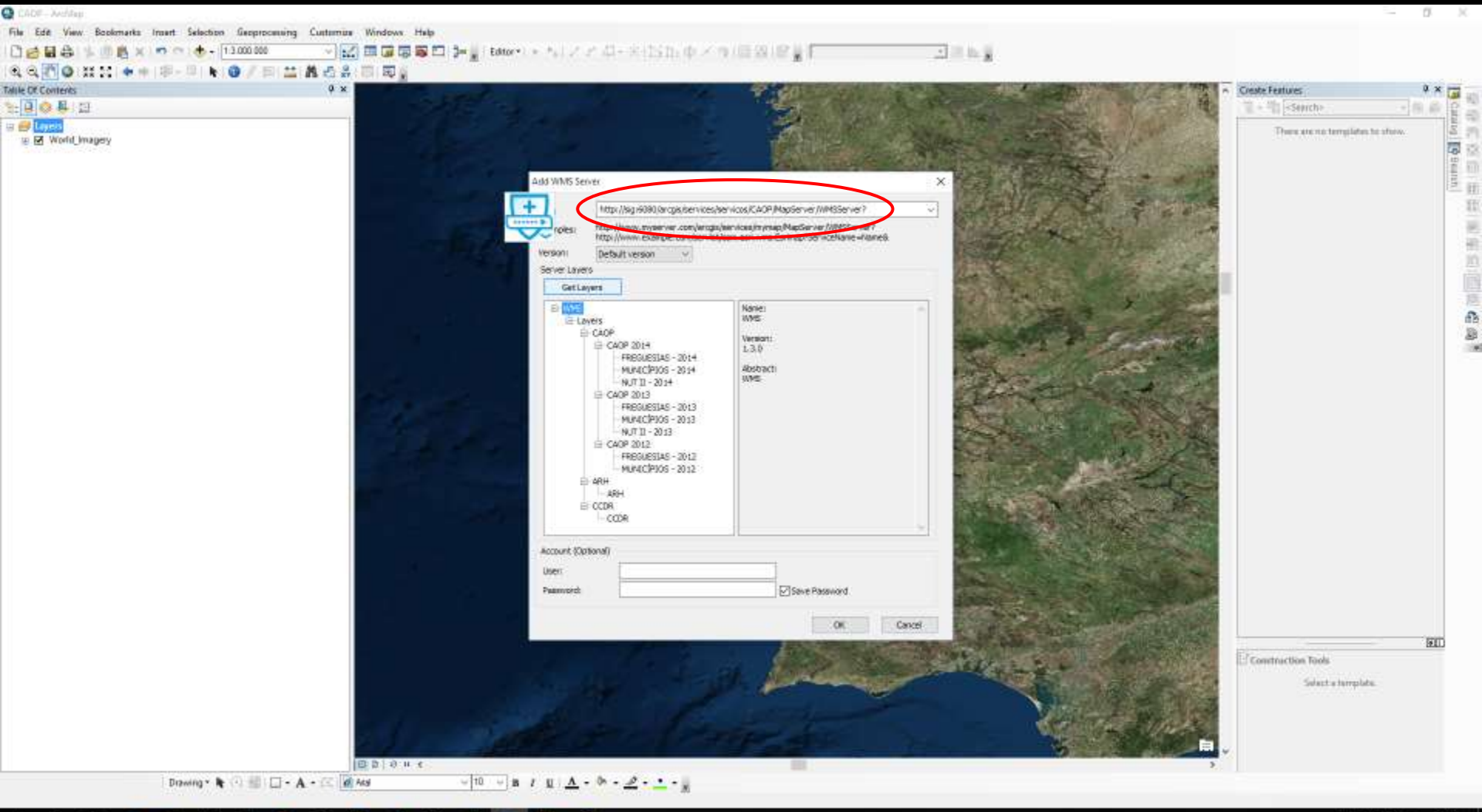
Supported Interfaces: REST SOAP Sitemap Geo Sitemap

Geographic Information System (GIS)
Web Services
Resource (URL)

Web services
ArcGIS – proprietary software
Visualizing Resource (URL) – Adding a Web Map service



Web services
ArcGIS – proprietary software
Visualizing Resource (URL) – Adding a Web Map service



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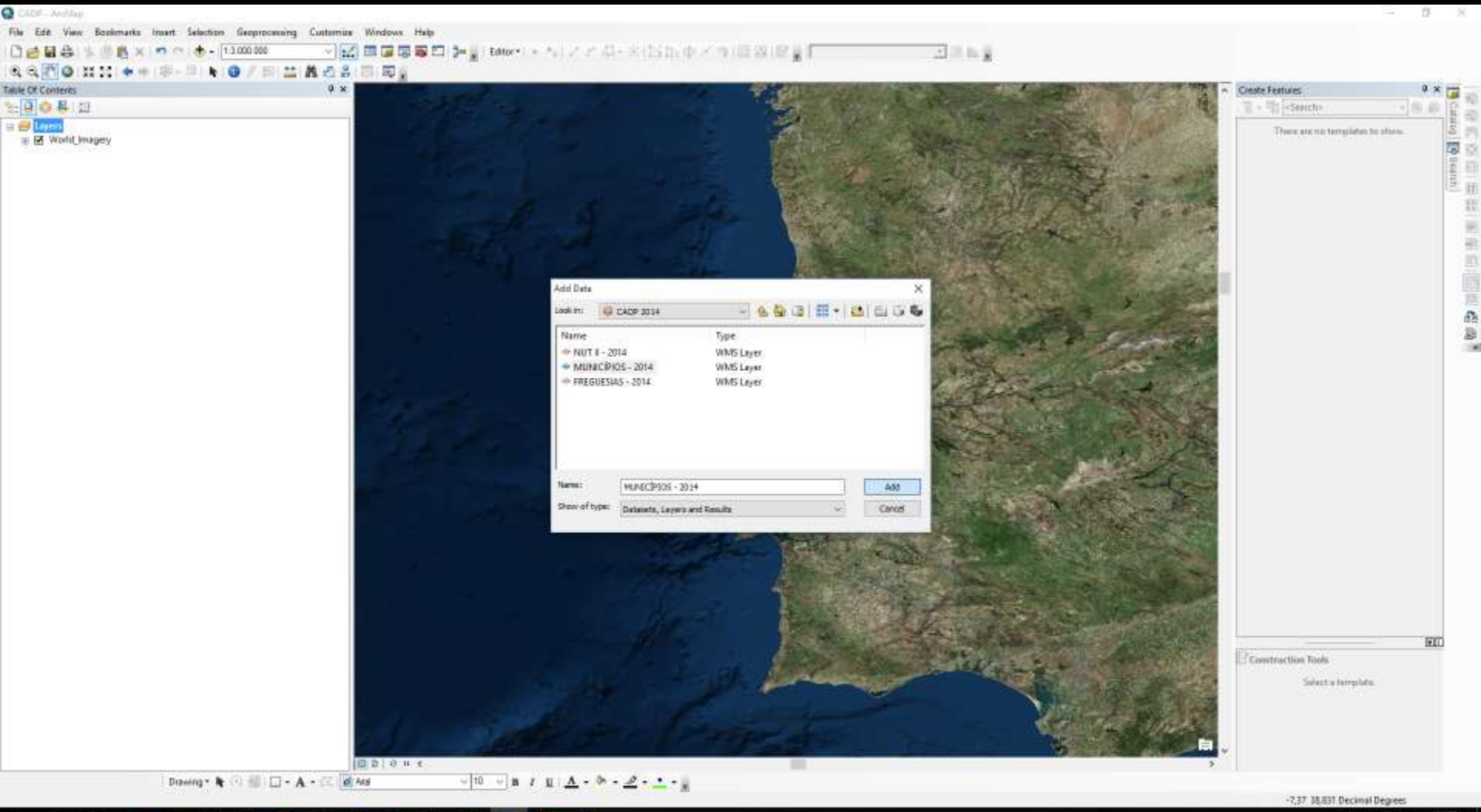

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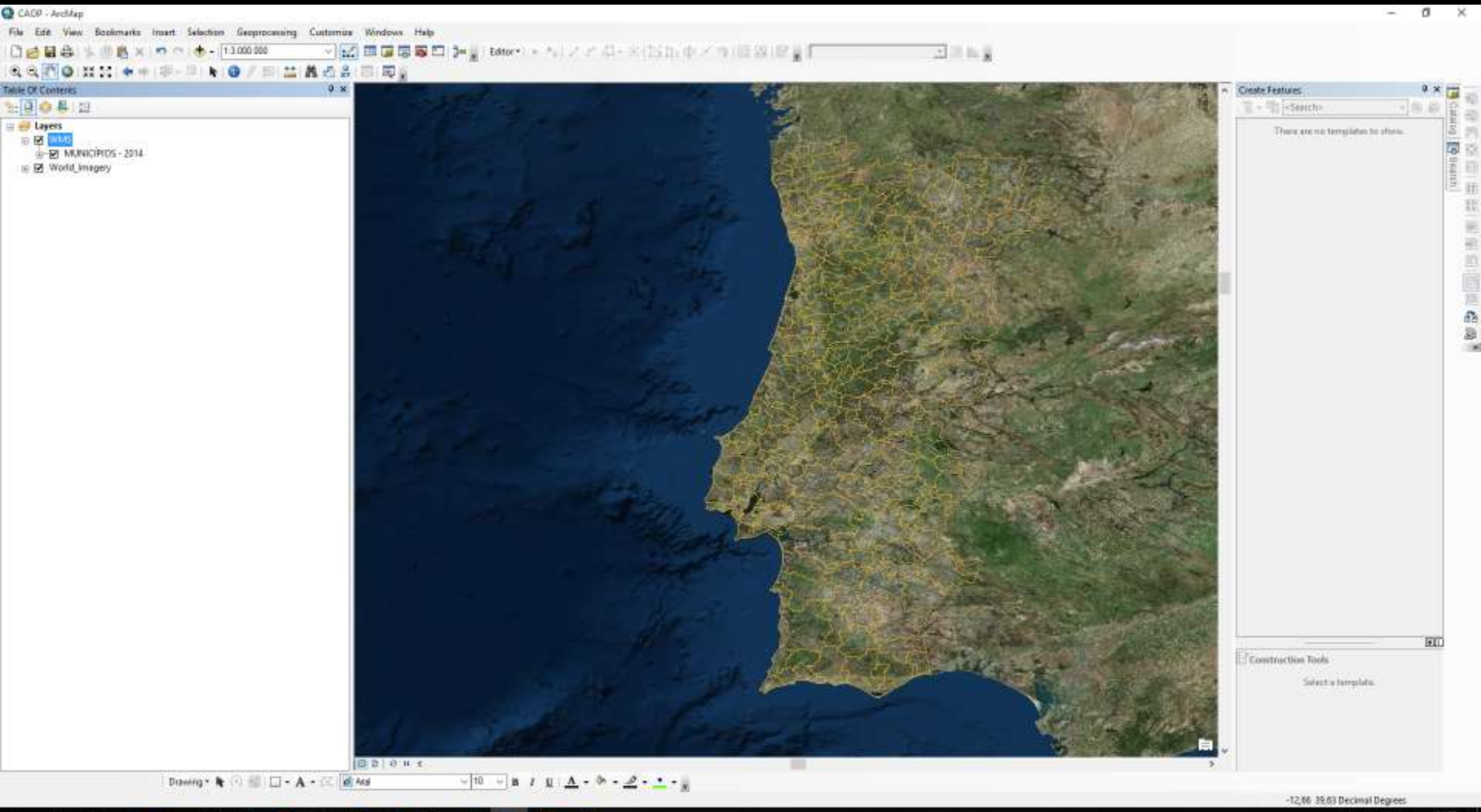
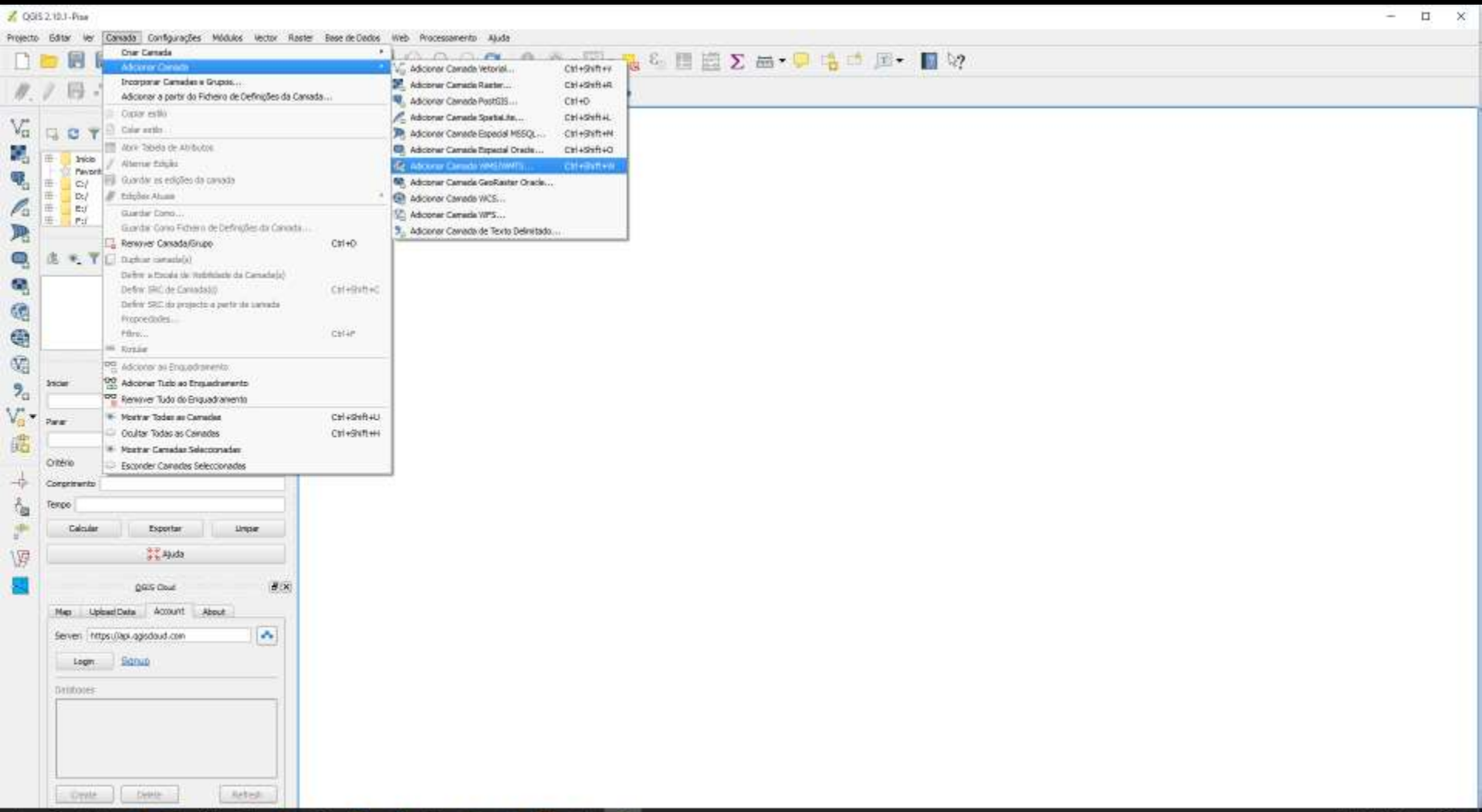
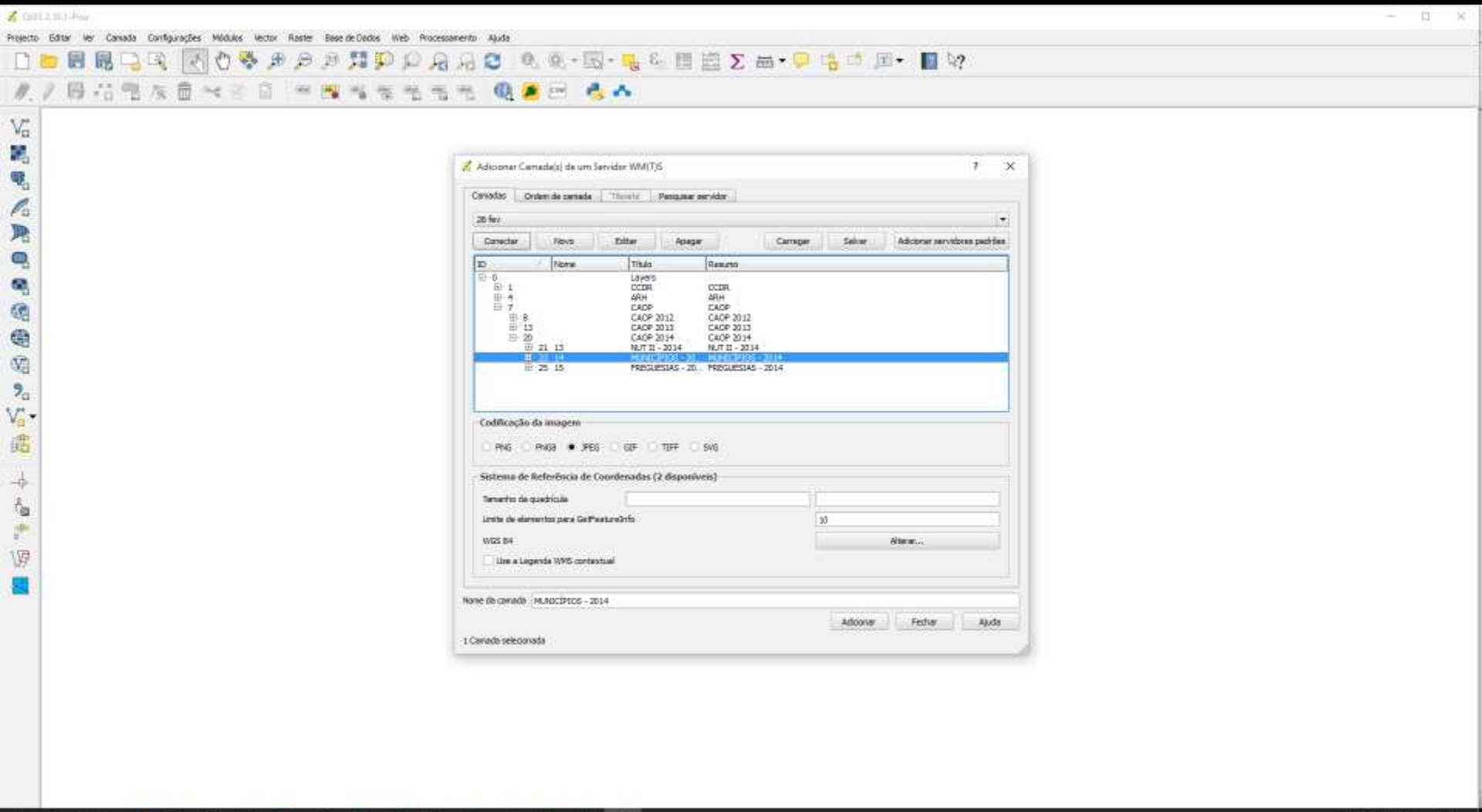


Web services
QGIS – Open Source GIS Software
Visualizing Resource (URL) – Adding a Web Map service



Web services
QGIS – Open Source GIS Software
Visualizing Resource (URL) – Adding a Web Map service



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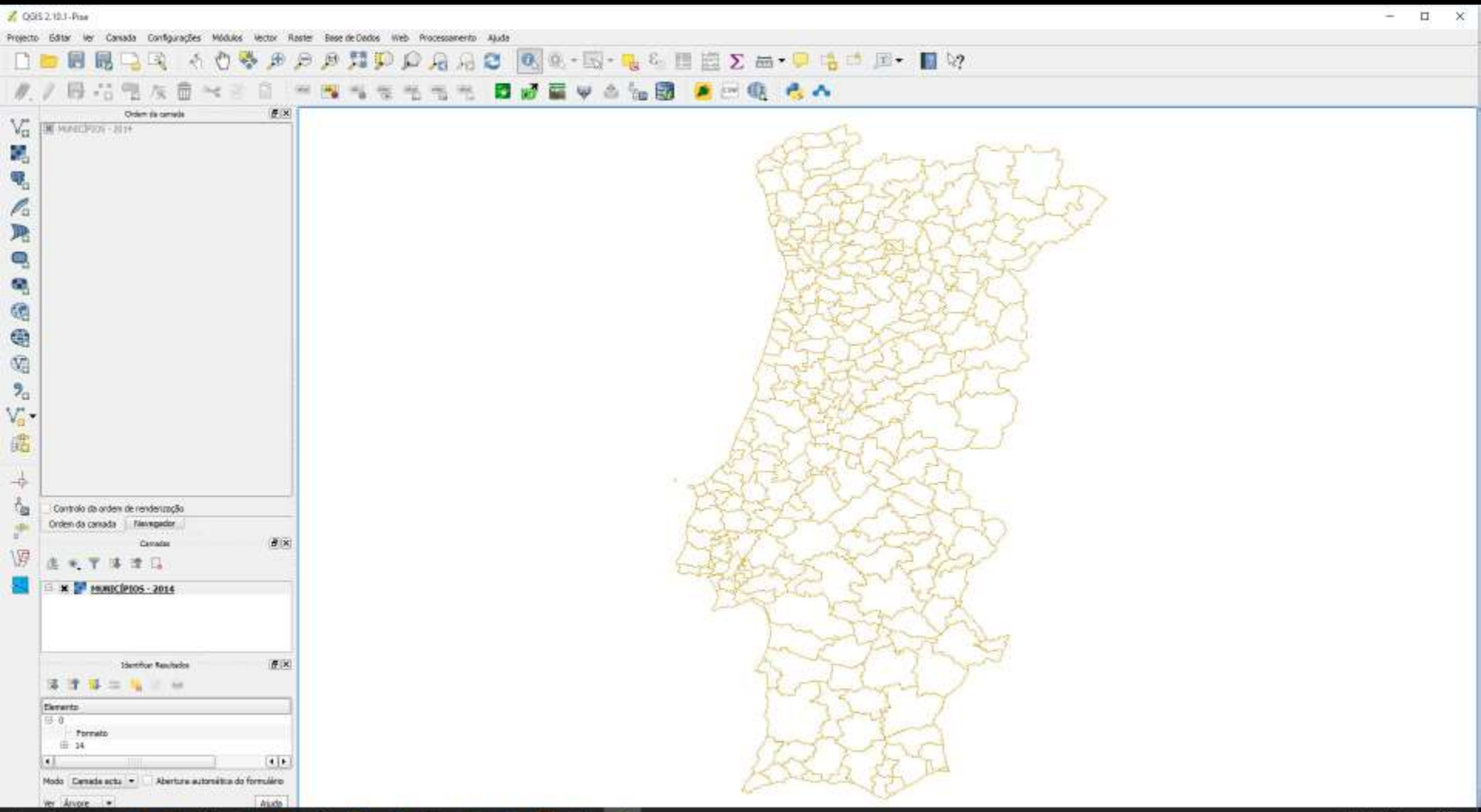

Web services
Google Earth – Free Software
Visualizing Resource (URL) – Adding a Web Map service

sig:6080/arcgis/rest/services/servicos/CAOP/MapServer

ArcGIS REST Services Directory Login

Home > services > servicos > CAOP (MapServer) Help | API Reference

JSON | SOAP | WMS

servicos/CAOP (MapServer)

View In: ArcGIS JavaScript ArcGIS.com Map Google Earth ArcMap ArcGIS Explorer

View Footprint In: ArcGIS.com Map

Service Description: CAOP 2012/13/14; ARH; CCDR

Map Name: Layers

Legend

All Layers and Tables

Layers:

- CAOP (0)
  - CAOP 2014 (1)
    - FREGUESIAS - 2014 (2)
    - MUNICÍPIOS - 2014 (3)
    - NUT II - 2014 (4)
  - CAOP 2013 (5)
    - FREGUESIAS - 2013 (6)
    - MUNICÍPIOS - 2013 (7)
    - NUT II - 2013 (8)
  - CAOP 2012 (9)
    - FREGUESIAS - 2012 (10)
    - MUNICÍPIOS - 2012 (11)
- ARH (12)
  - ARH (13)
- CCDR (14)
  - CCDR (15)

Description:

Copyright Text: IGAMAOT; DGT; APA

Spatial Reference: 4326 (4326)

Single Fused Map Cache: false

Initial Extent:

XMin: -9.175581578106403
YMin: 38.7108492869248
XMax: -9.015641568452239
YMax: 38.7921771381251

Web services
Google Earth – Free Software
Visualizing Resource (URL) – Adding a Web Map service

sig:6080/arcgis/rest/services/servicos/CAOP/MapServer

ArcGIS REST Services Directory

Login

Home > services > servicos > CAOP (MapServer)

Help | API Reference

JSON | SOAP | WMS

servicos/CAOP (MapServer)

View In: ArcGIS JavaScript ArcGIS.com Map Google Earth ArcMap ArcGIS Explorer

View Footprint In: ArcGIS.com Map

Service Description: CAOP 2012/13/14; ARH; CCDR

Map Name: Layers

Legend

All Layers and Tables

Layers:

- CAOP (0)
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    - FREGUESIAS - 2014 (2)
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  - CCDR (15)

Description:

Copyright Text: IGAMAOT; DGT; APA

Spatial Reference: 4326 (4326)

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XMin: -9.175581578106403
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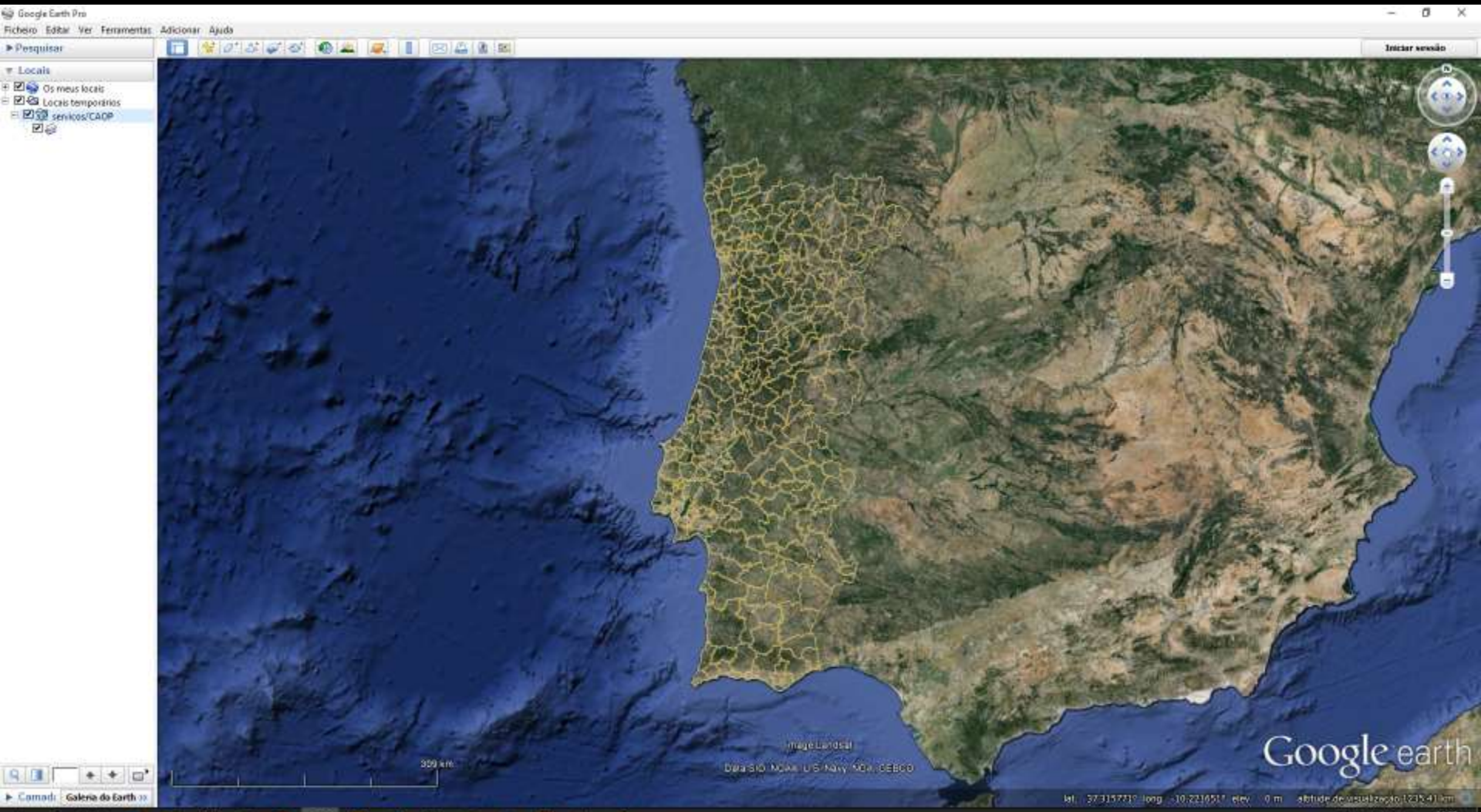
Web services
Google Earth – Free Software
Visualizing Resource (URL) – Adding a Web Map service



Viewer
Javascript code
Adding a Web Service

viewer.js - Microsoft Visual Studio

File Edit View Project Debug Tools Window Help

client

XHTML 1.0 Transition

Identify.js | NavTools.css | identify.js | viewer.js | Directions.js | proxy.ashx | proxy.config

```
            layerControlLayerInfos: {
                metadataUrl: true
            }

        }, {
            type: 'dynamic',
            url: 'http://sig:6080/arcgis/rest/services/servicos/CAOP/MapServer',
            title: 'Limites Administrativos',
            options: {
                id: 'CAOP',
                opacity: 1.0,
                visible: false,
                outFields: ['*'],
                //mode: 1,
                imageParameters: imageParameters
            },
            identifyLayerInfos: {
                layerIds: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]
            },
            layerControlLayerInfos: {
                metadataUrl: 'http://snig.dgterritorio.pt/geoportal/catalog/search/resource/detailsPretty.page?uuid=%7BF70C6F98-1051-4903-B236-0785AA60F966%7D'
            }

        }, {

            type: 'dynamic',
            url: 'http://sig:6080/arcgis/rest/services/servicos/Toponimia/MapServer',
```

100 %

Item(s) Saved | Ln 102 | Col 17 | Ch 17 | INS

Viewer
Javascript code

viewer.js - Microsoft Visual Studio

File Edit View Project Debug Tools Window Help

client

XHTML 1.0 Transition

Identify.js | NavTools.css | identify.js | viewer.js | Directions.js | proxy.ashx | proxy.config

```
        dnd: {
            include: true,
            id: 'dnd',
            type: 'titlePane',
            canFloat: false,
            position: 9,
            path: 'gis/dijit/DnD',
            title: '<i class="fa fa-plus-circle"></i>  Adicionar',
            options: {
                map: true
            }
        },

        print: {
            include: true,
            id: 'print',
            type: 'titlePane',
            //canFloat: true,
            path: 'gis/dijit/Print',
            title: '<i class="fa fa-print"></i>  Imprimir',
            open: false,
            position: 10,
            options: {
                map: true,
                printTaskURL: 'http://sig:6080/arcgis/rest/services/Utilities/PrintingTools/GPServer/Export%20Web%20Map%20Task',
                copyrightText: 'Copyright 2015',
                authorText: 'IGAMAOT',
                defaultTitle: 'Napa',
                defaultFormat: 'PDF',
                defaultLayout: 'A4 Portrait'
            }
```

83 %

Item(s) Saved | Ln 588 | Col 13 | Ch 13 | INS

Viewer
Javascript code

viewer.js - Microsoft Visual Studio

File Edit View Project Debug Tools Window Help

client

XHTML 1.0 Transition

Identify.js | NavTools.css | identify.js | viewer.js | Directions.js | proxy.ashx | proxy.config

```
        }
    },

    navtools: {
        include: true,
        id: 'navtools',
        type: 'contentPane',
        canFloat: false,
        path: 'gis/dijit/NavTools',
        title: 'Tools',
        open: false,
        position: 13,
        placeAt: 'top',
        options: {
            map: true,
            mapClickMode: true
        }
    },

    directions: {
        include: true,
        id: 'directions',
        type: 'titlePane',
        path: 'gis/dijit/Directions',
        title: '<i class="fa fa-map-marker"></i>  Direções',
        open: false,
        position: 11,
        options: {
            map: true,
            mapRightClickMenu: true,
            options: {
```

83 %

Item(s) Saved | Ln 618 | Col 13 | Ch 13 | INS

Viewer
Javascript code

viewer.js - Microsoft Visual Studio

File Edit View Project Debug Tools Window Help

client

XHTML 1.0 Transition

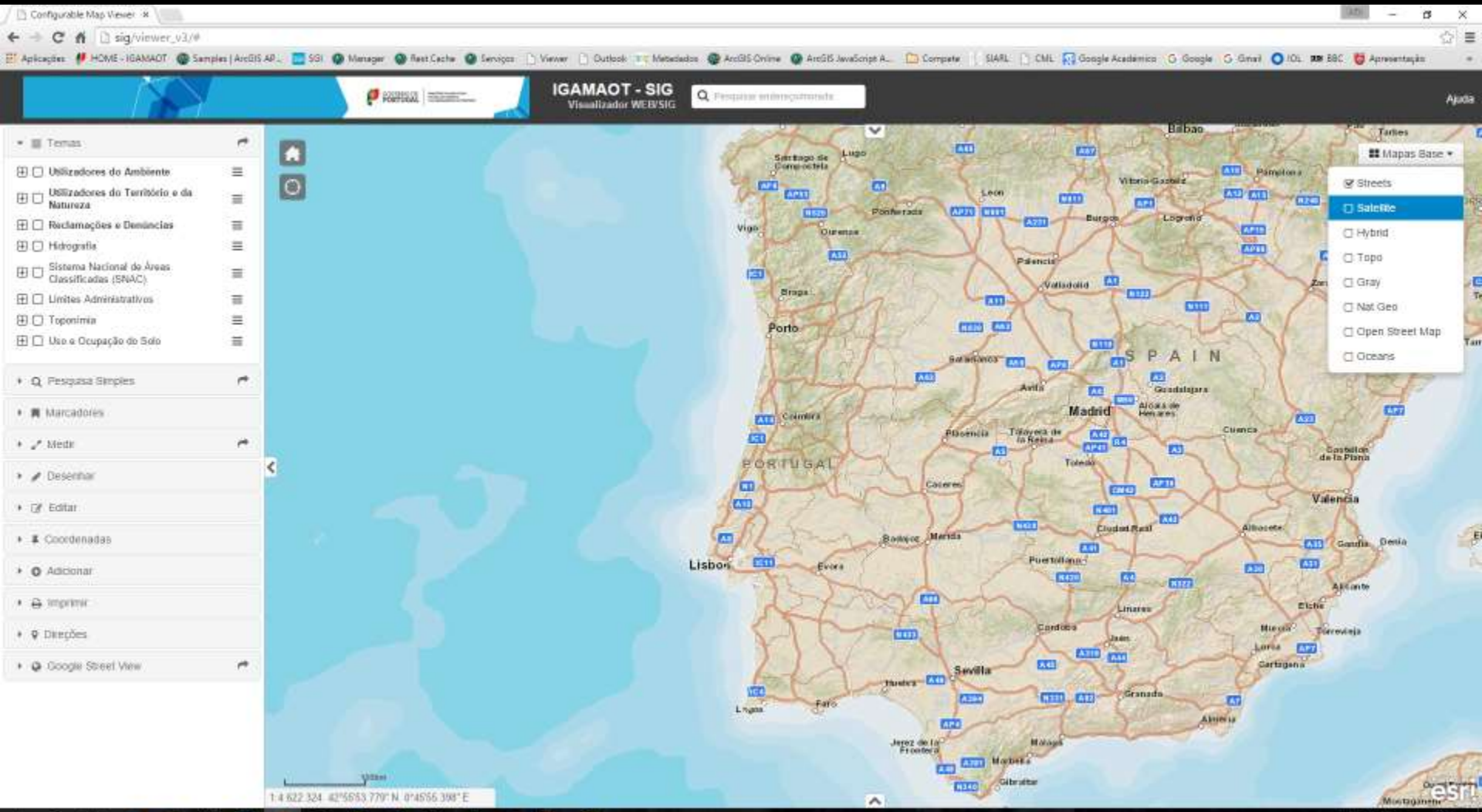
Identify.js | NavTools.css | identify.js | viewer.js | Directions.js | proxy.ashx | proxy.config

```
                options: {
                    routeTaskUrl: 'http://tasks.arcgisonline.com/ArcGIS/rest/services/NetworkAnalysis/ESRI_Route_EU/MapServer',
//                    routeParams: {
//                        directionsLanguage: 'pt',
//                        directionsLengthUnits: units.METERS
//                    },
                    active: false //for 3.12, starts active by default, which we dont want as it interfears with mapClickMode
                }
            }
        },

        streetview: {
            include: true,
            id: 'streetview',
            type: 'titlePane',
            canFloat: true,
            position: 12,
            path: 'gis/dijit/Streetview',
            title: '<i class="fa fa-globe"></i>  Google street view',
            options: {
                map: true,
                mapClickMode: true,
                mapRightClickMenu: true
            }
        },

//          extract: {
//              include: true,
//              id: 'extract',
//              type: 'titlePane',
//              canFloat: true,
```

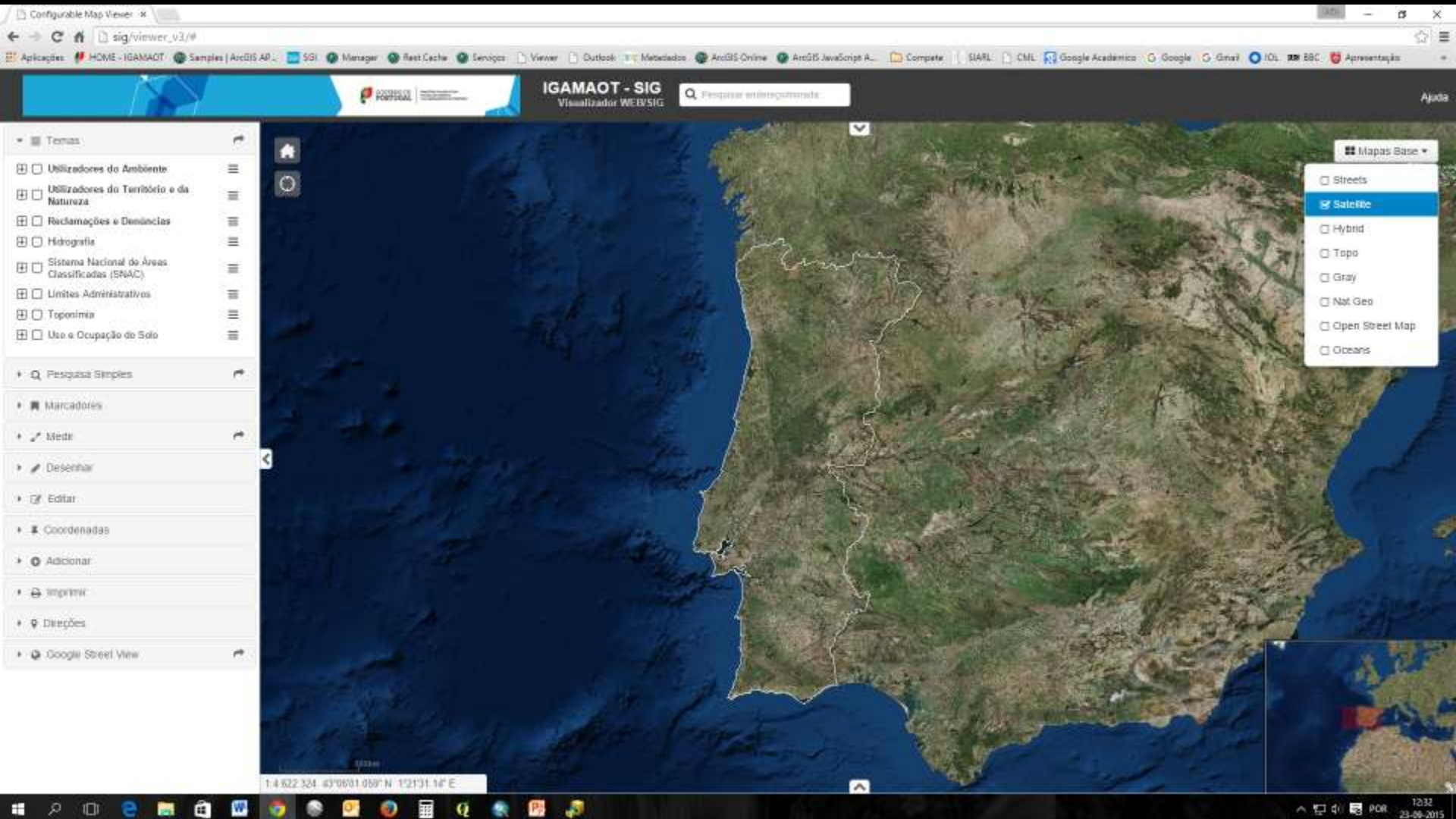
83 %

Item(s) Saved | Ln 650 | Col 27 | Ch 27 | INS

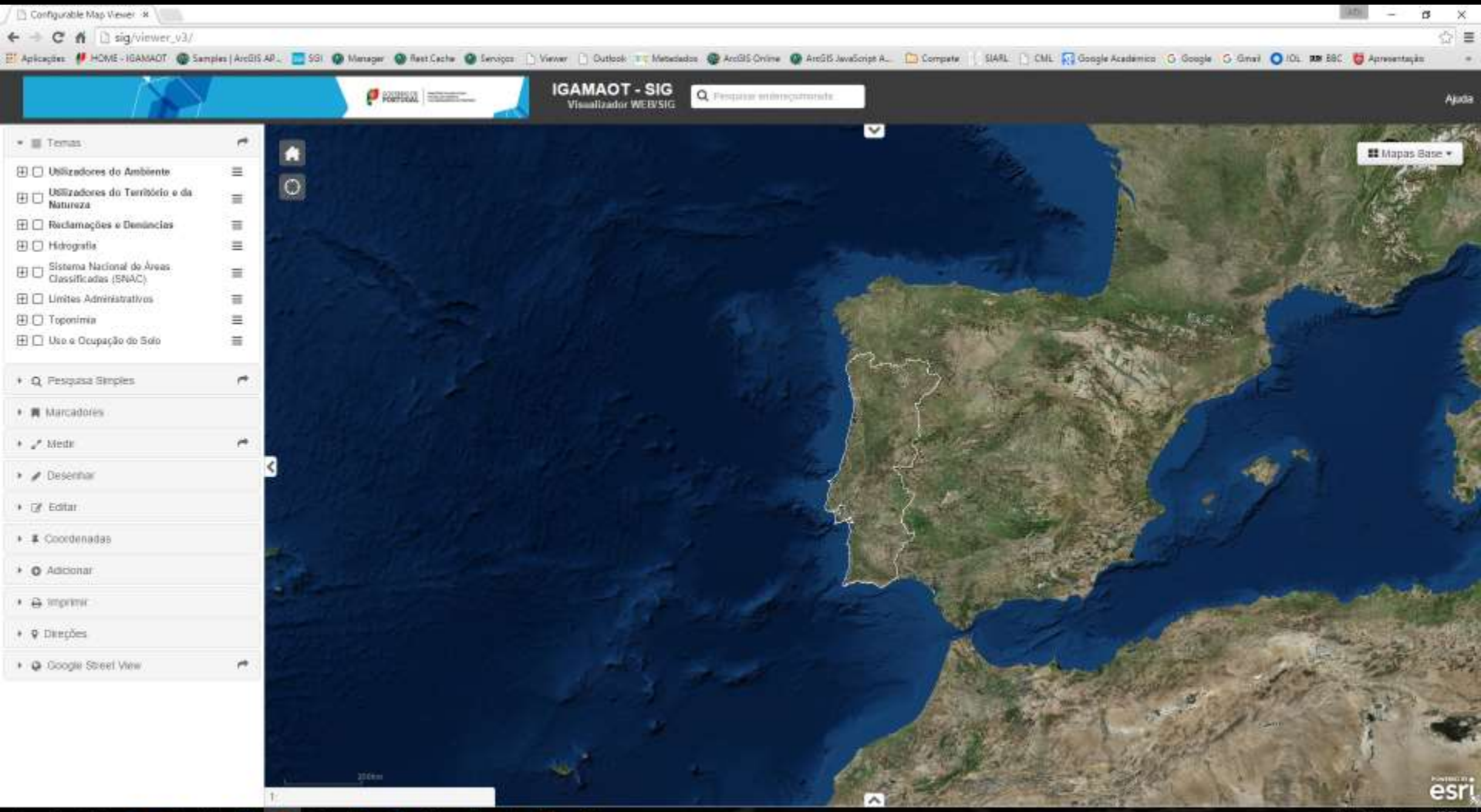
Viewer
Basemaps (tiles) – Streets



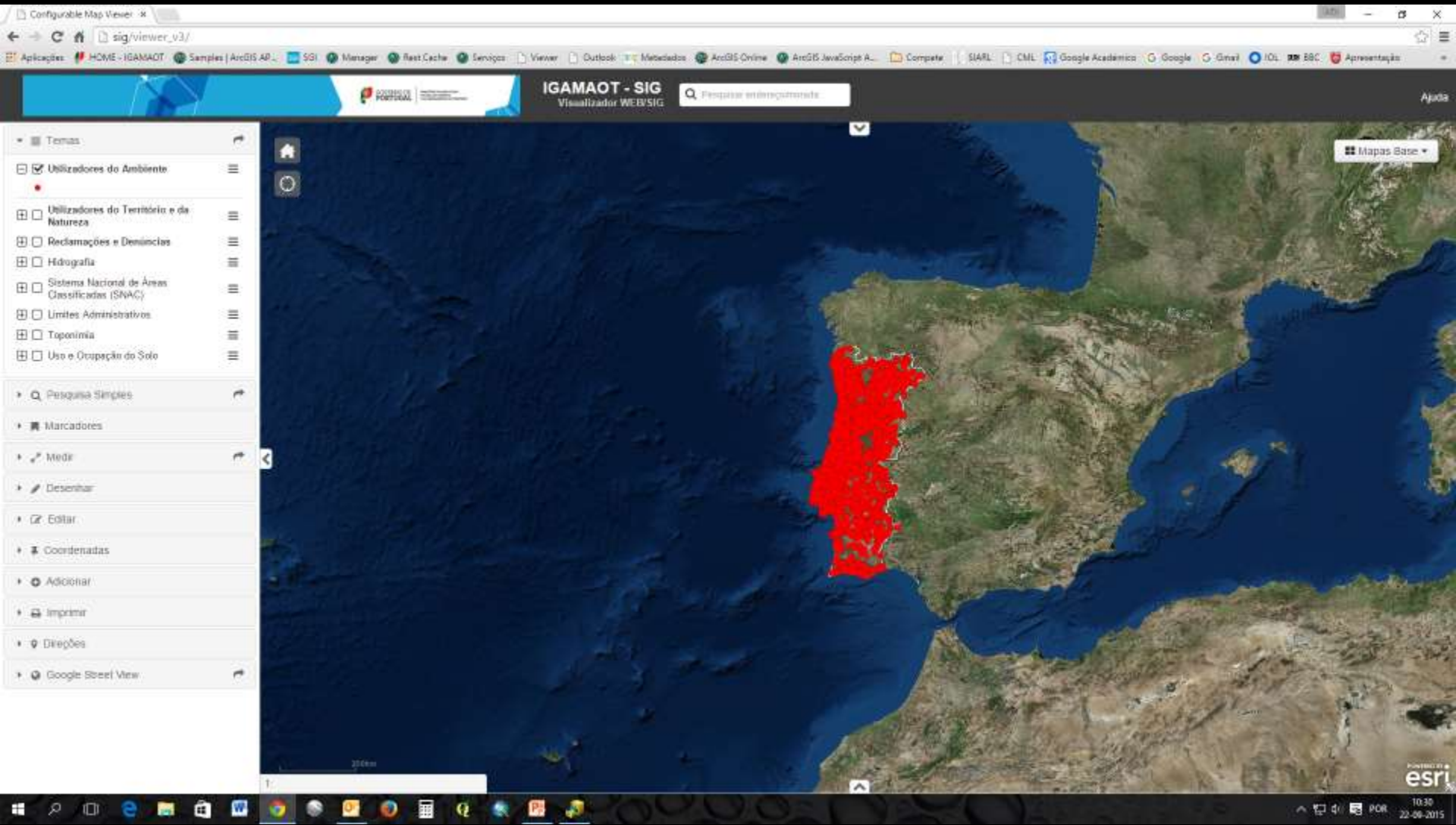
Viewer
Basemaps (tiles) – Satellite + Overview map



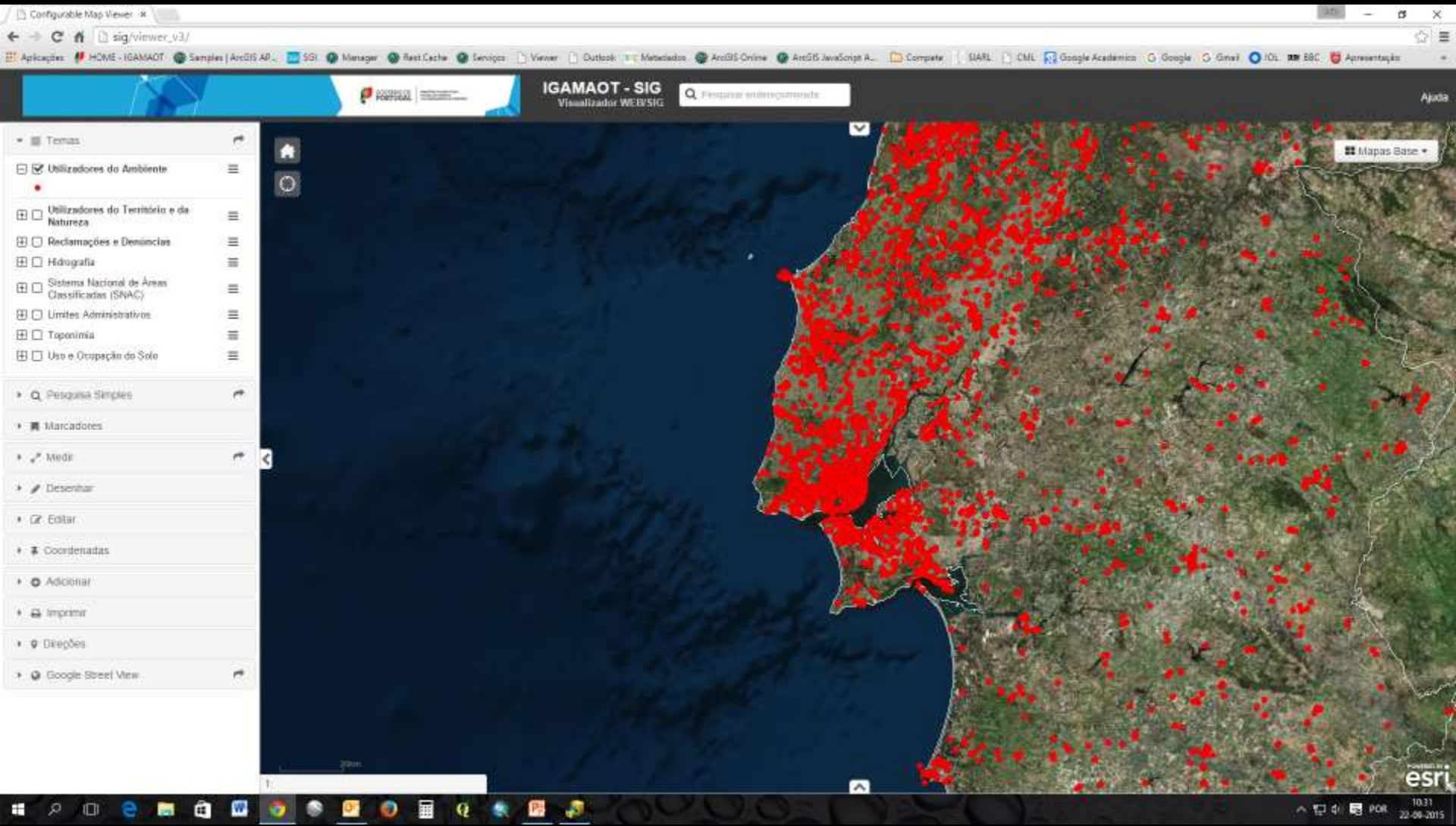
Viewer
Home


Configurable Map Viewer
sig/viewer_v3/
IGAMAOT - SIG
Visualizador WEB/SIG
Ajuda
Temas
Utilizadores do Ambiente
Utilizadores do Território e da Natureza
Reclamações e Denúncias
Hidrografia
Sistema Nacional de Áreas Classificadas (SNAC)
Limites Administrativos
Toponímia
Uso e Ocupação do Solo
Pesquisa Simples
Marcadores
Medir
Desenhar
Editar
Coordenadas
Adicionar
Imprimir
Direções
Google Street View
Mapas Base
esri

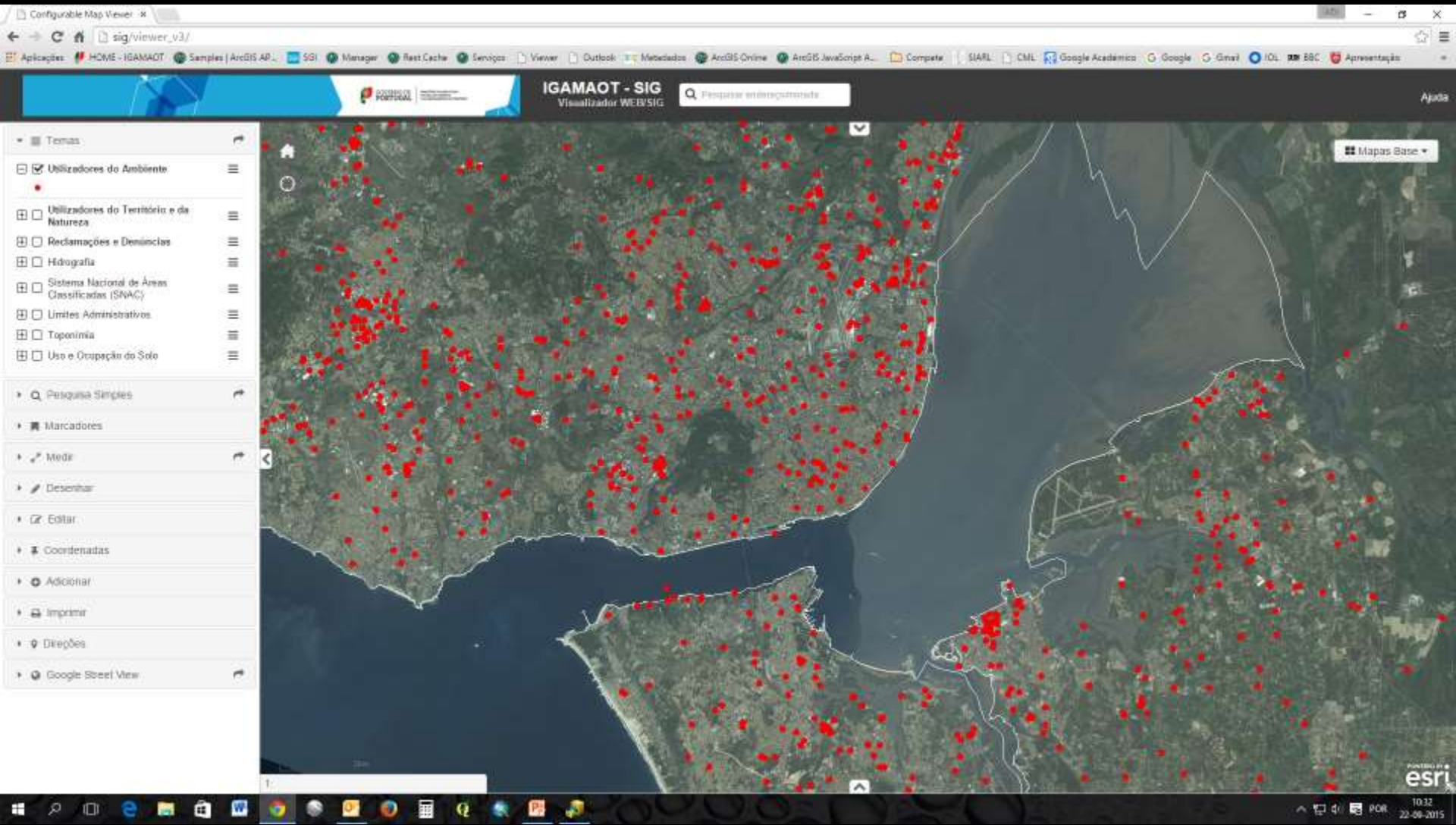
Viewer
Layers
Internal Data: Environmental Users



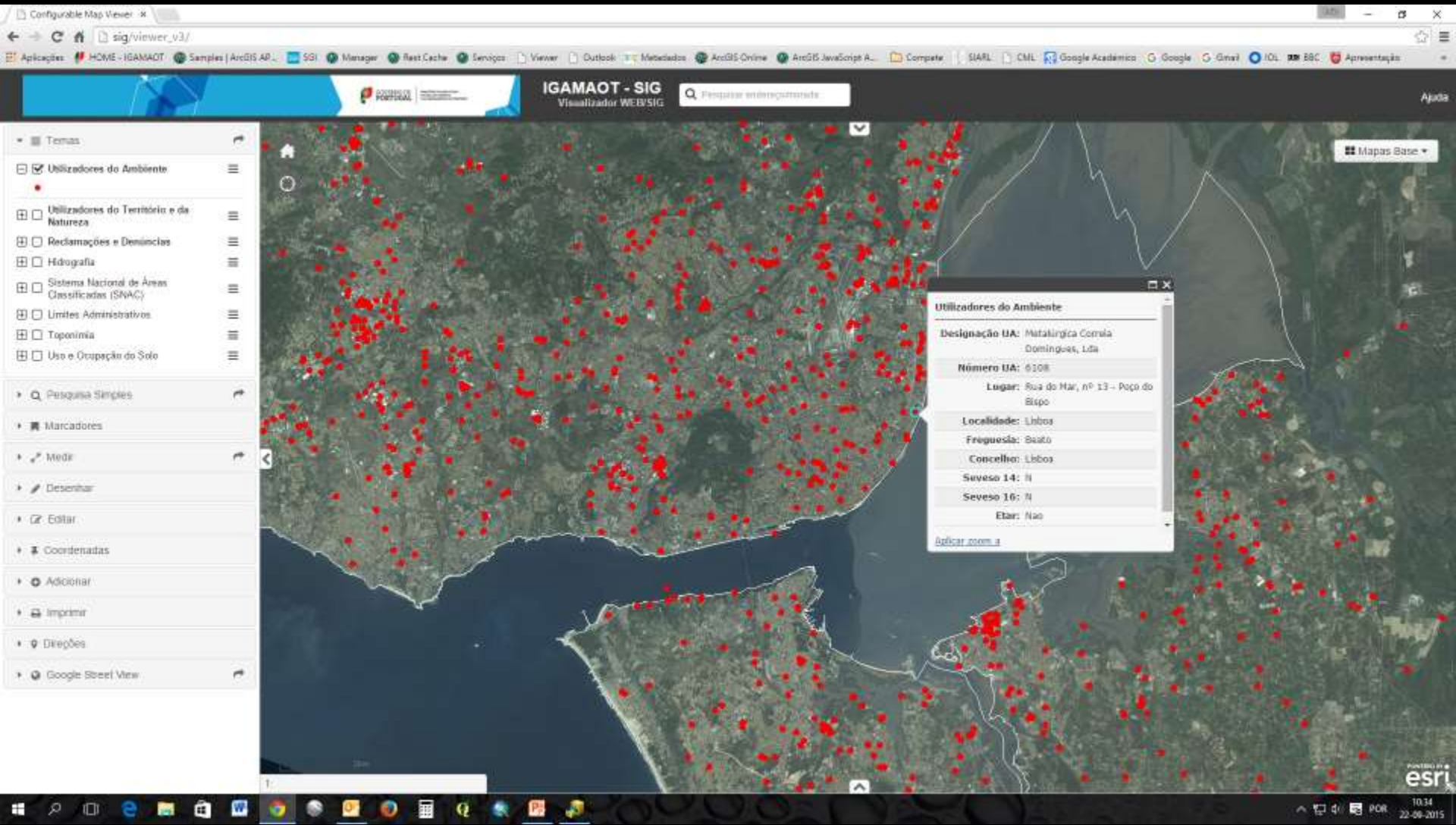
Viewer
Layers
Internal Data: Environmental Users



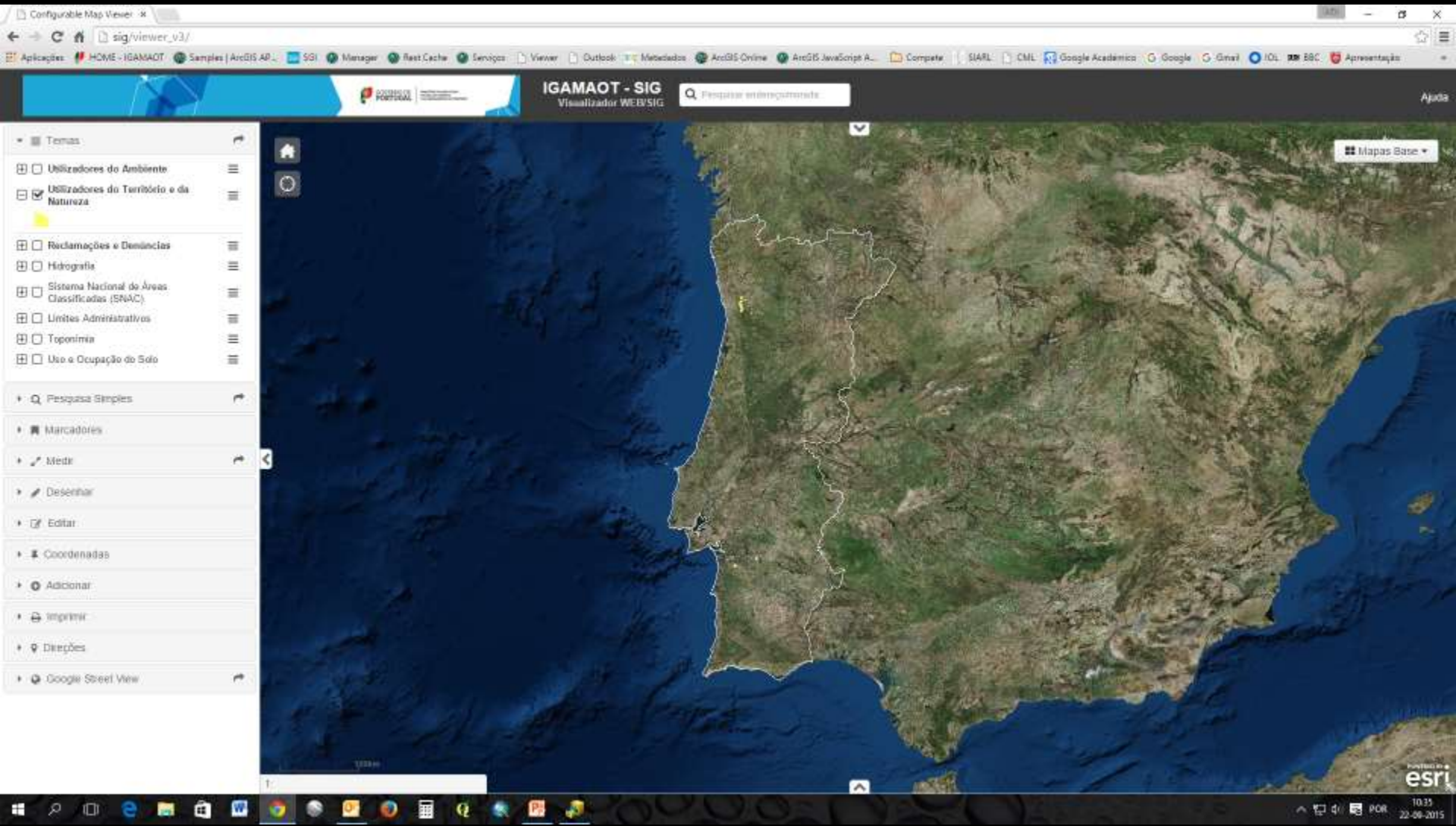
Viewer
Layers
Internal Data: Environmental Users



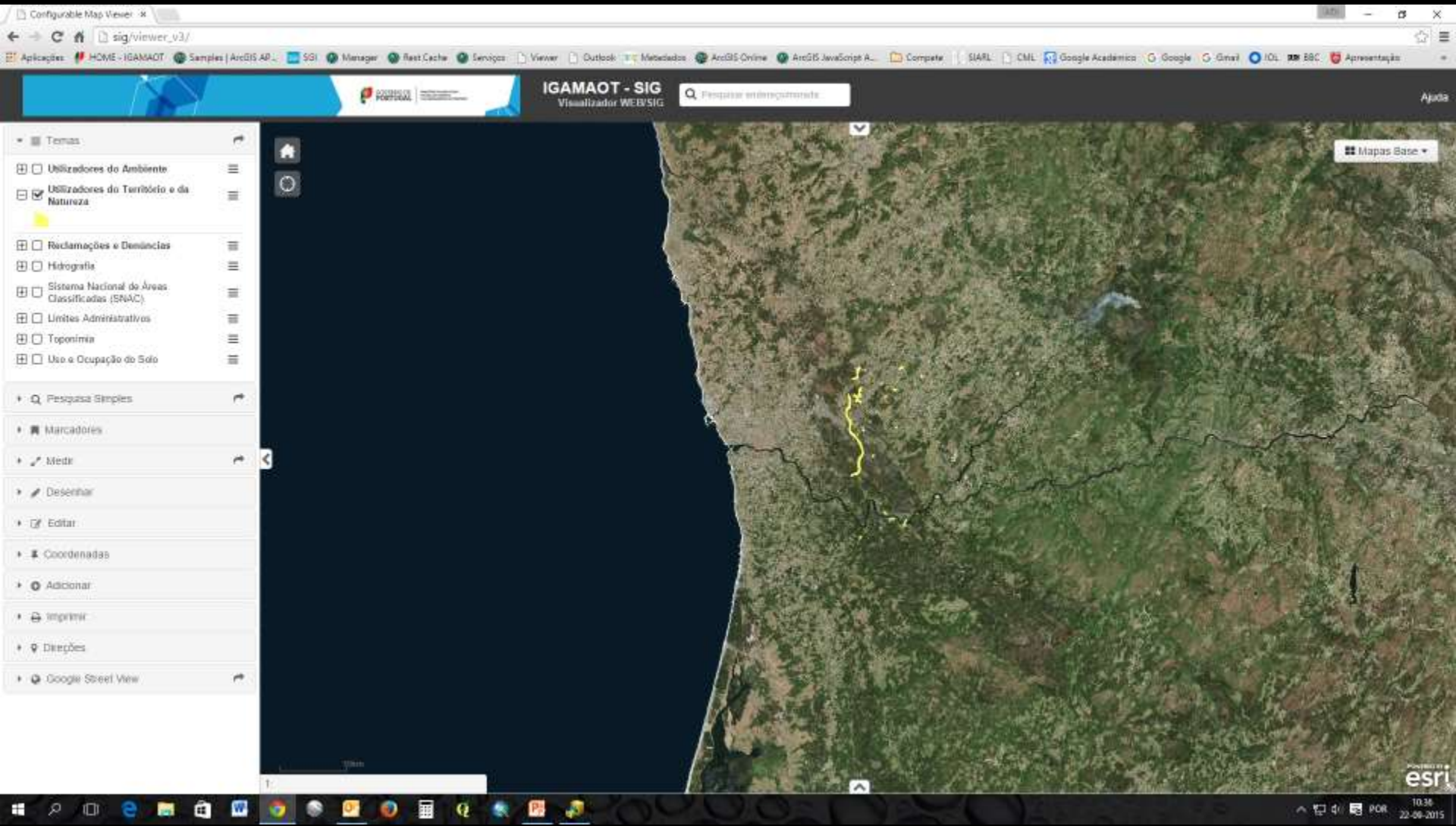
Viewer
Layers
Internal Data: Environmental Users



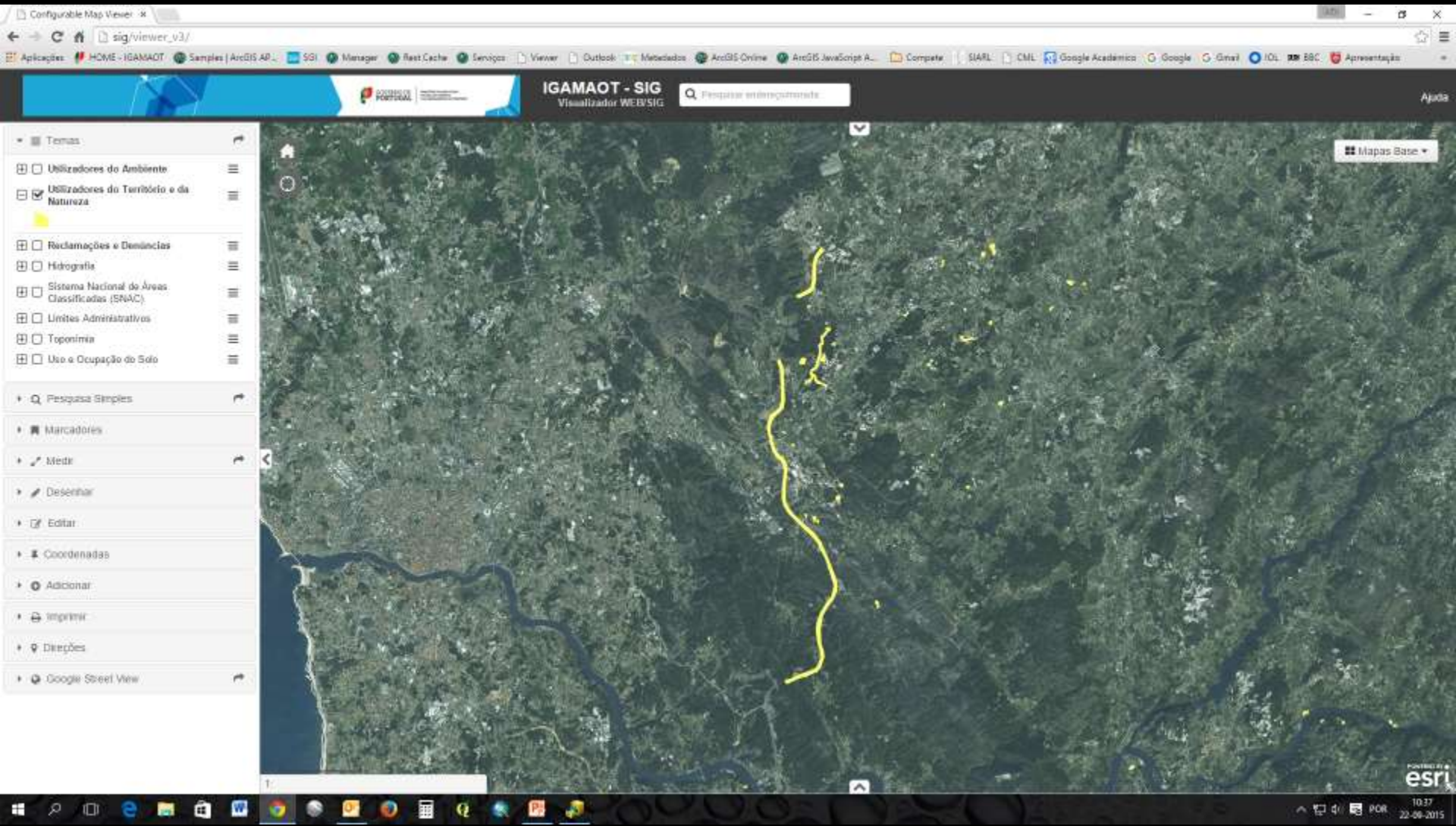
Viewer
Layers
Internal Data: Territorial and Nature Users



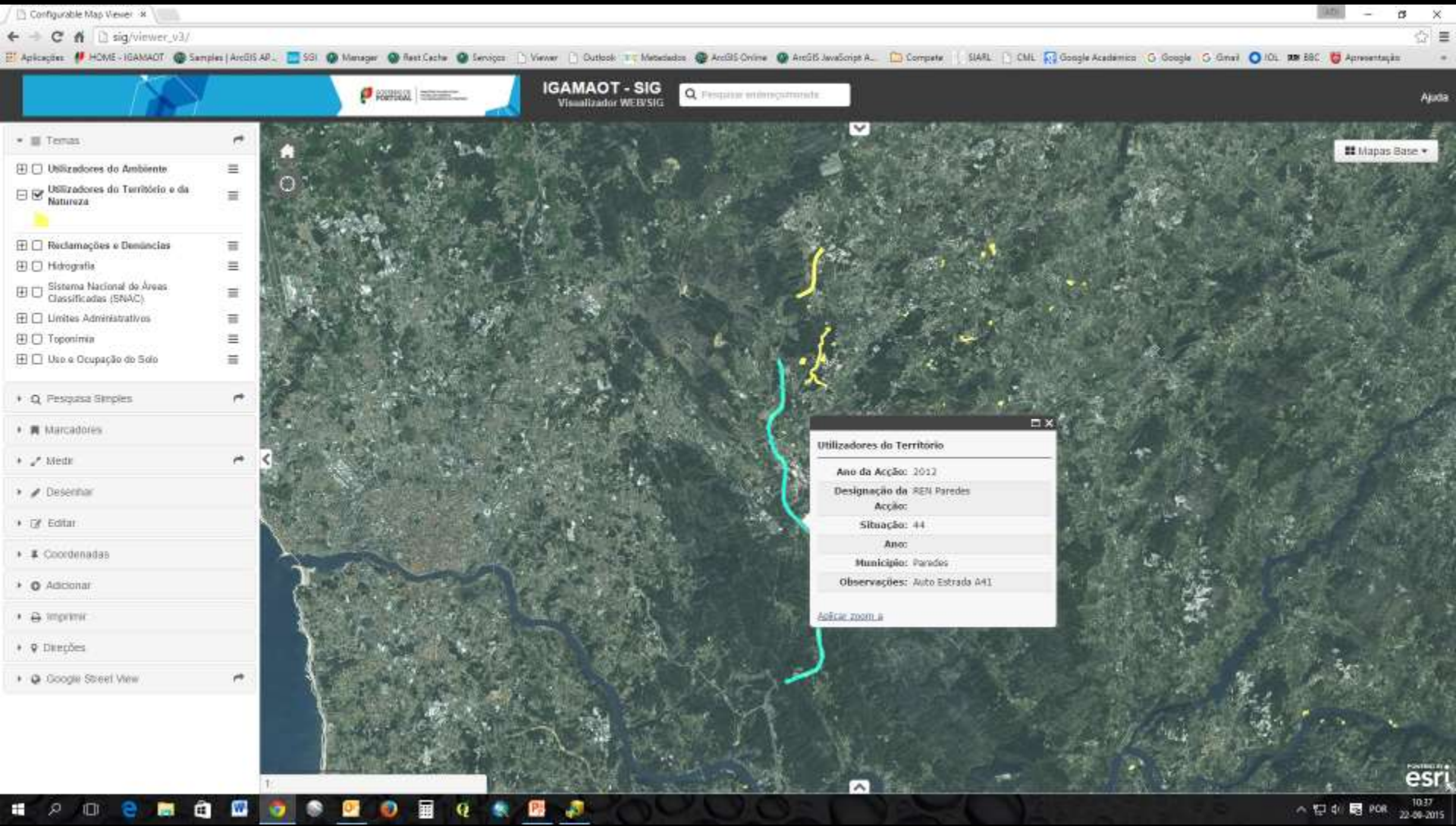
Viewer
Layers
Internal Data: Territorial and Nature Users



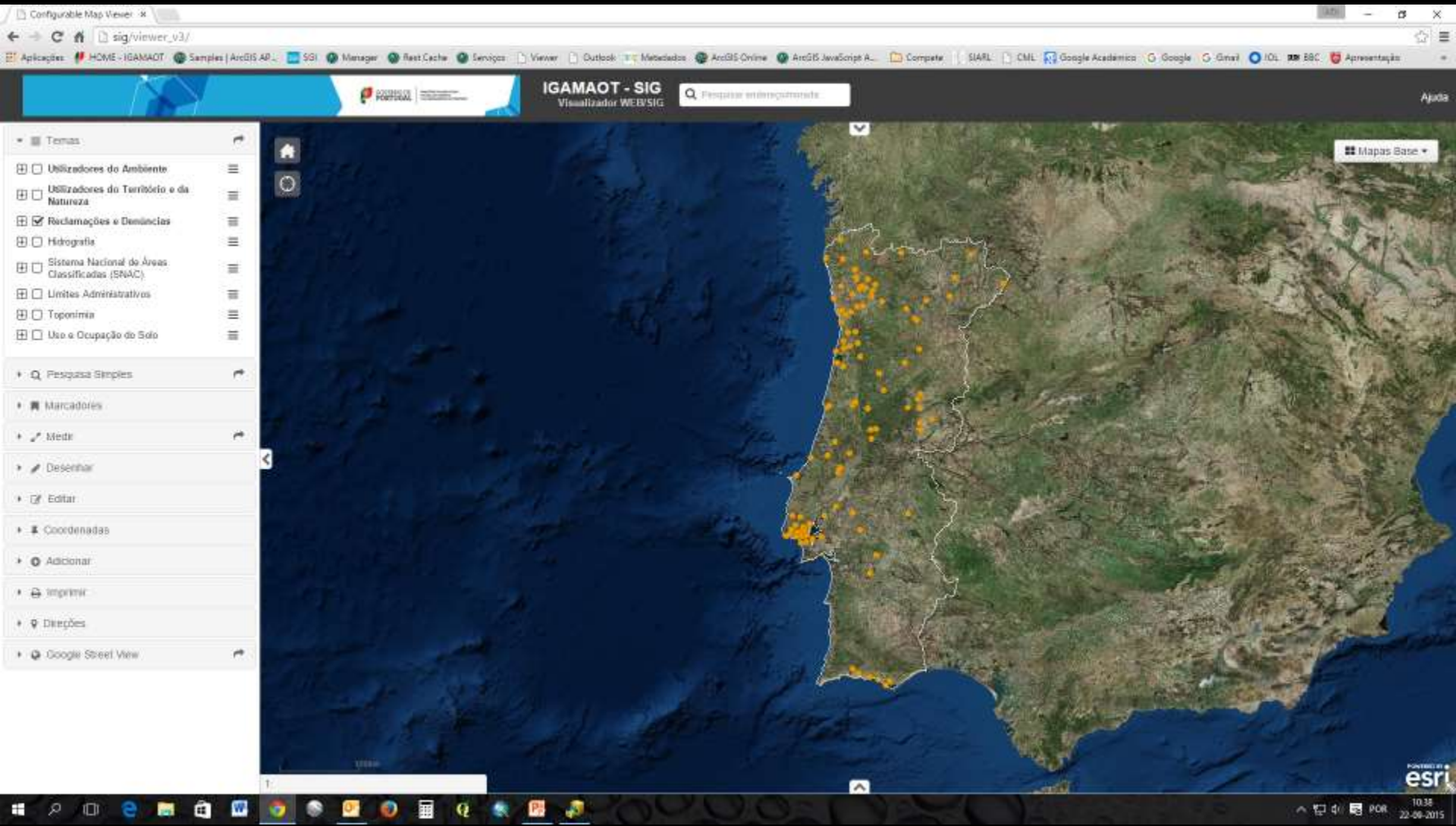
Viewer
Layers
Internal Data: Territorial and Nature Users



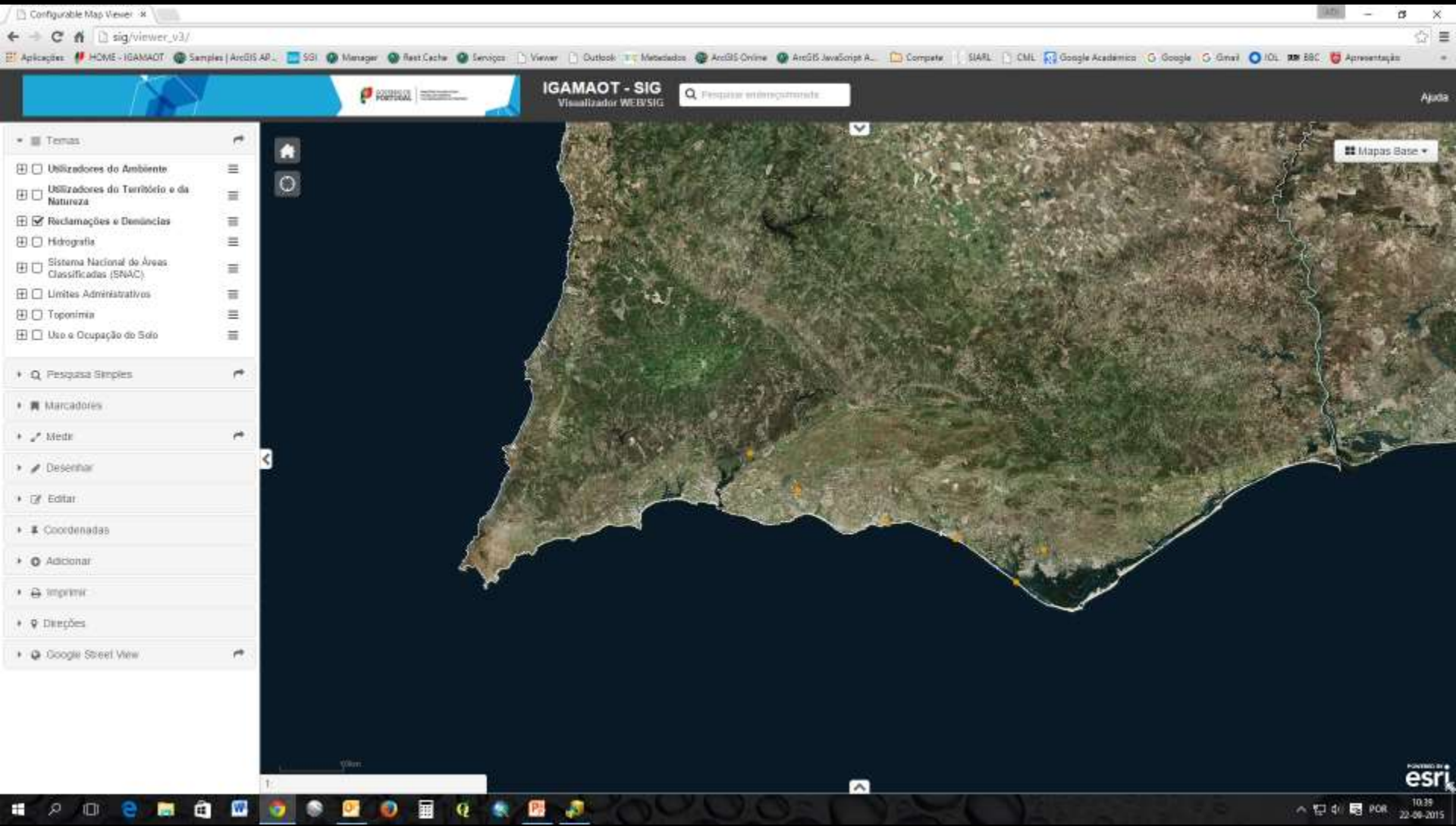
Viewer
Layers
Internal Data: Territorial and Nature Users



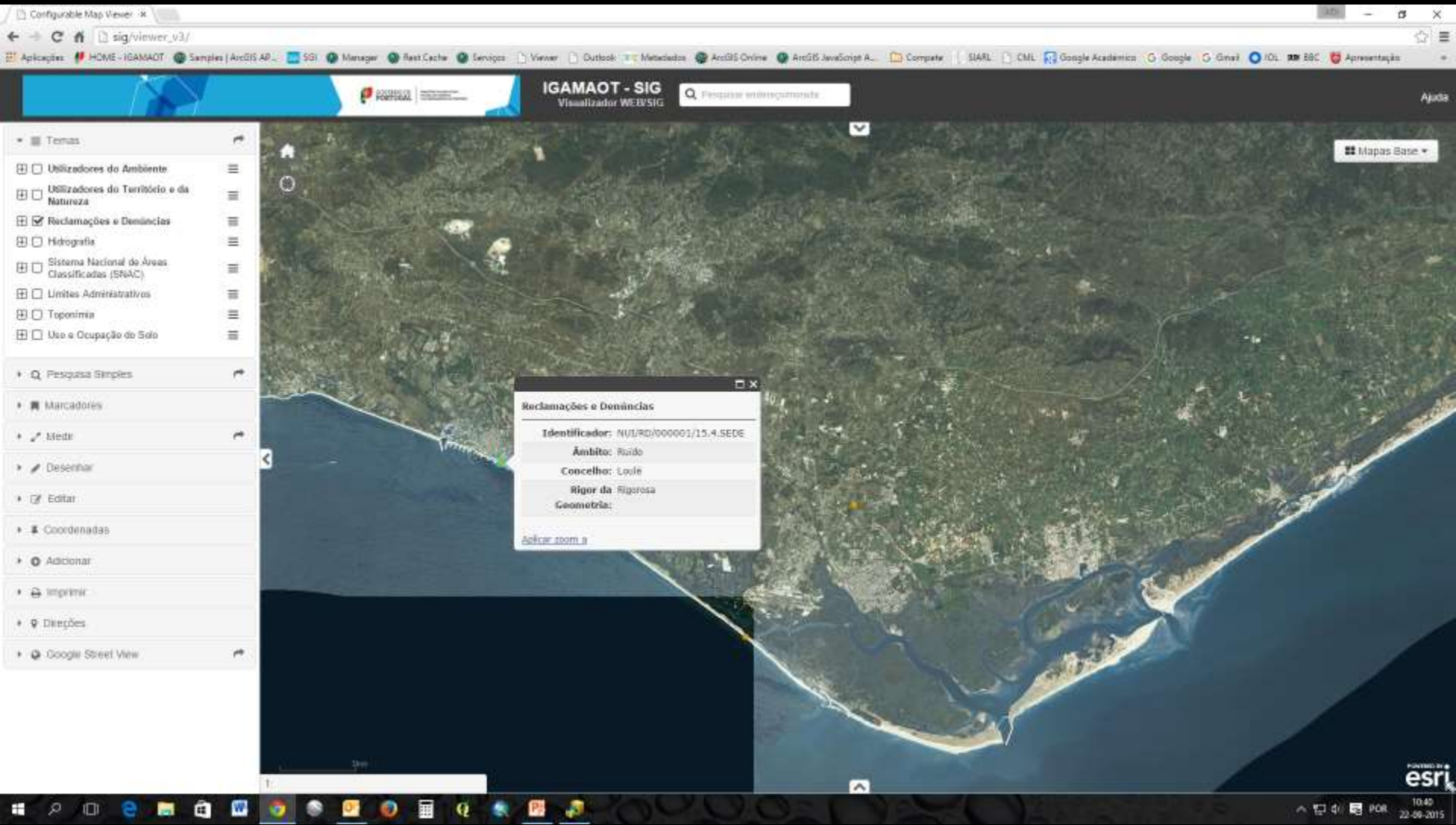
Viewer
Layers
Internal Data: Complaints



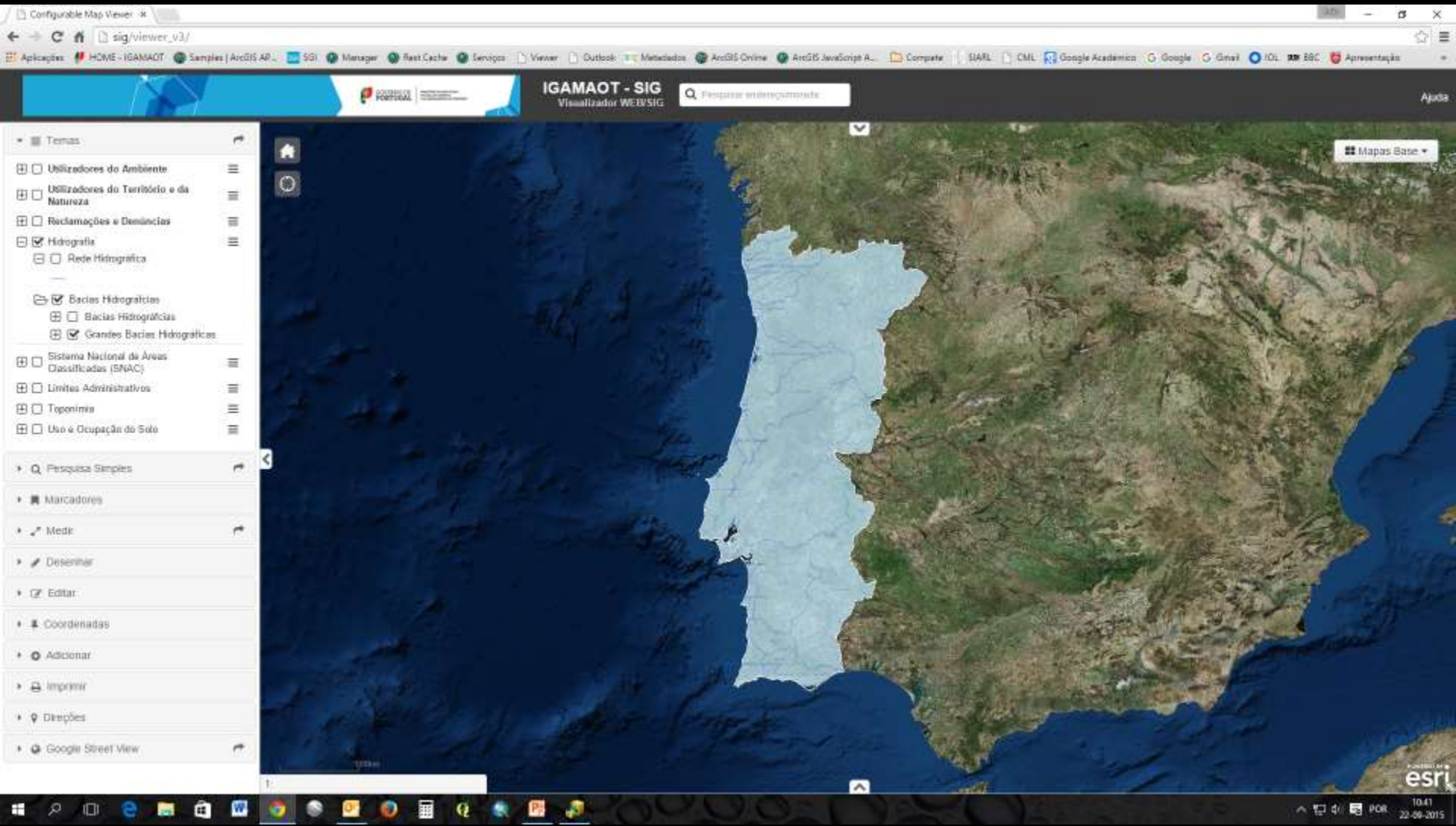
Viewer
Layers
Internal Data: Complaints



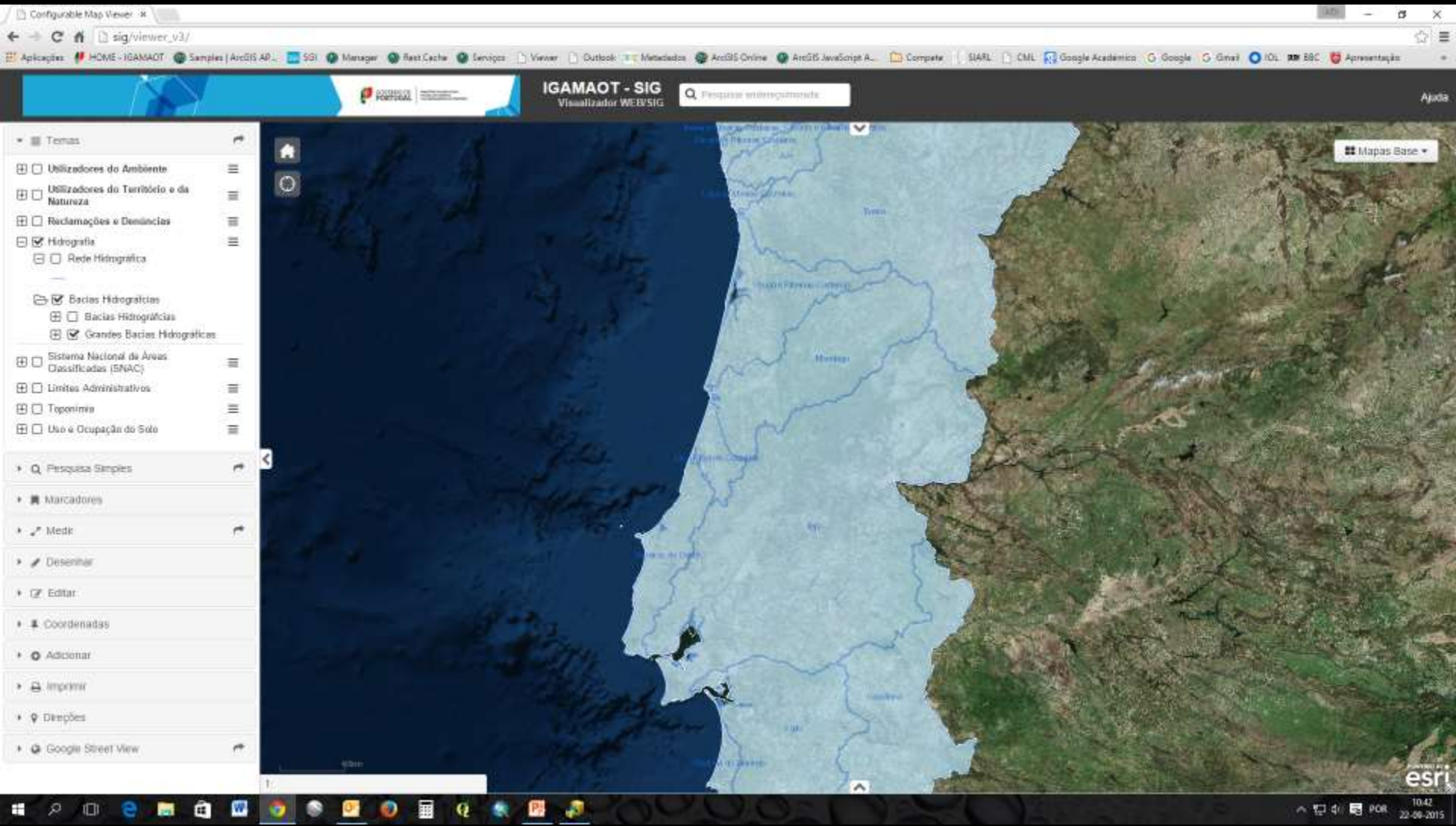
Viewer
Layers
Internal Data: Complaints



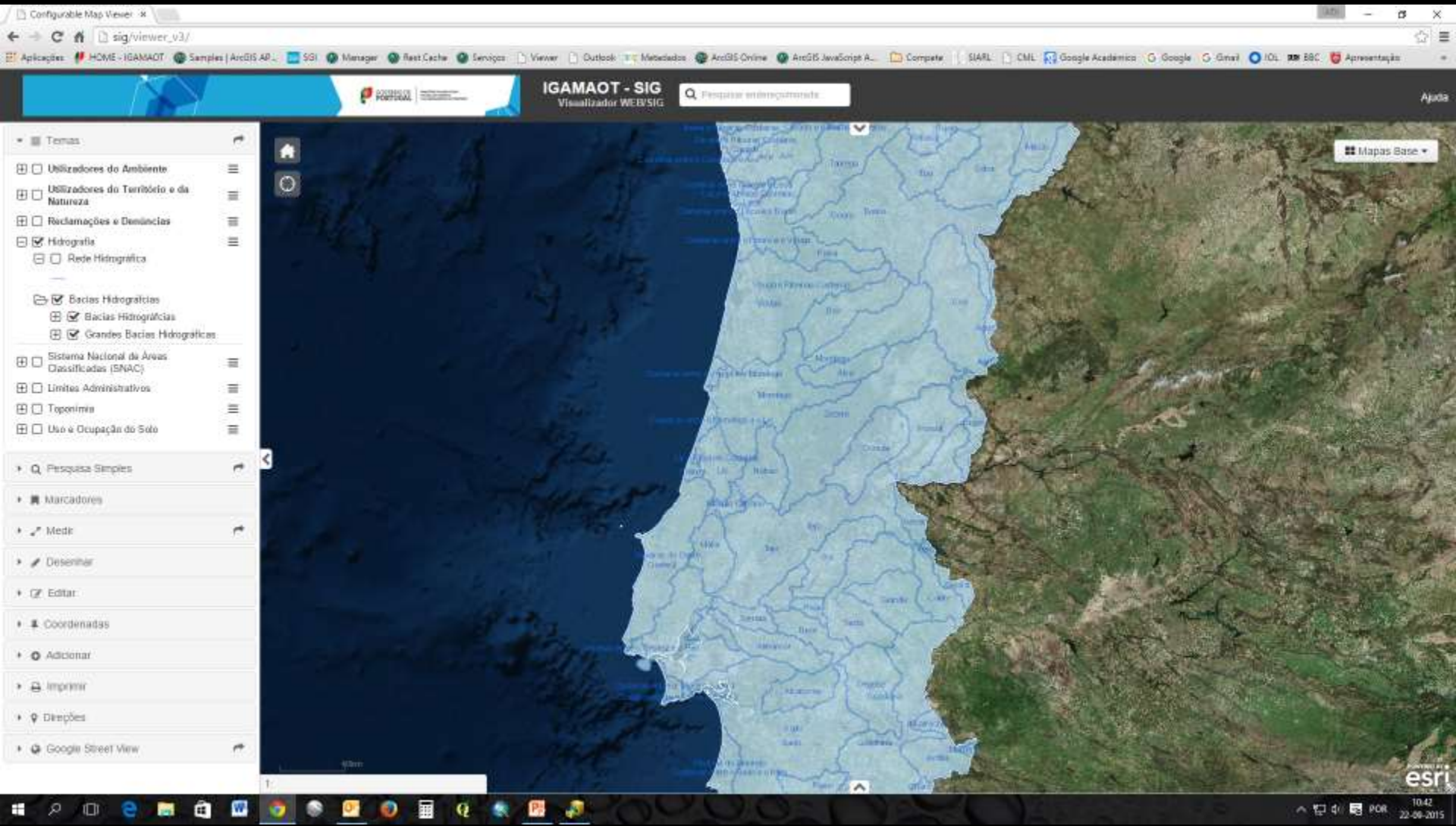
Viewer
Layers
External data: watersheds



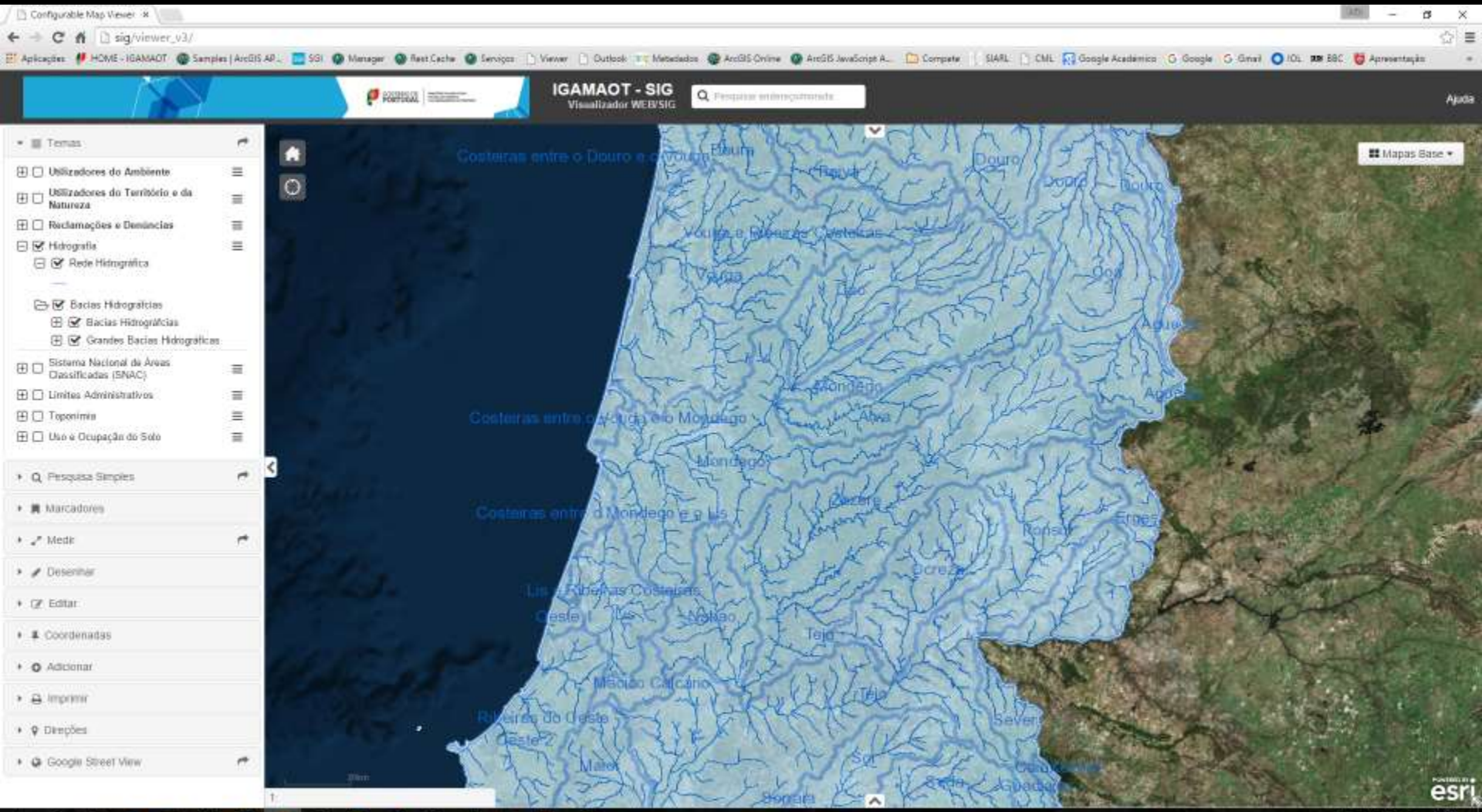
Viewer
Layers
External data: watersheds



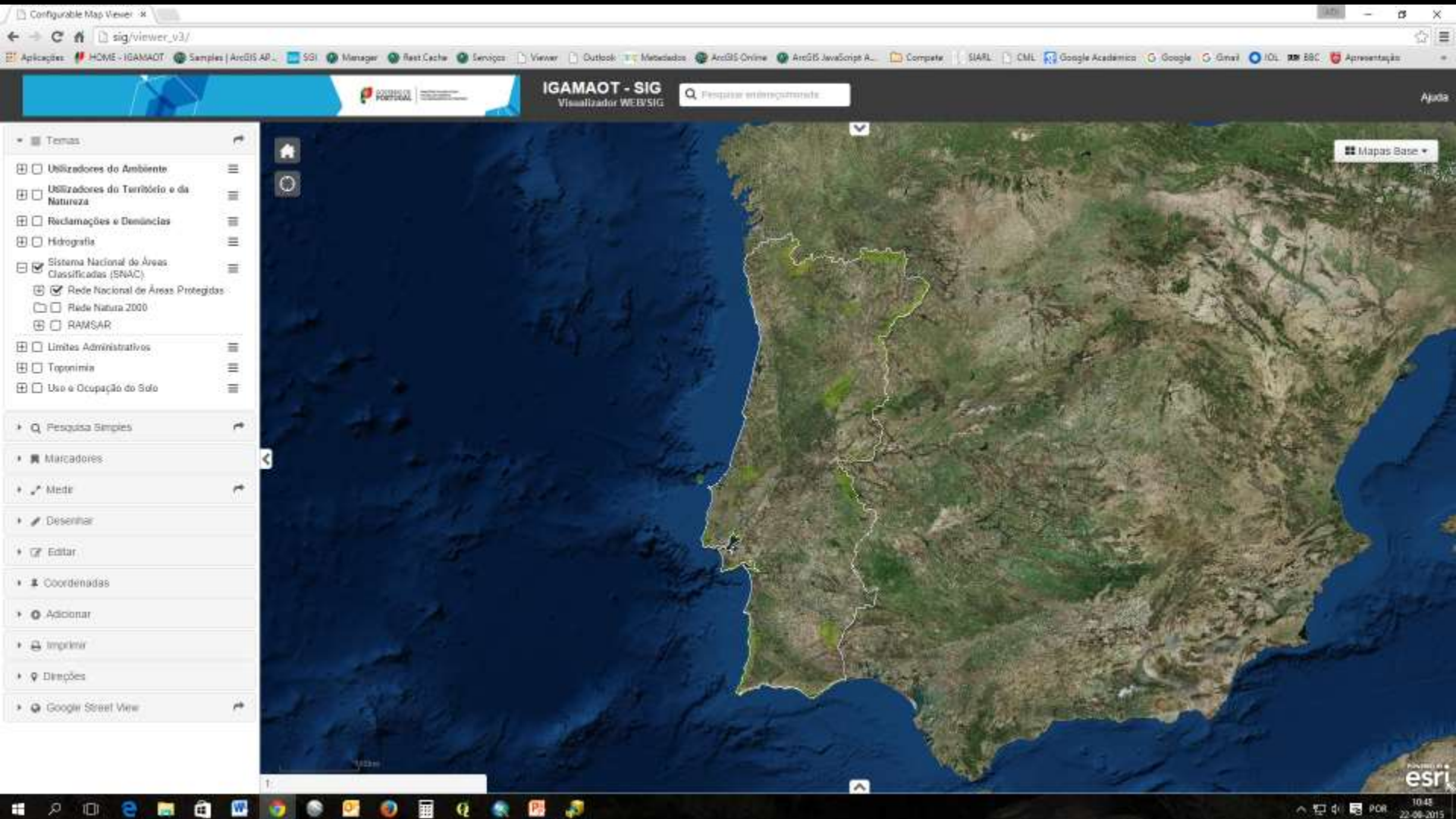
Viewer
Layers
External data: watersheds



Viewer
Layers
External data: watersheds and hydrographical system

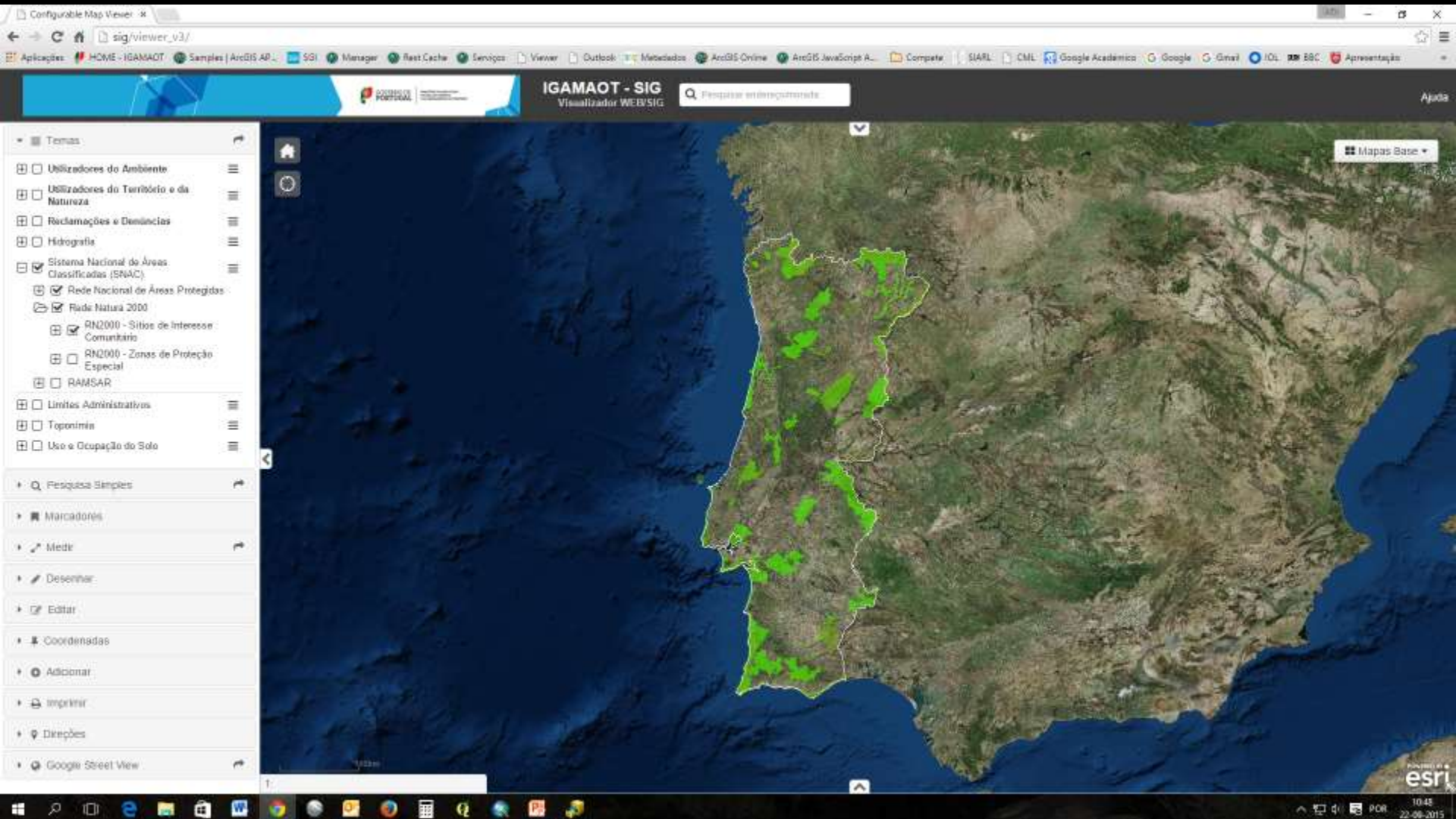


Viewer
Layers
External data: Protected Areas (National)



Viewer
Layers
External data: Protected Areas (National) + Natura2000 (SAC)

SAC – Special Areas of Conservation (Habitats)

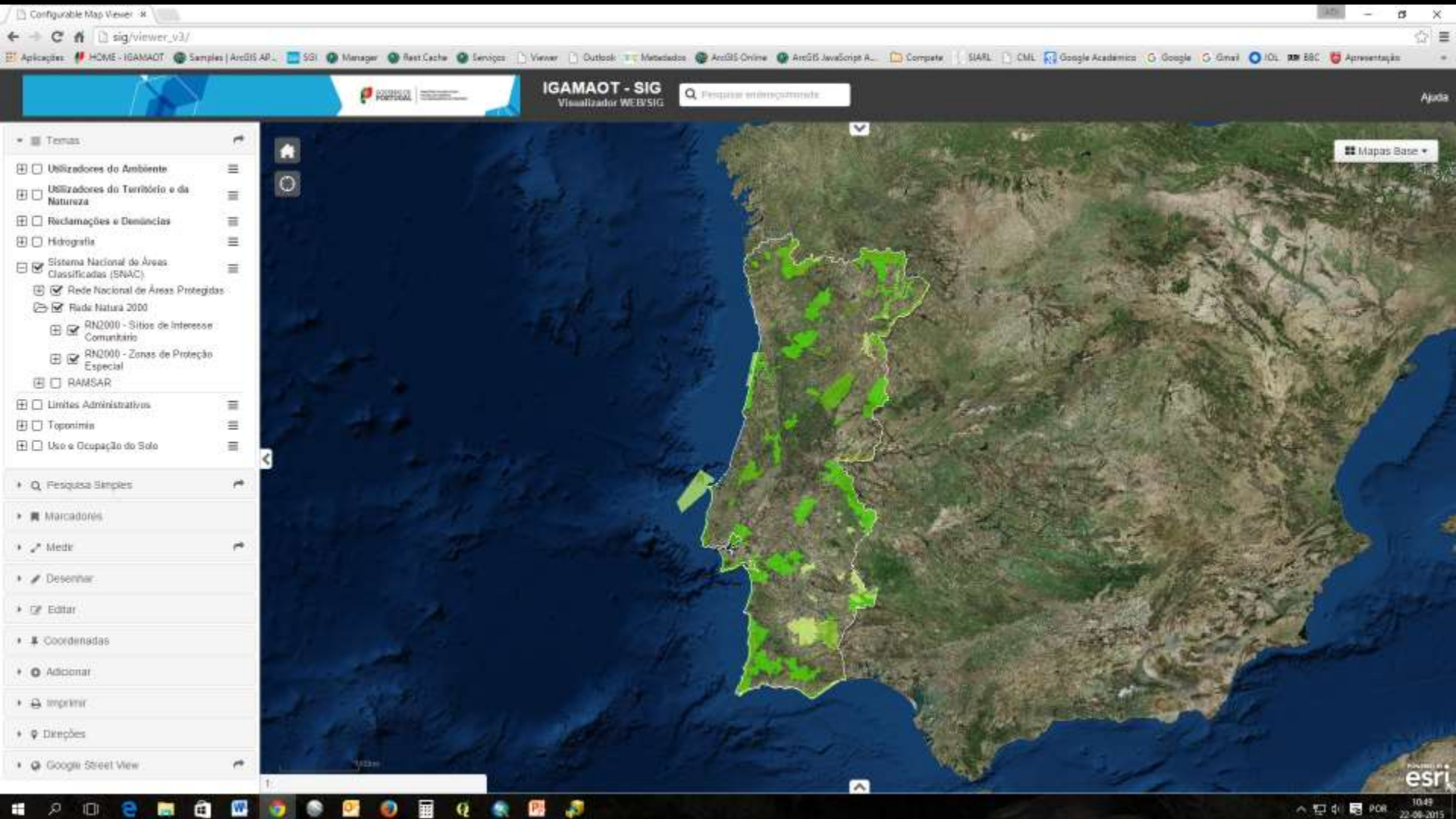


Viewer

Layers

External data: Protected Areas (National) + Natura2000 (SAC+SPA)

SAC – Special Areas of Conservation (Habitats)
SPA – Special Protected Areas (Birds)

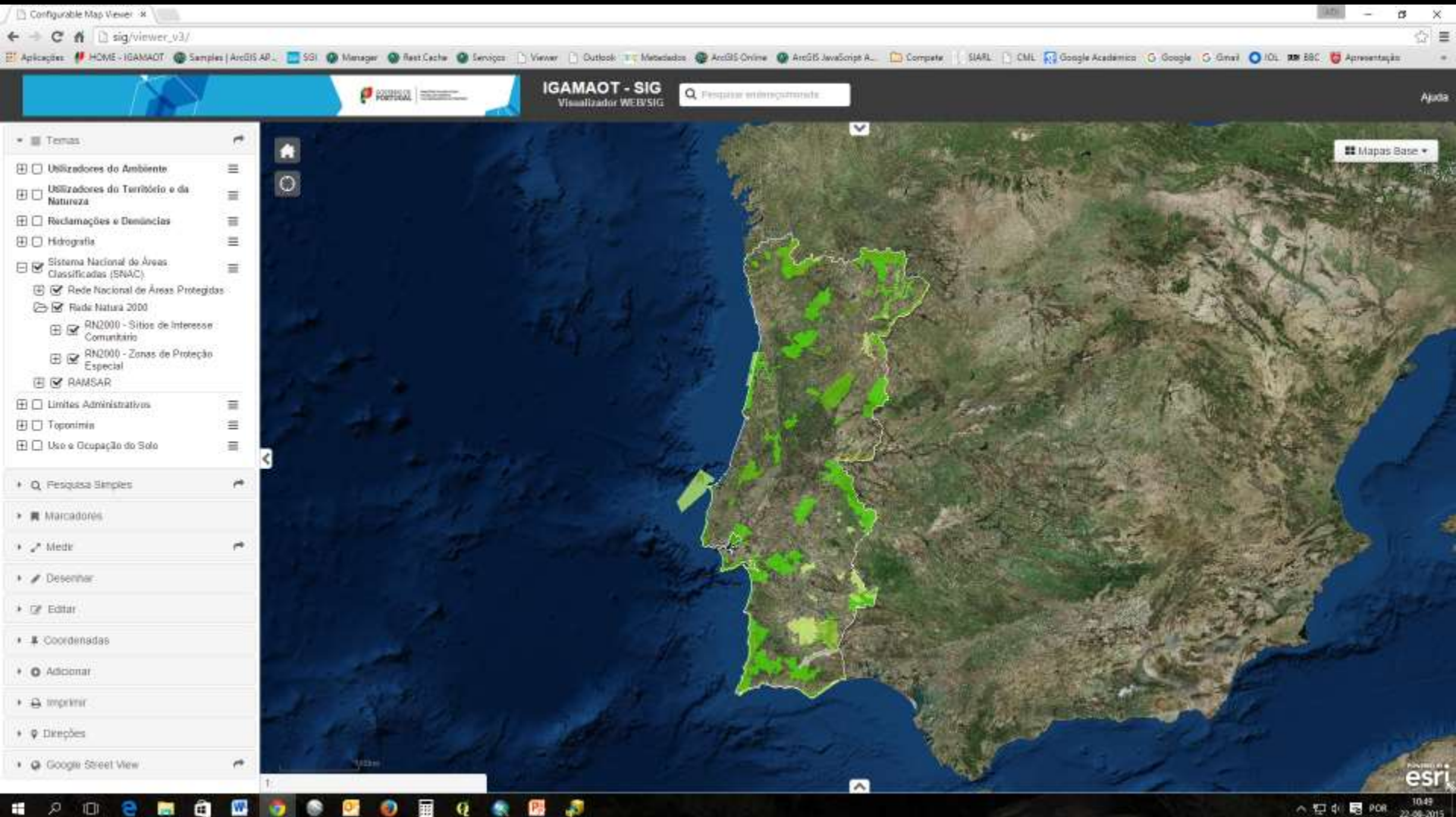


Viewer

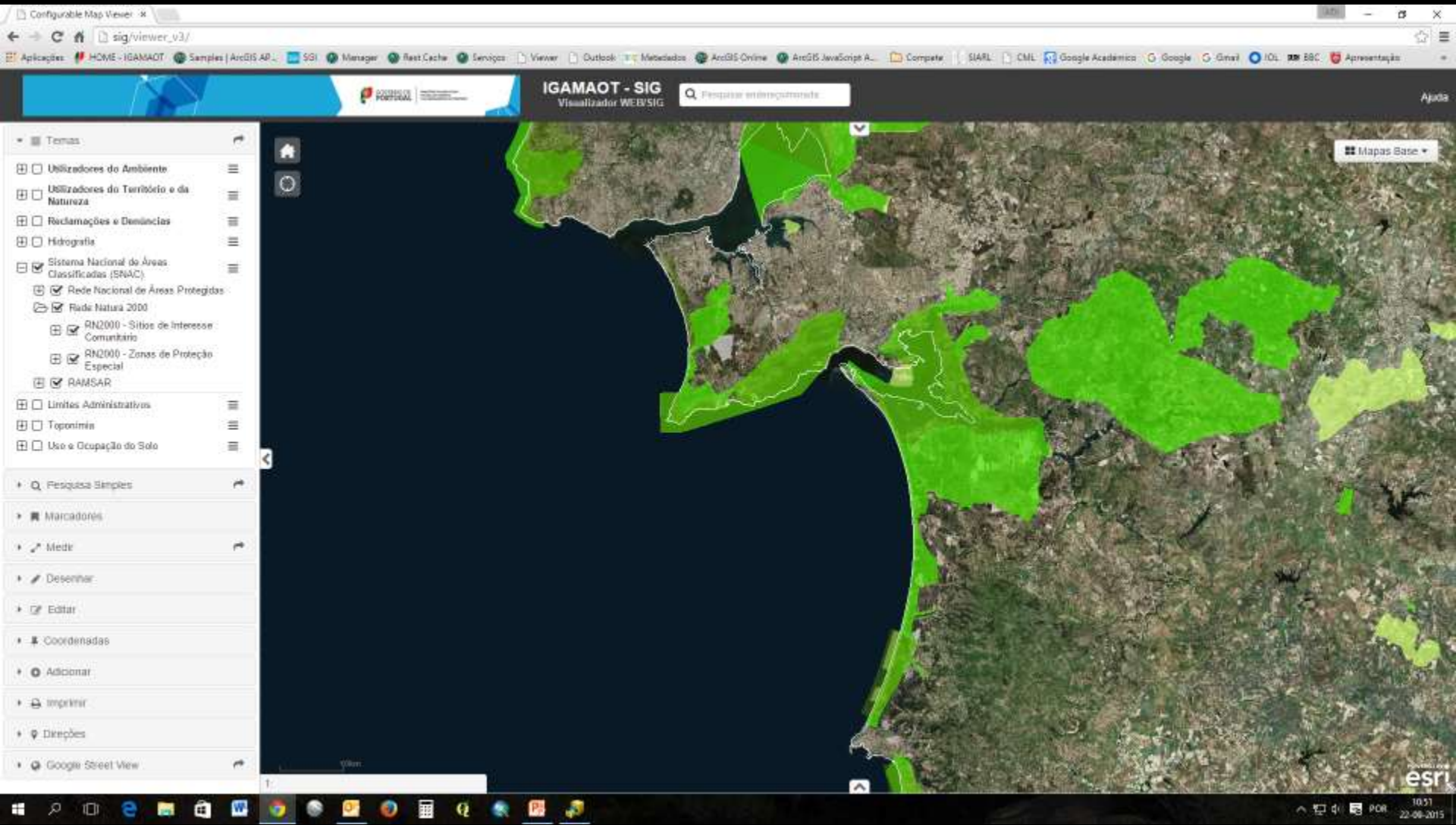
Layers

External data: Protected Areas (National) + Natura2000 (SAC+SPA) + RAMSAR

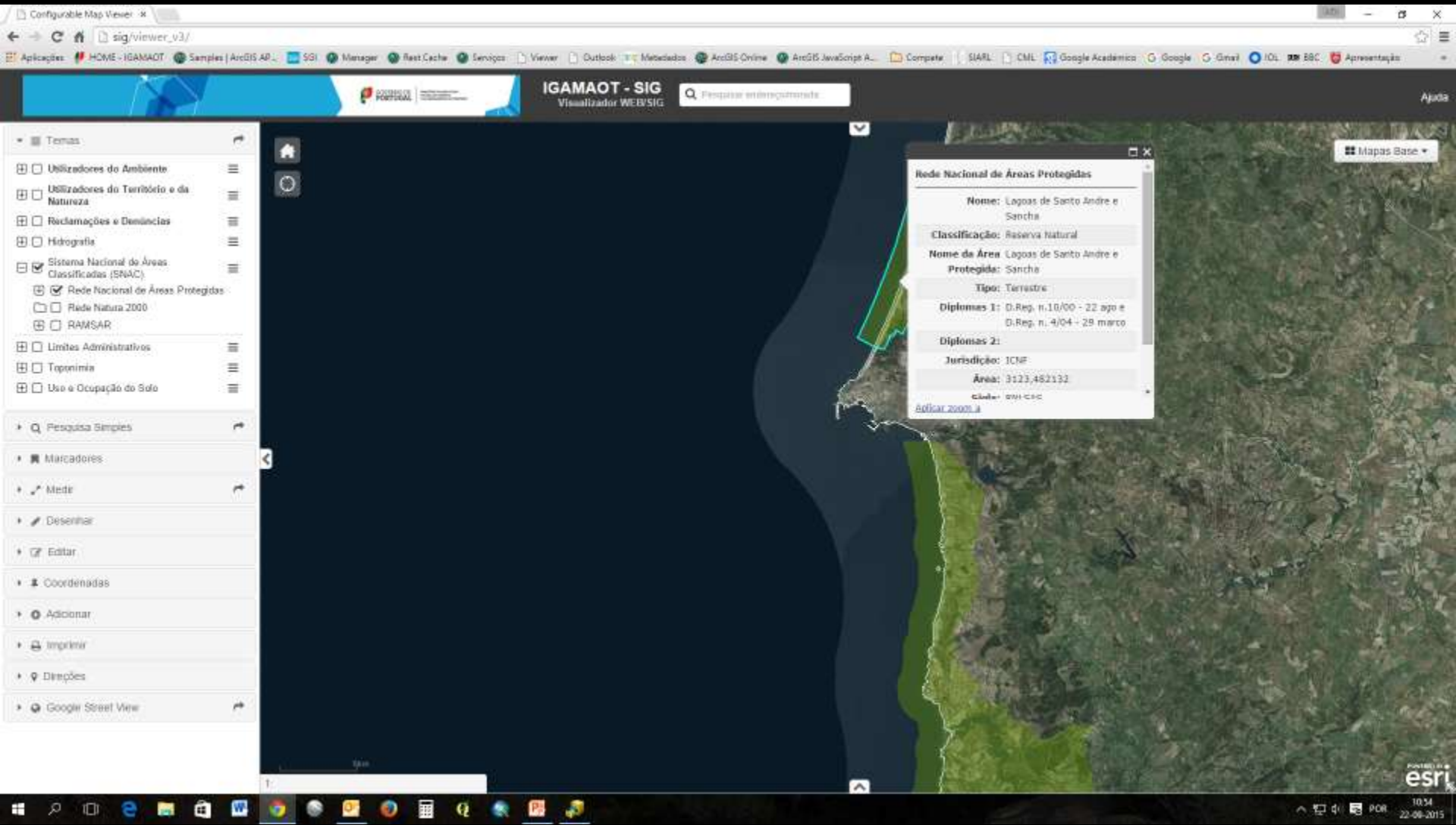
SAC – Special Areas of Conservation (Habitats)
SPA – Special Protected Areas (Birds)



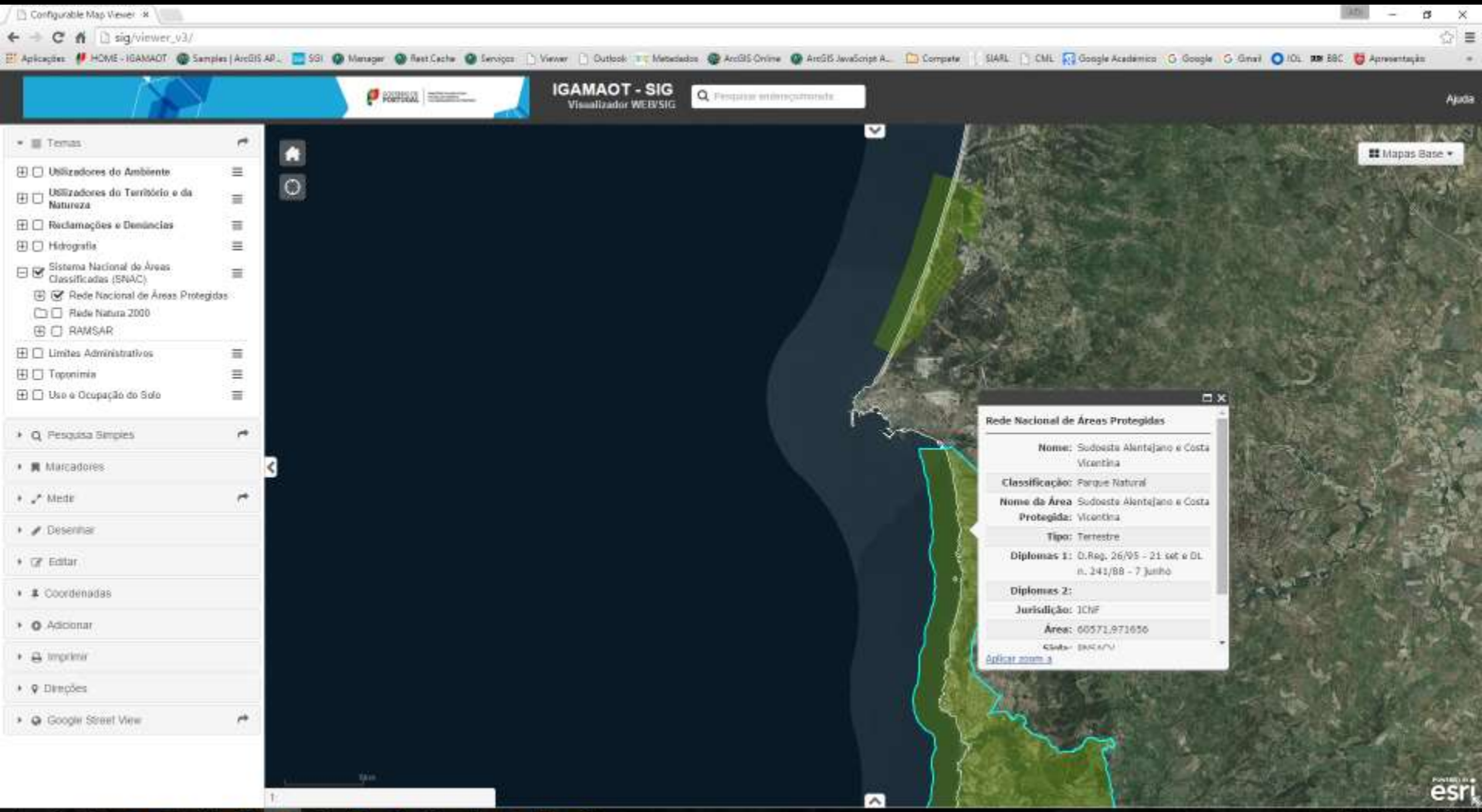
Viewer
Layers
External data: Protected Areas (sites)



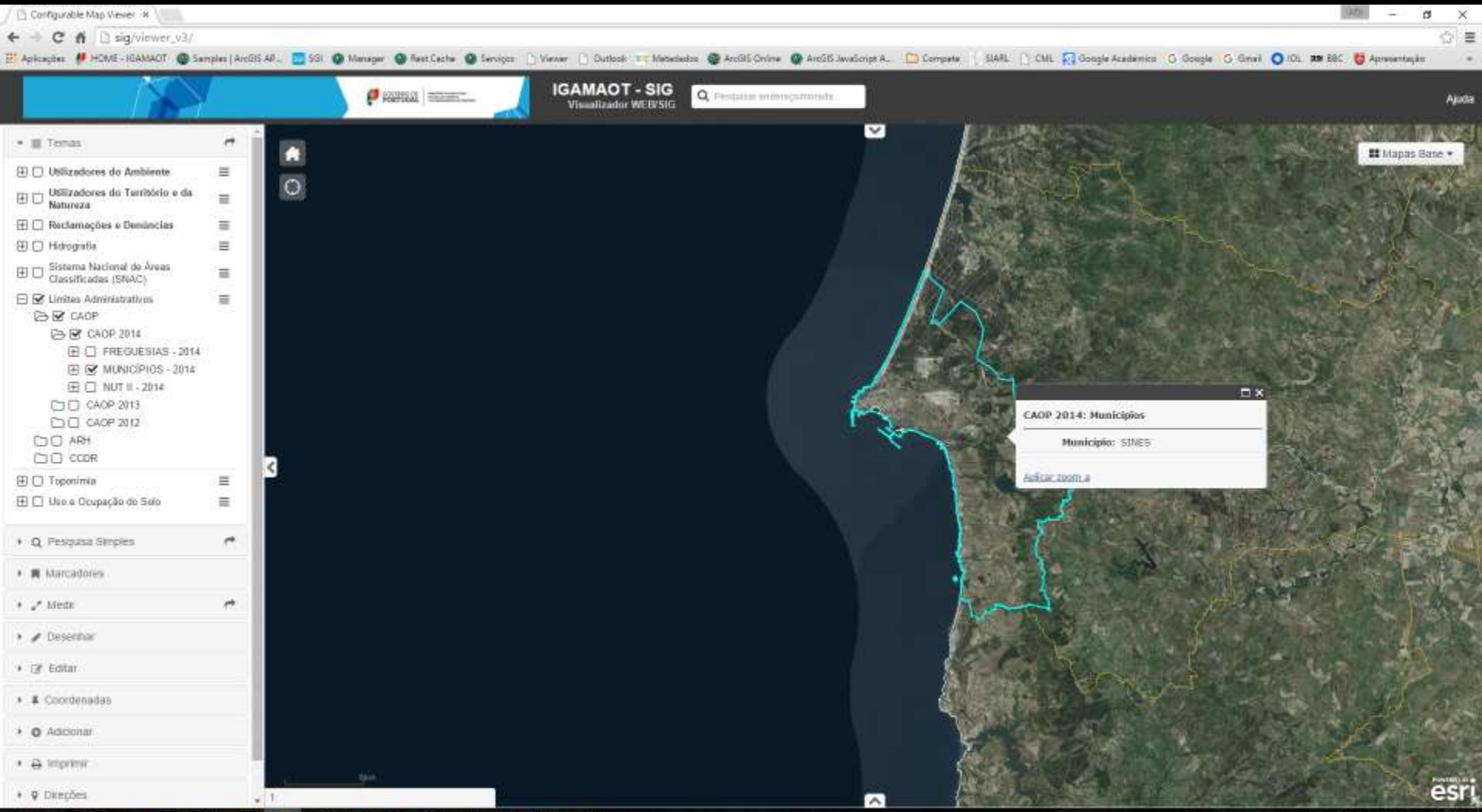
Viewer
Layers
External data: Protected Areas (sites) – Lagoas de Santo André e Sancha



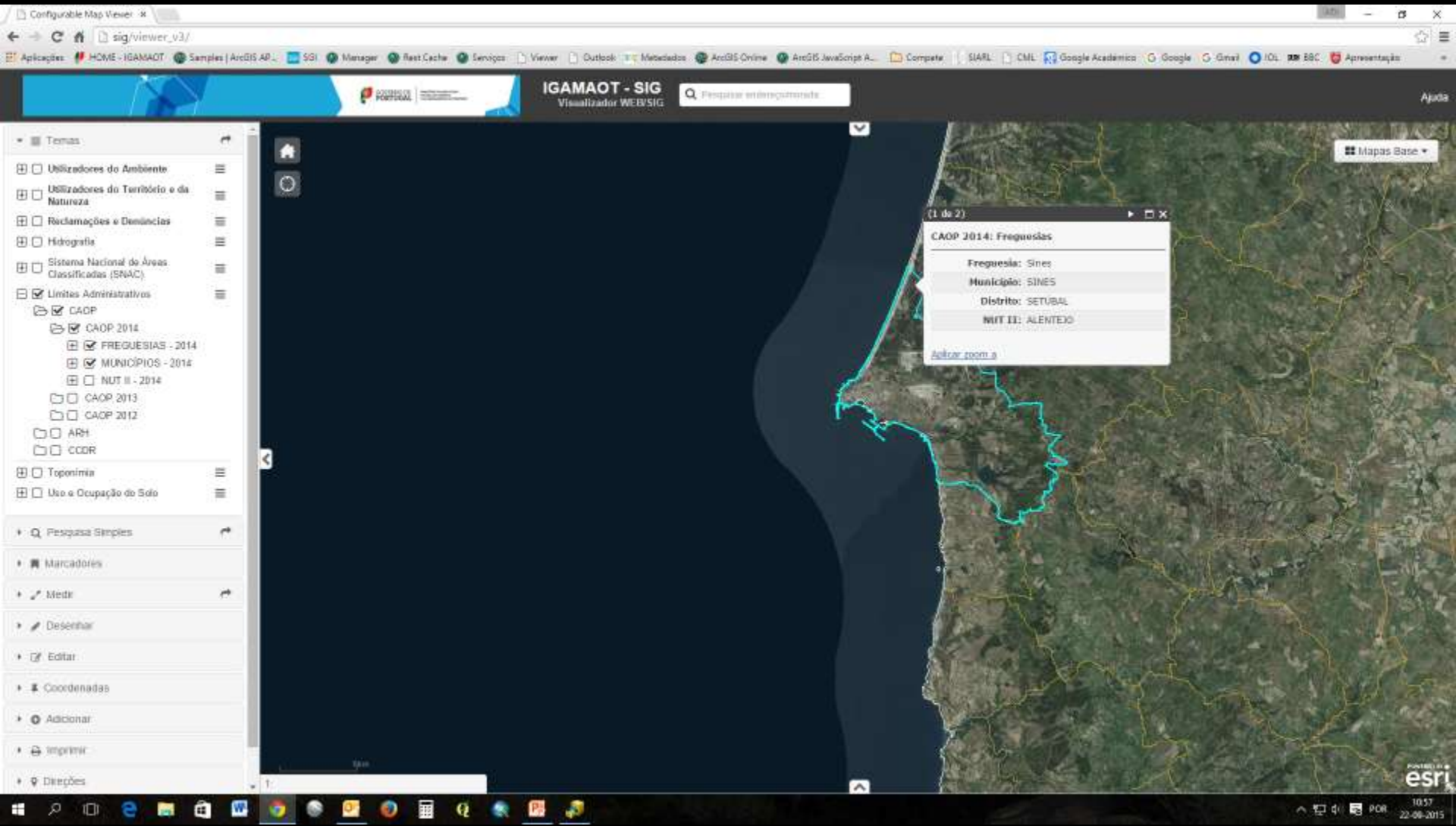
Viewer
Layers
External data: Protected Areas (sites) – Sudoeste Alentejano e Costa Vicentina



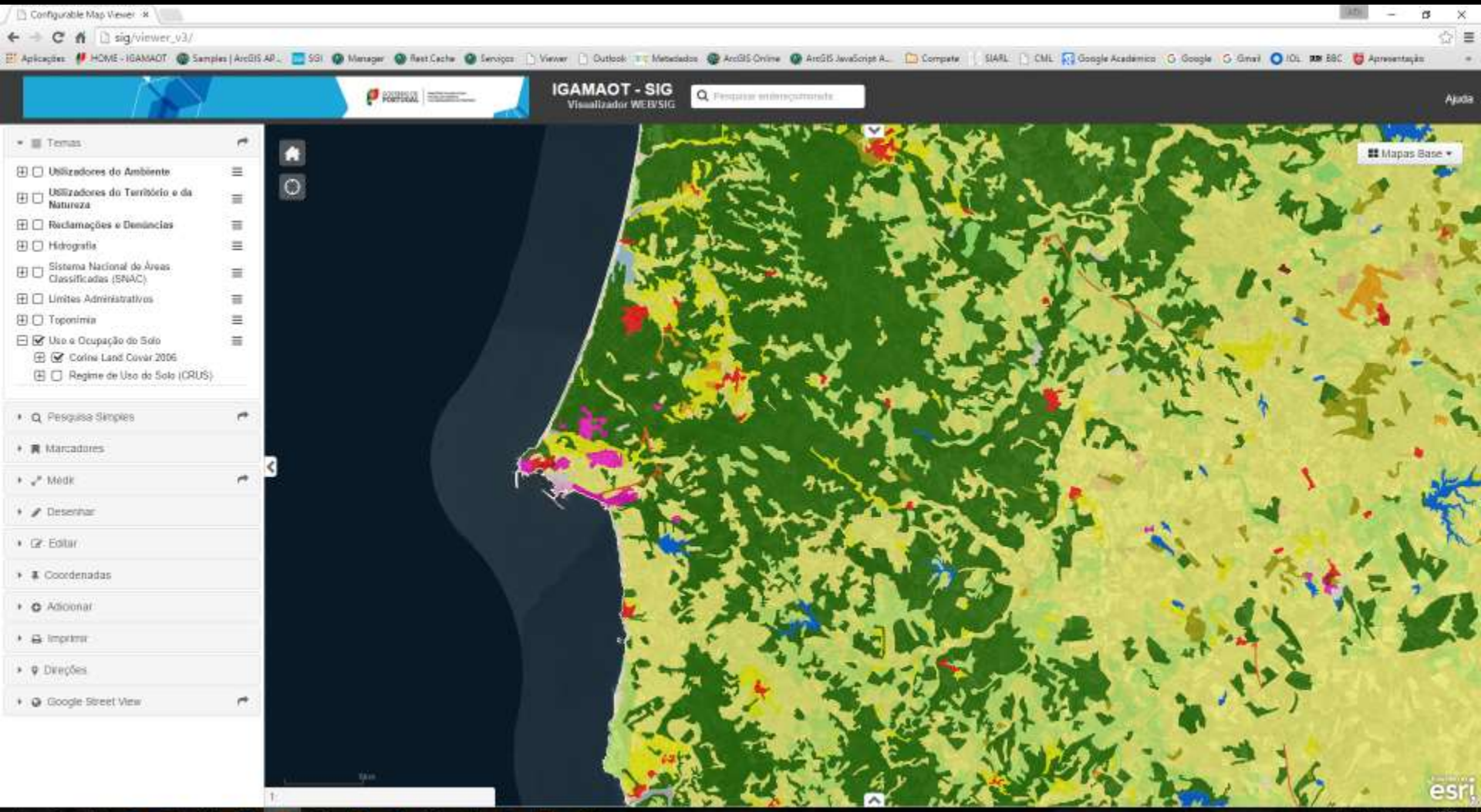
Viewer
Layers
External data: Administrative boundaries – Municipalities (SINES)



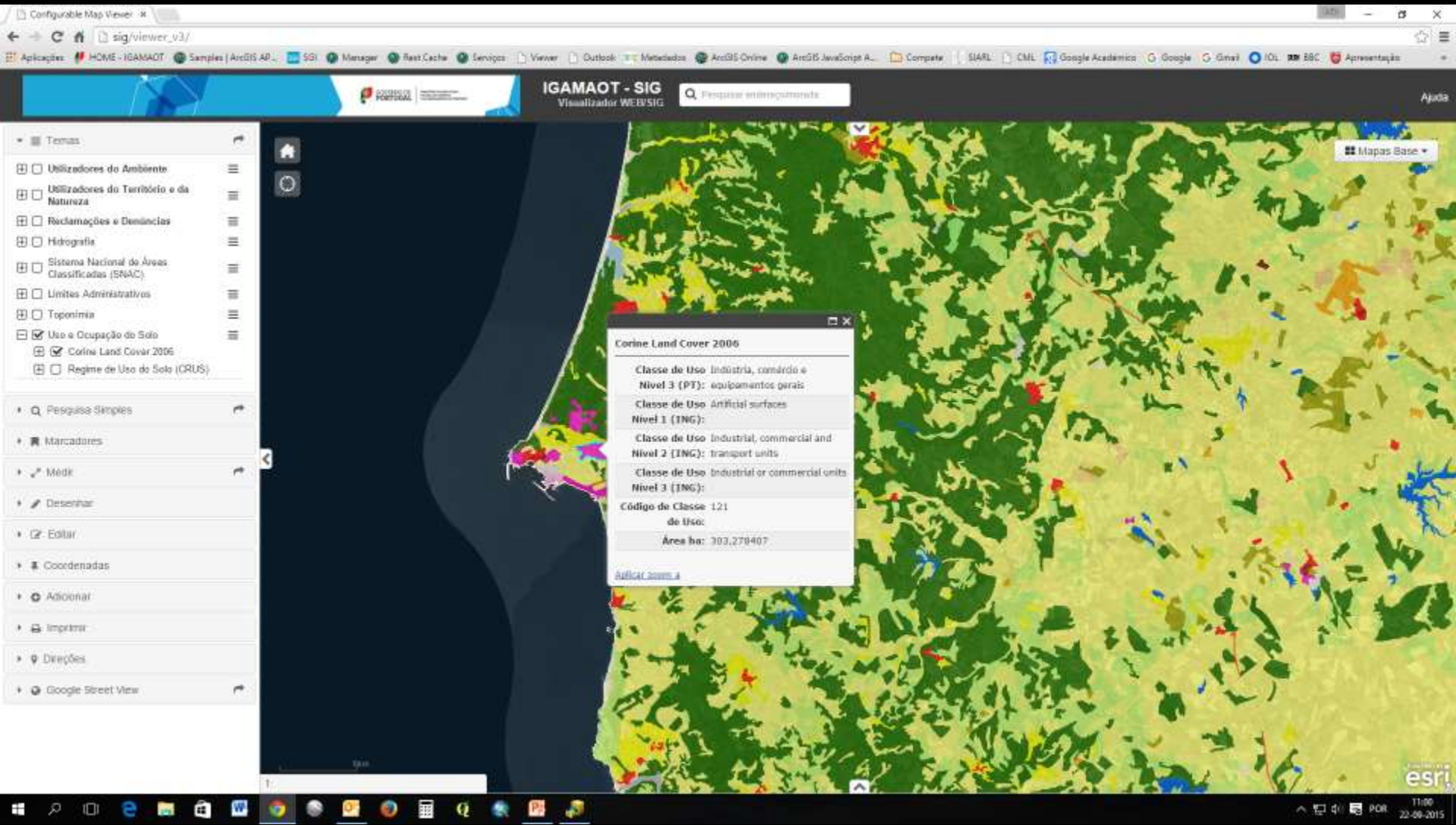
Viewer
Layers
External data: Administrative boundaries – lower level (SINES *freguesia*)



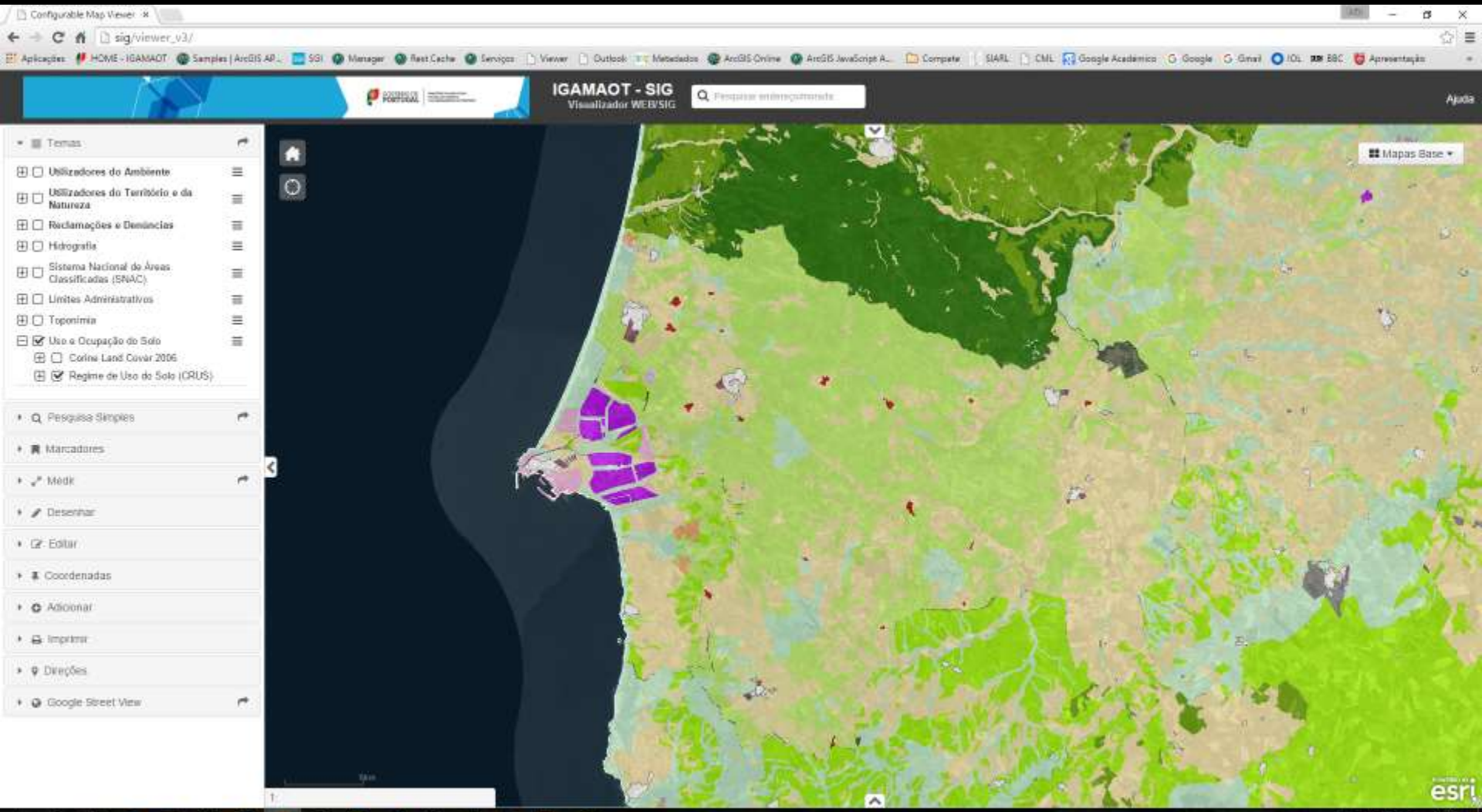
Viewer
Layers
External data: CORINE LandCover 2006



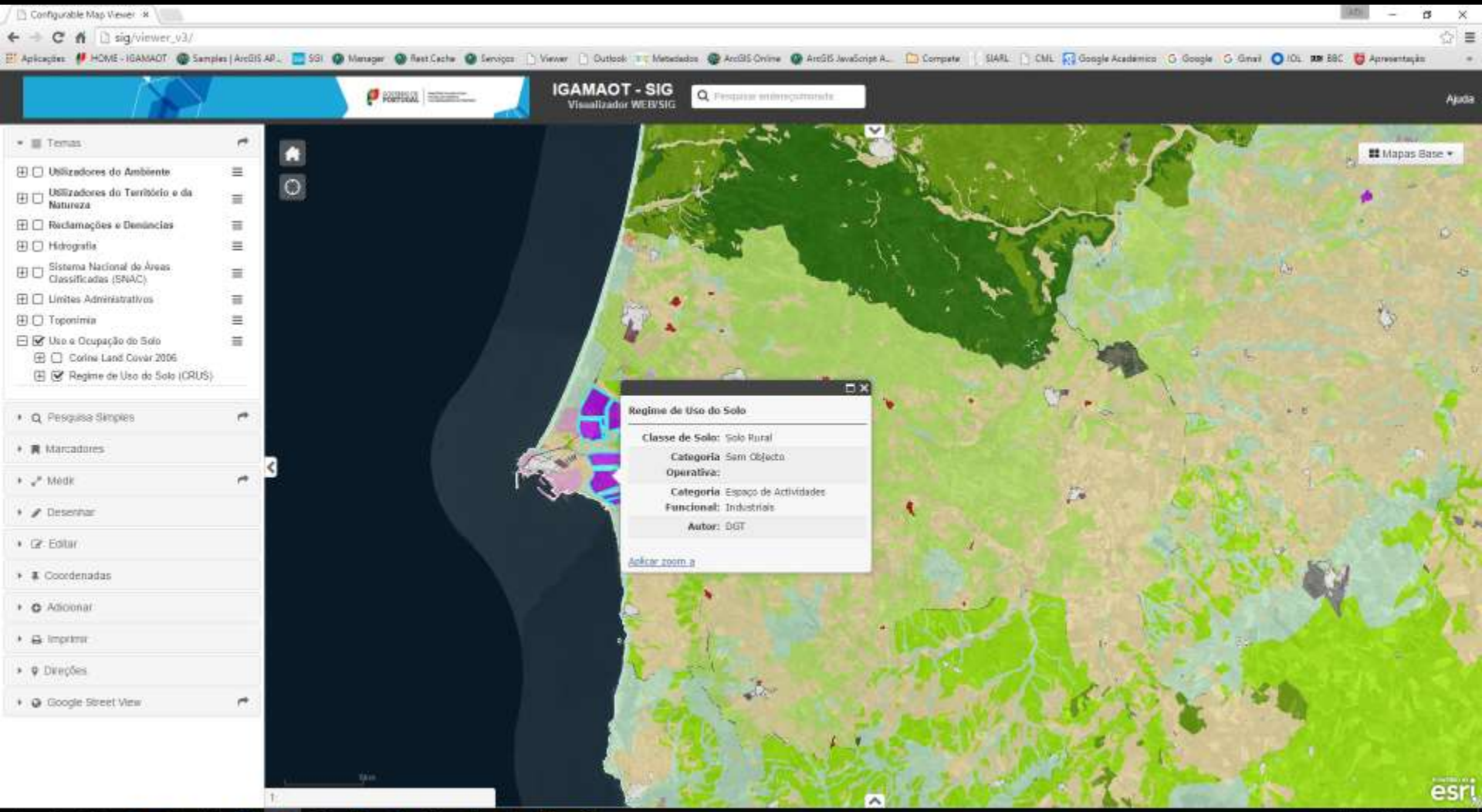
Viewer
Layers
External data: CORINE LandCover 2006 – accessing alphanumeric data



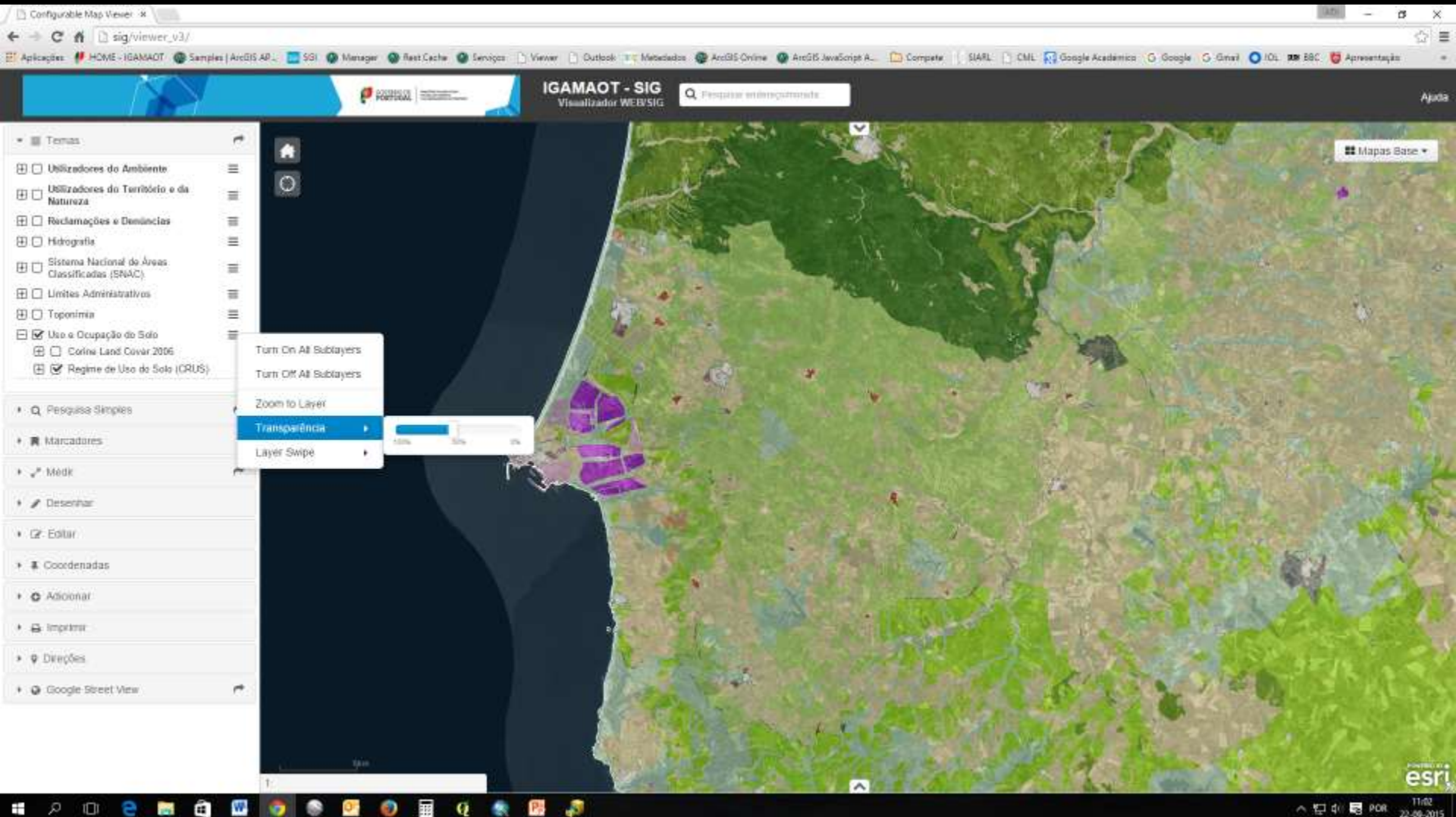
Viewer
Layers
External data: Land use cartography (approved)



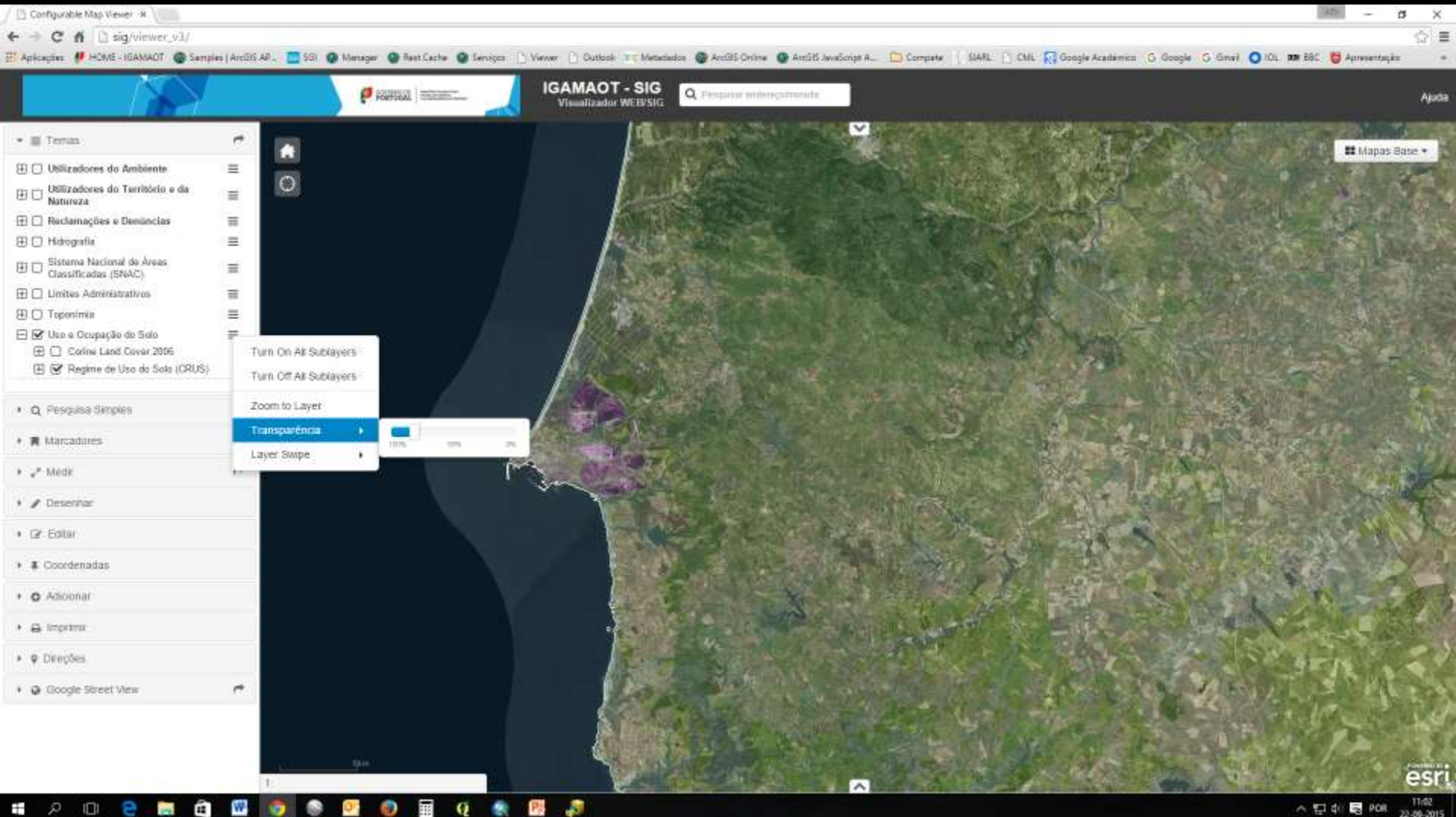
Viewer
Layers
External data: Land use cartography (approved) – accessing data



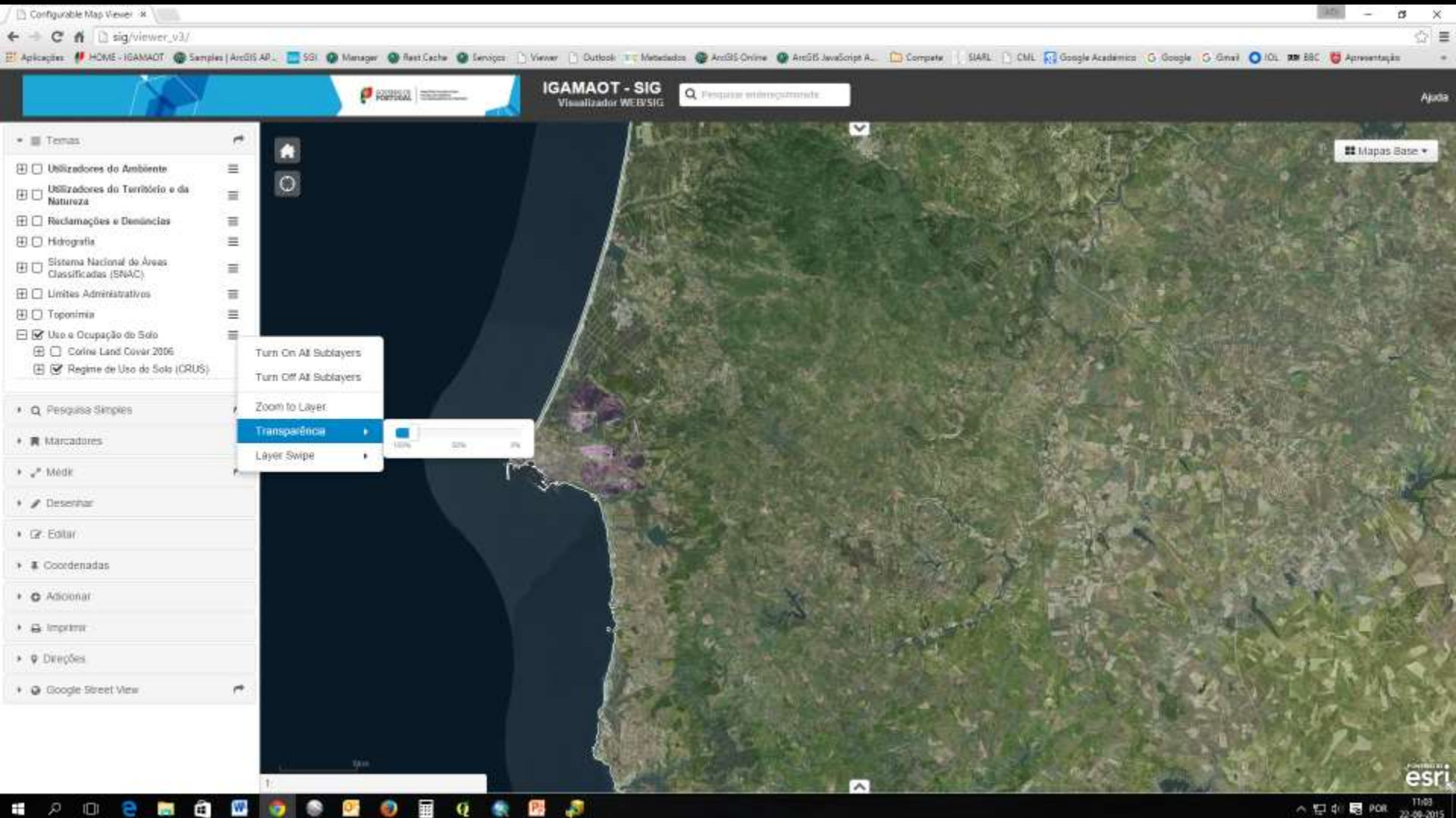
Viewer
Layers
External data: Land use cartography (approved) – transparency



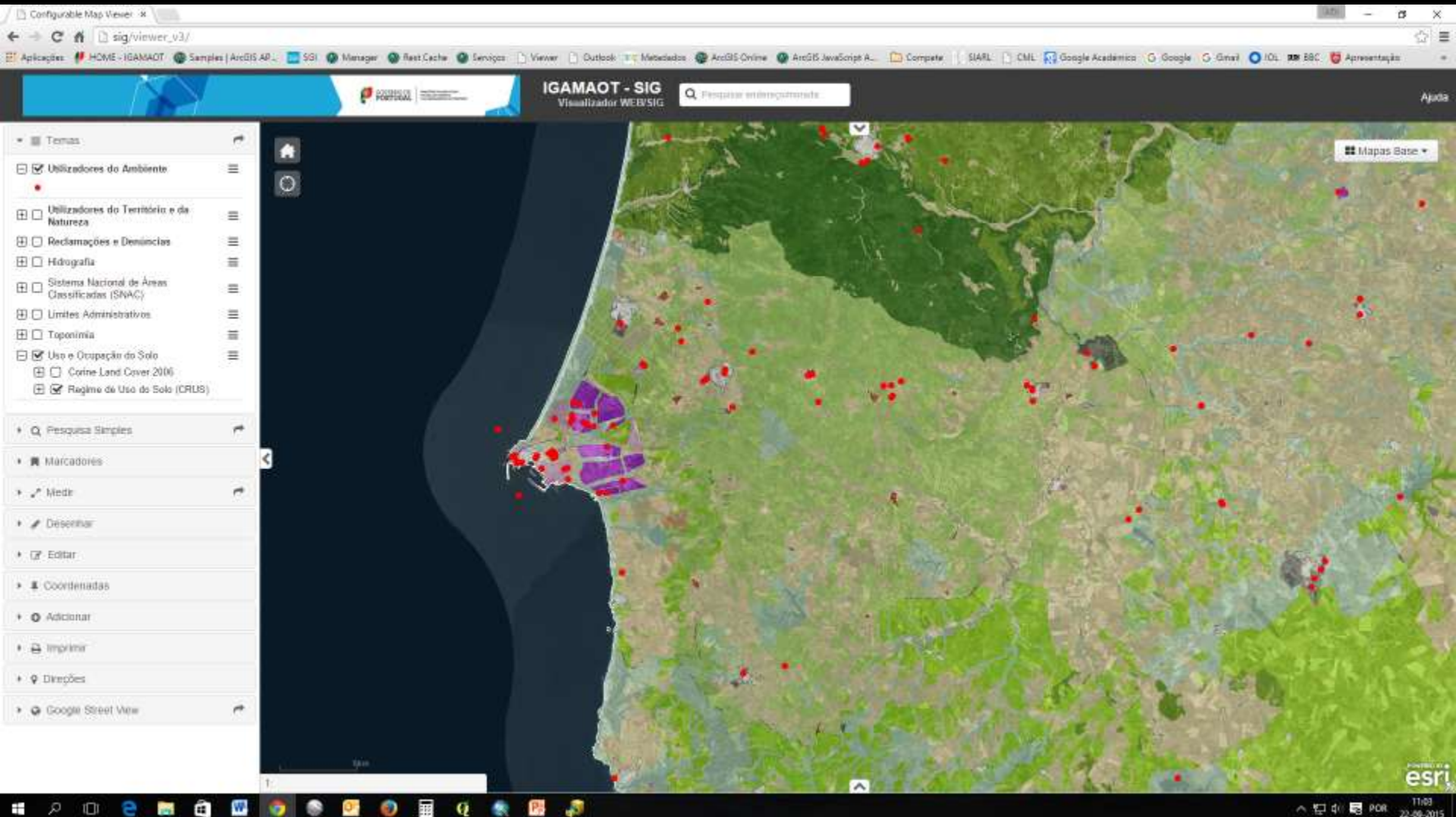
Viewer
Layers
External data: Land use cartography (approved) – transparency



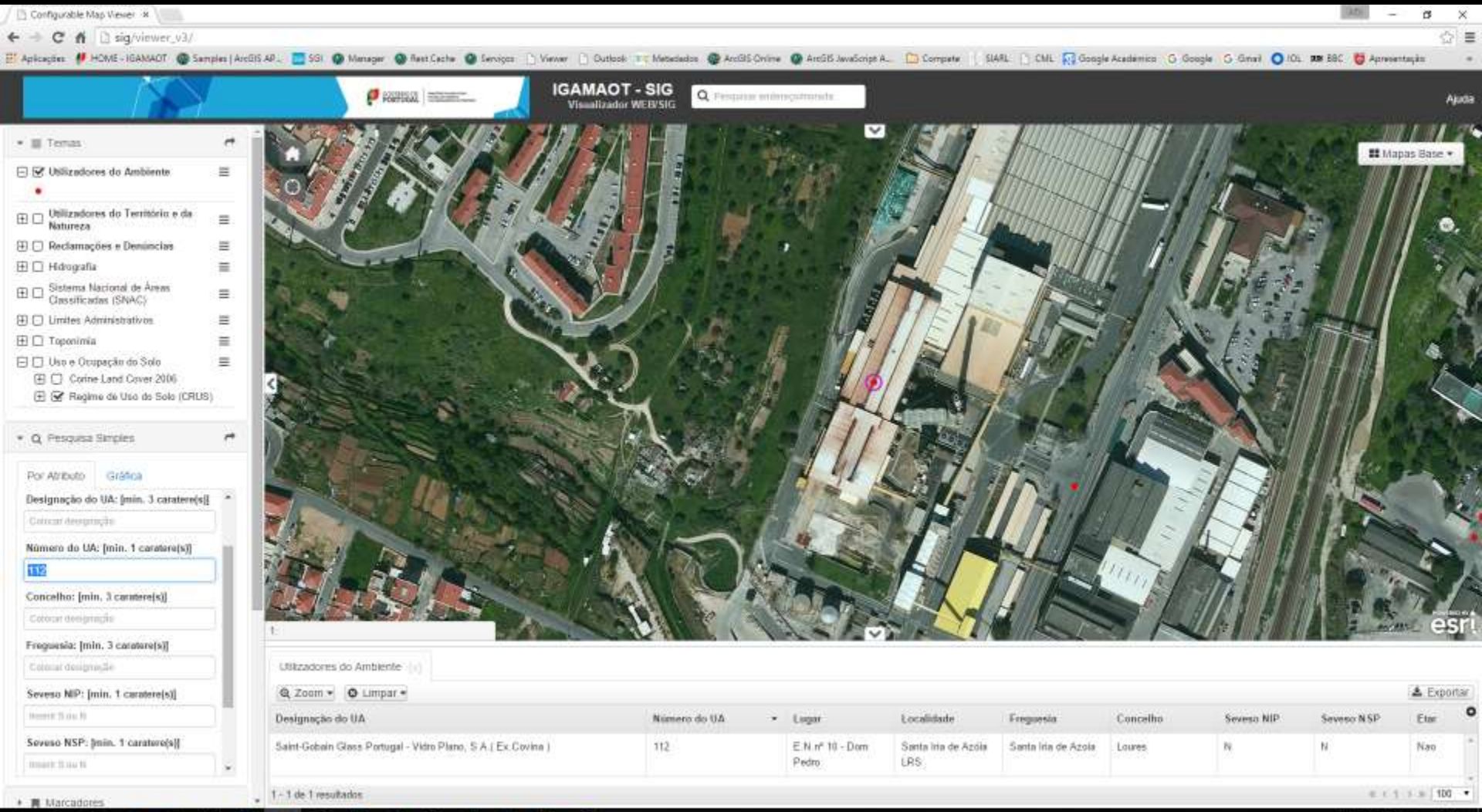
Viewer
Layers
External data: Land use cartography (approved) – transparency



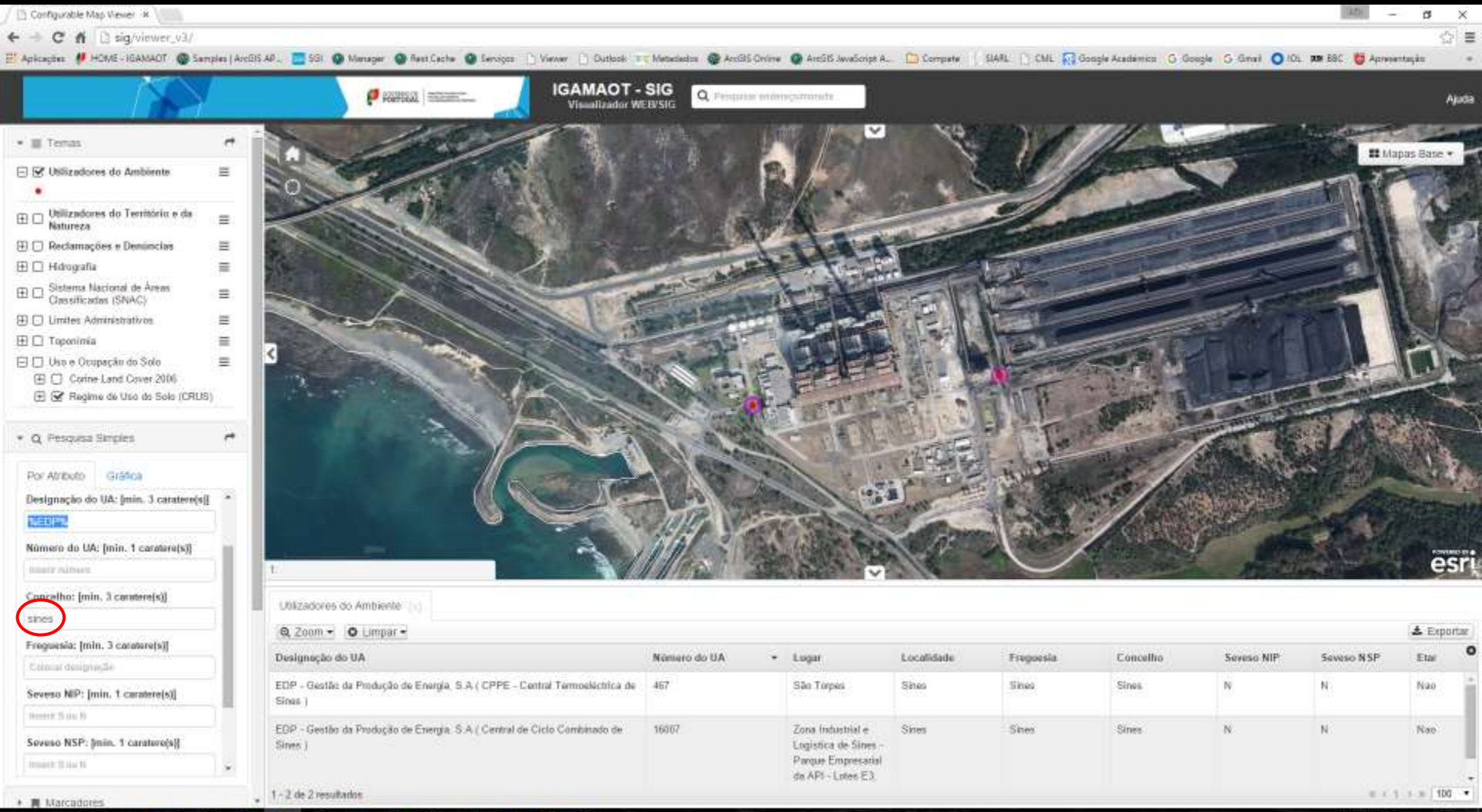
Viewer
Layers (overlay)
Internal / External data: Land use cartography (approved) and Environmental Users



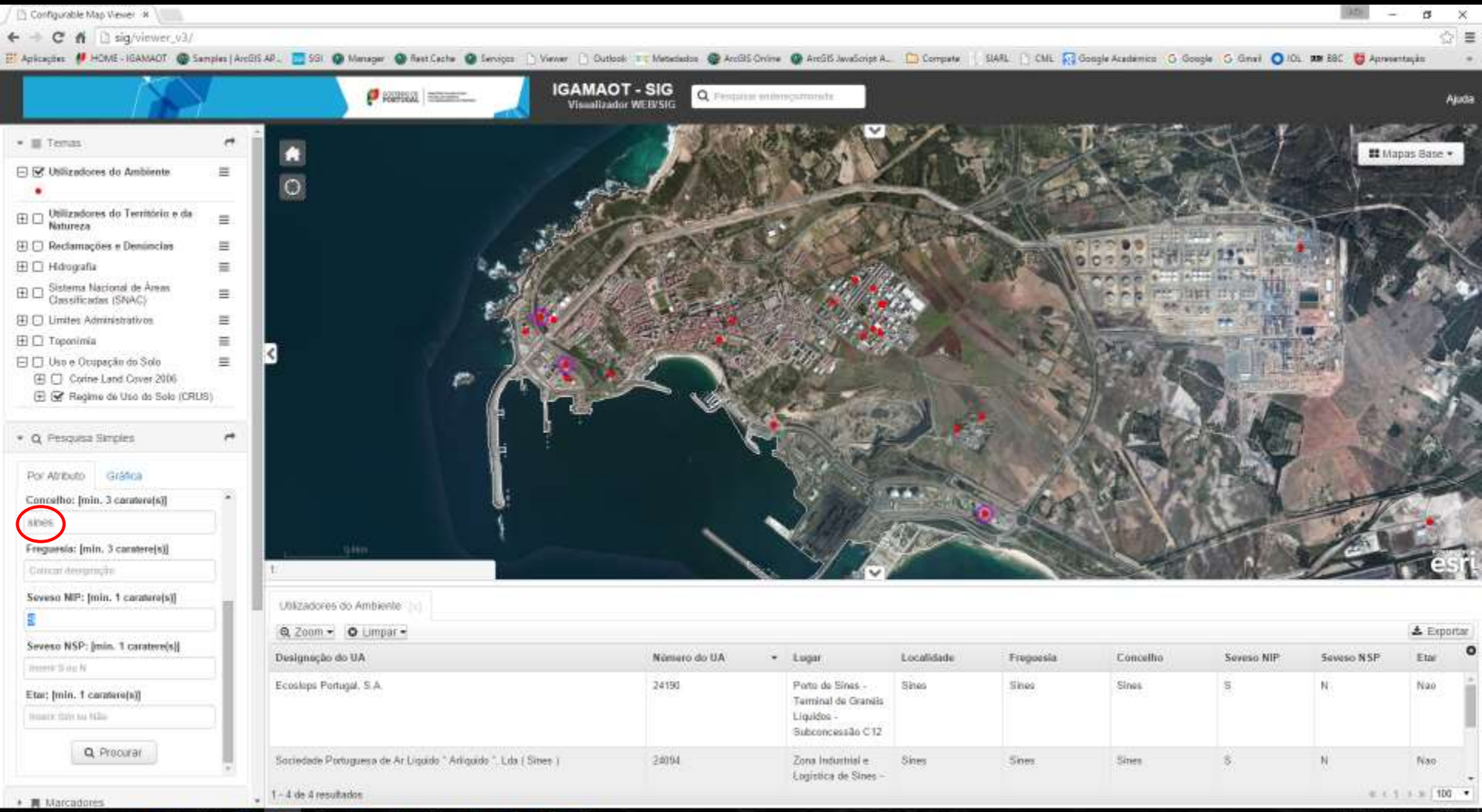
Viewer
Tools
Database search: Attribute (code, name…) or Graphic (area or distance)



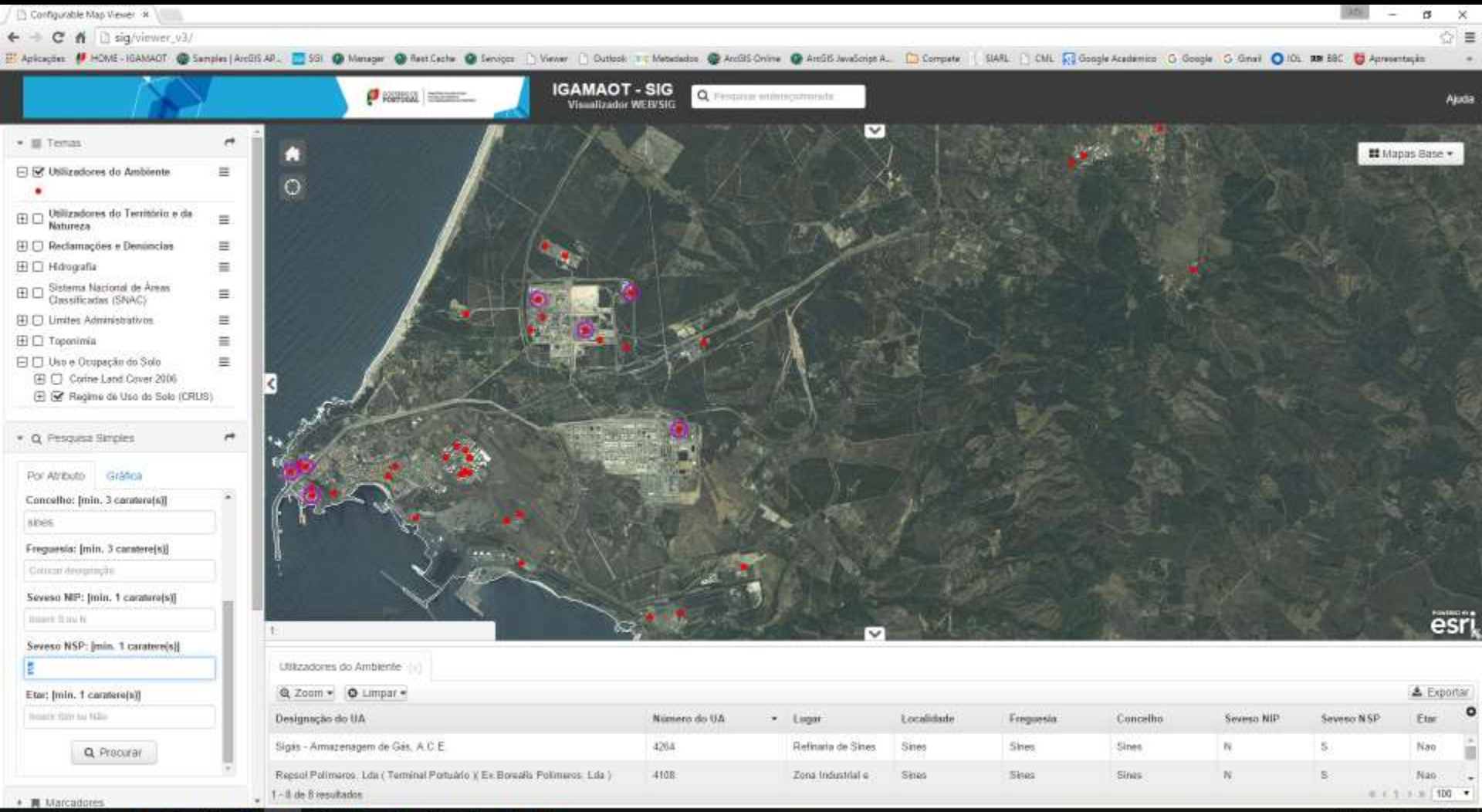
Viewer
Tools
Database search: Attribute (name: EDP / municipality: Sines)



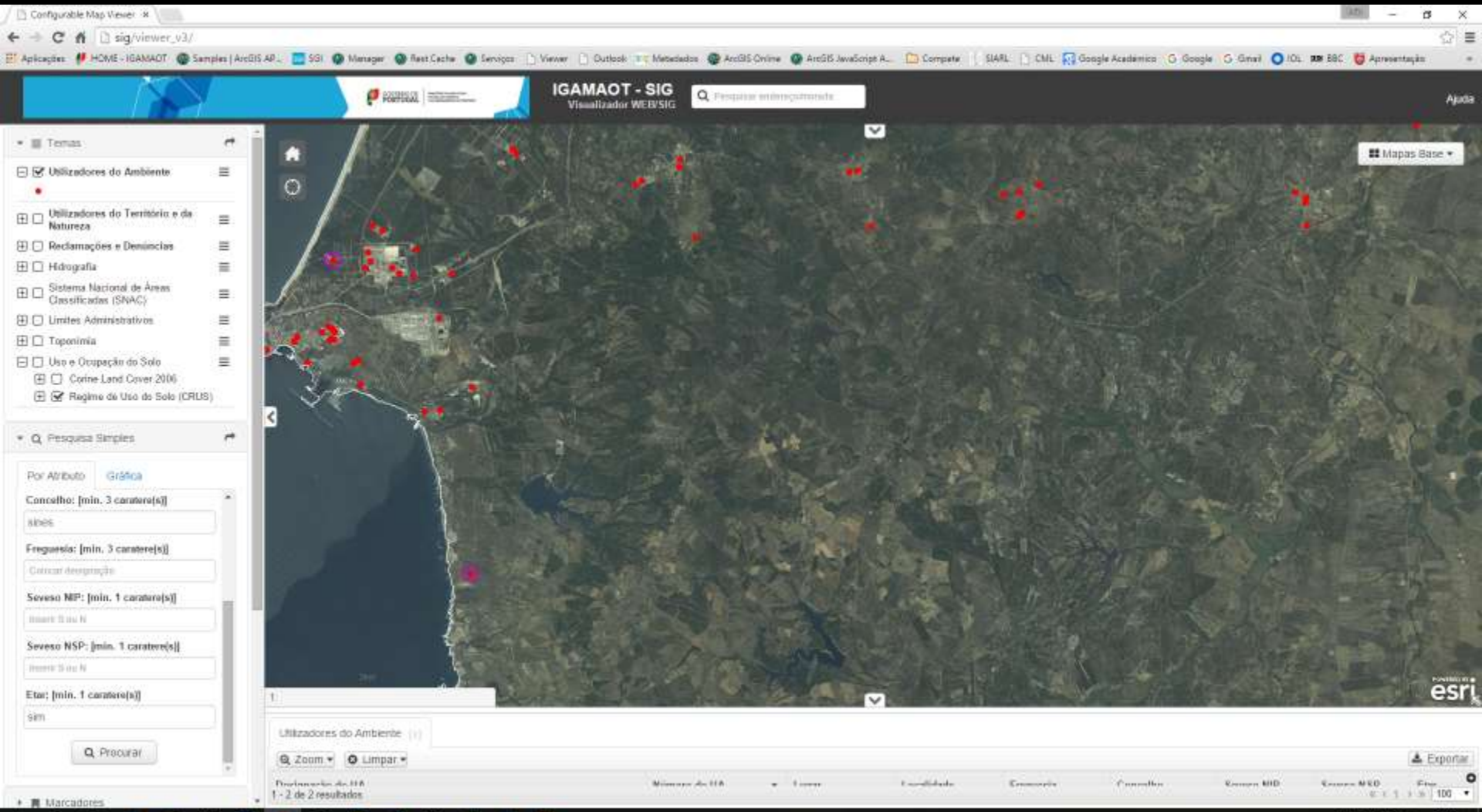
Viewer
Tools
Database search: Attribute (municipality: Sines / Seveso NIP: Y or N)



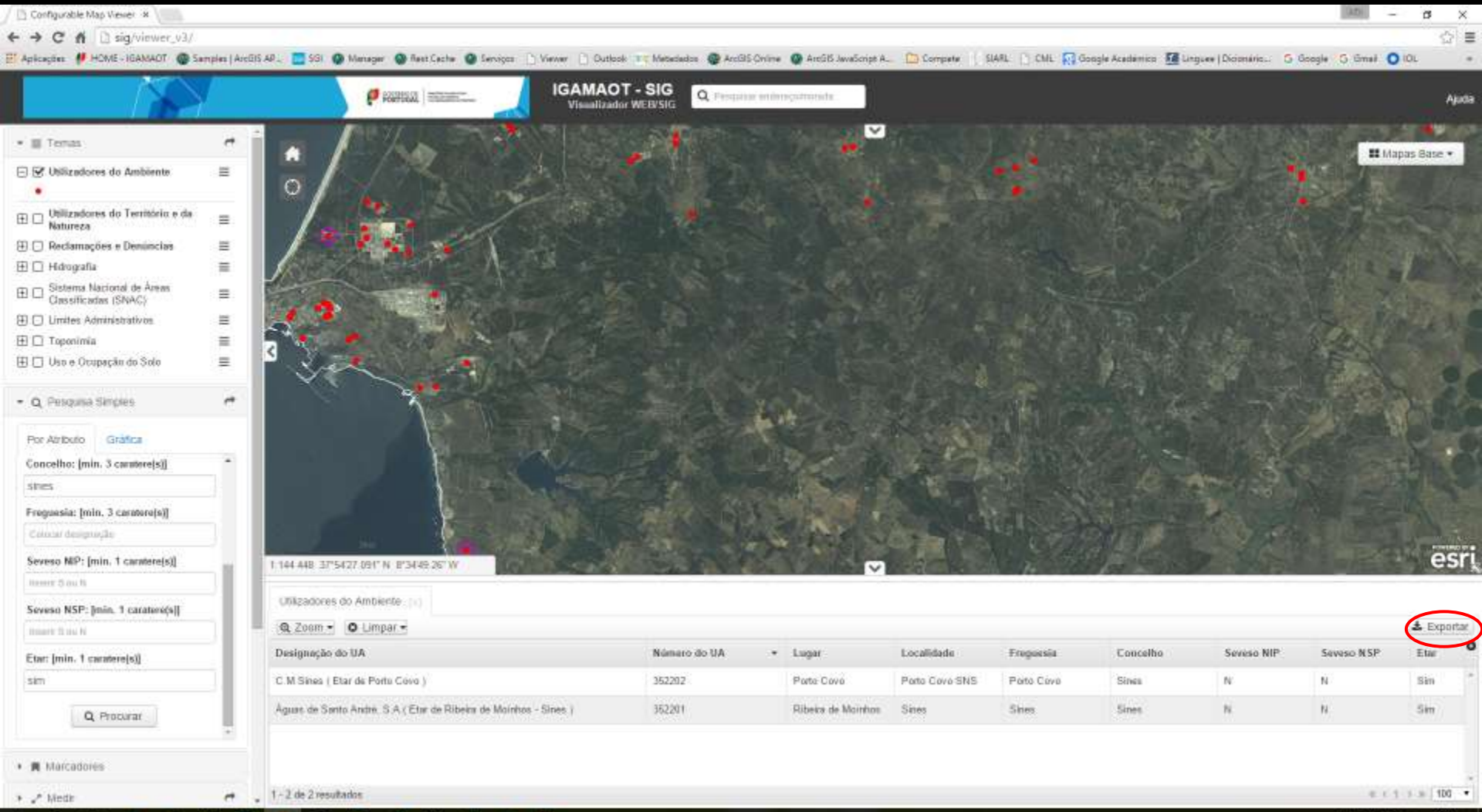
Viewer
Tools
Database search: Attribute (municipality: Sines / Seveso NSP: Y or N)



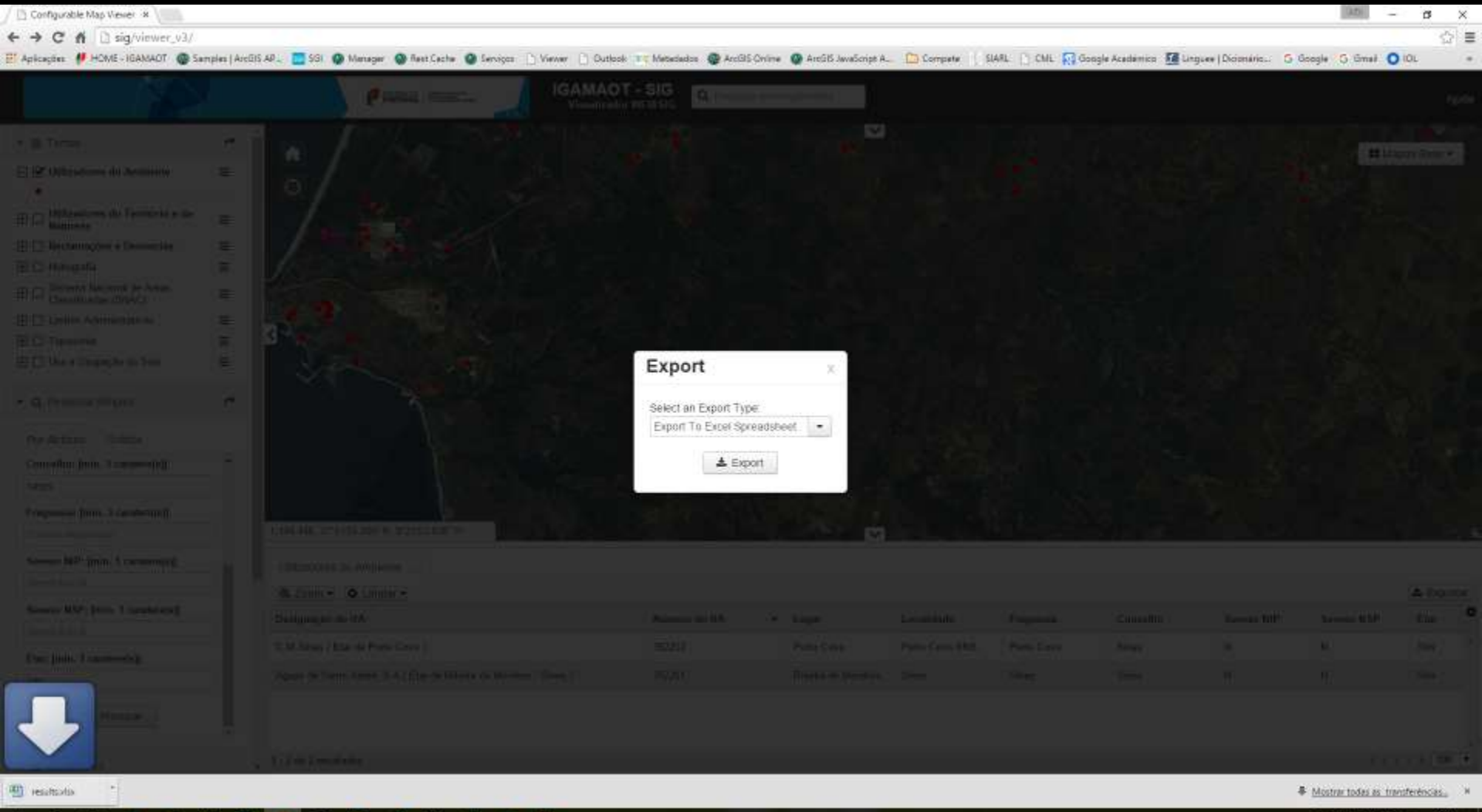
Viewer
Tools
Database search: Attribute (municipality: Sines / ETAR: Yes or No)



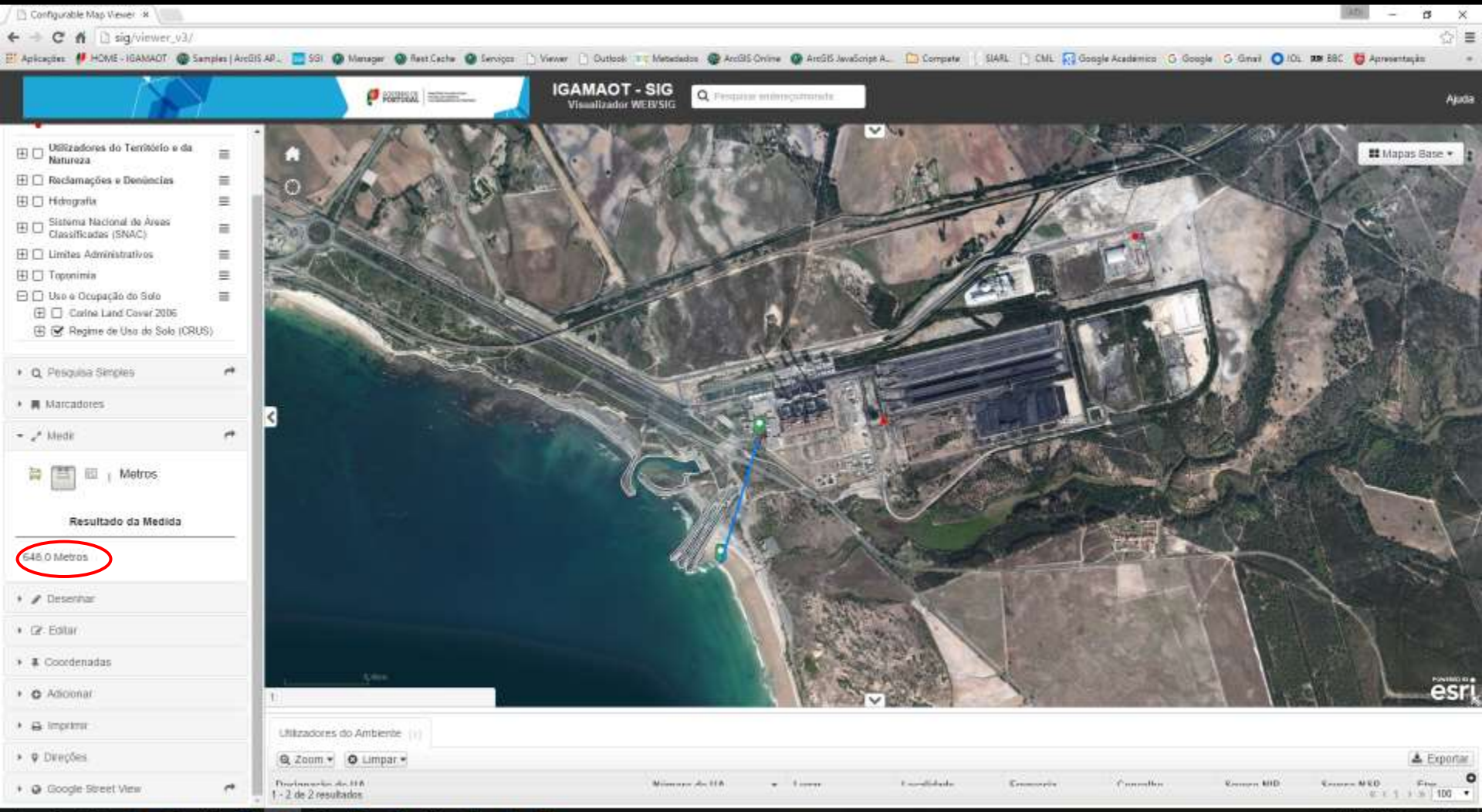
Viewer
Tools
Database export



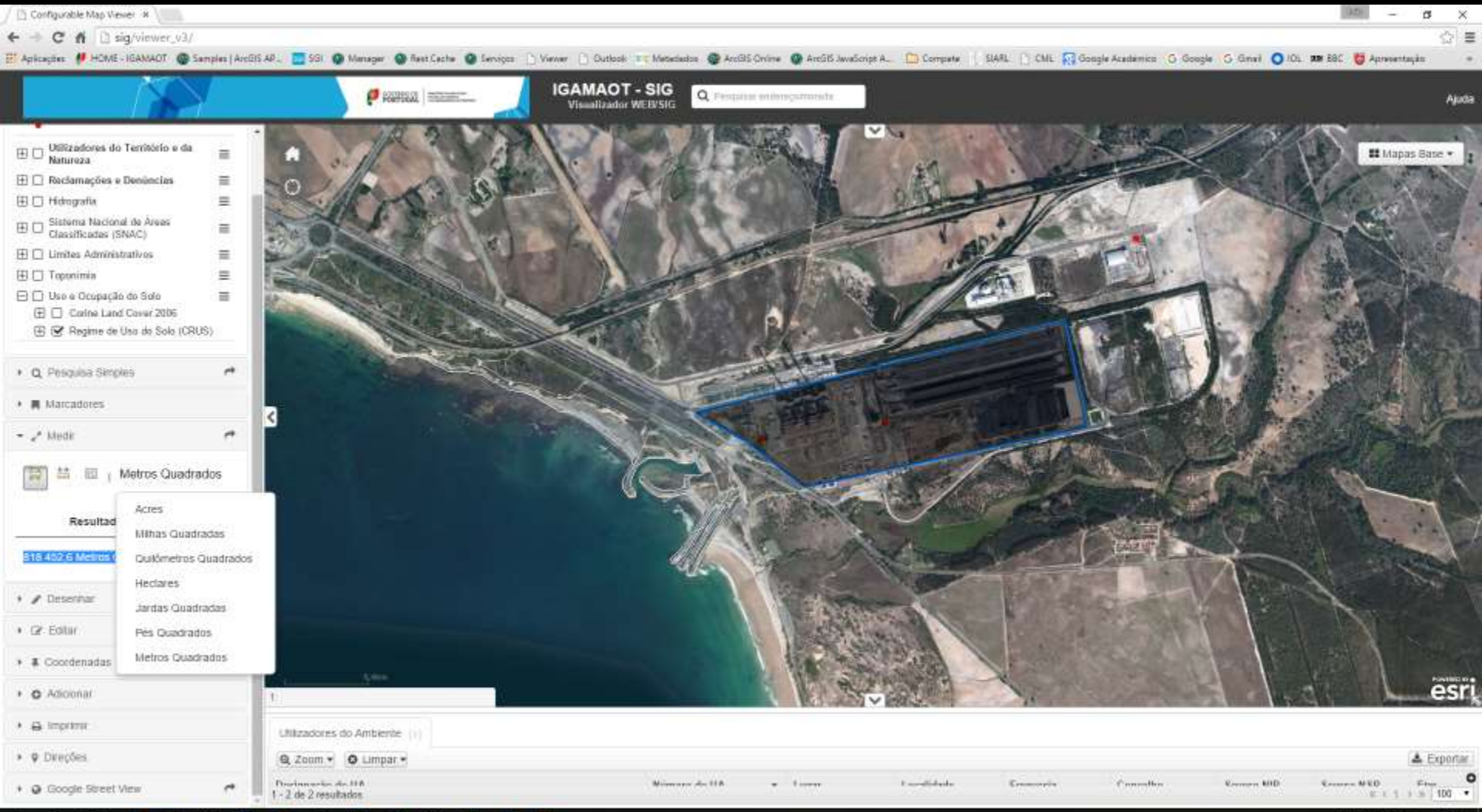
Viewer
Tools
Database export



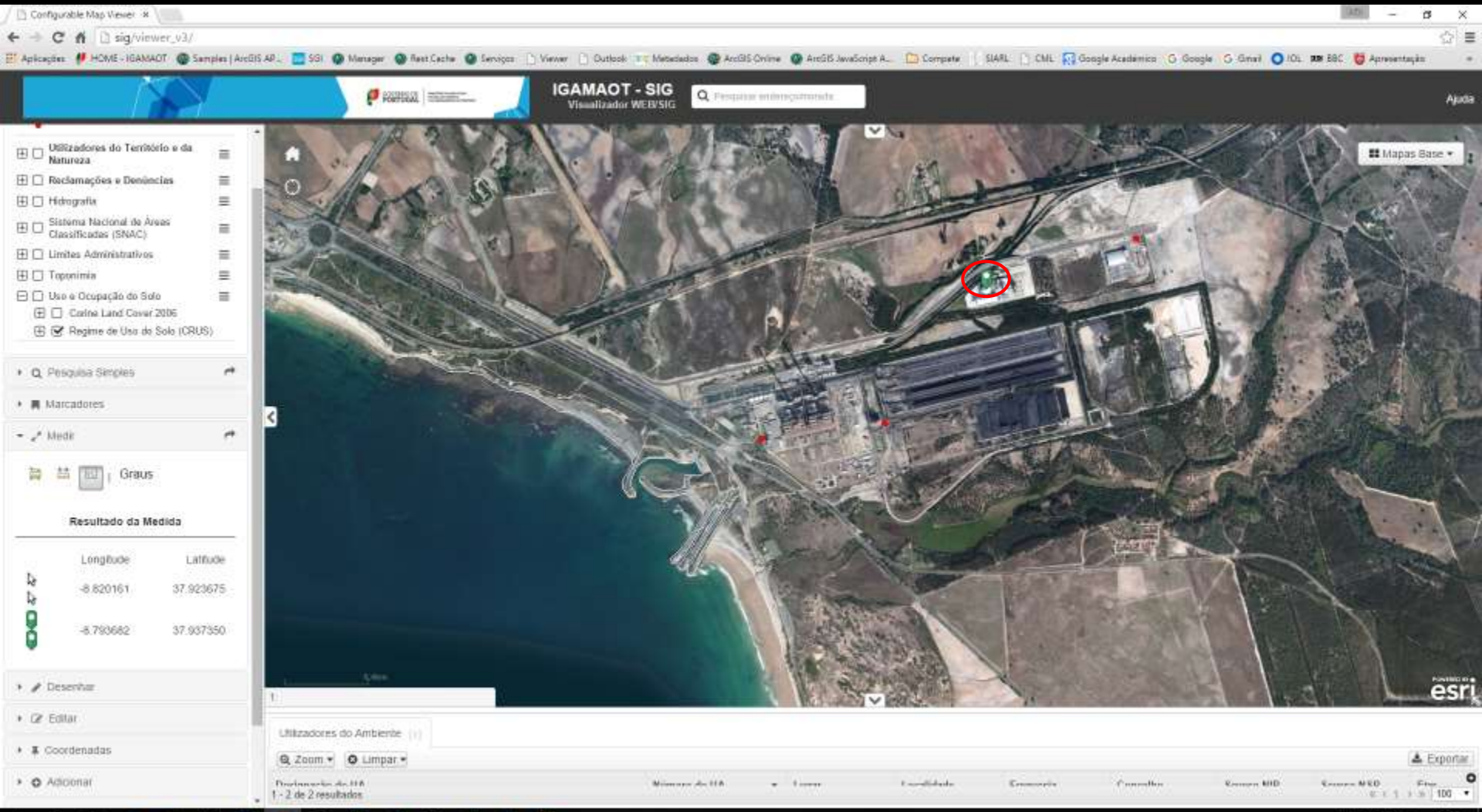
Viewer
Tools
Measurement: linear (different units)



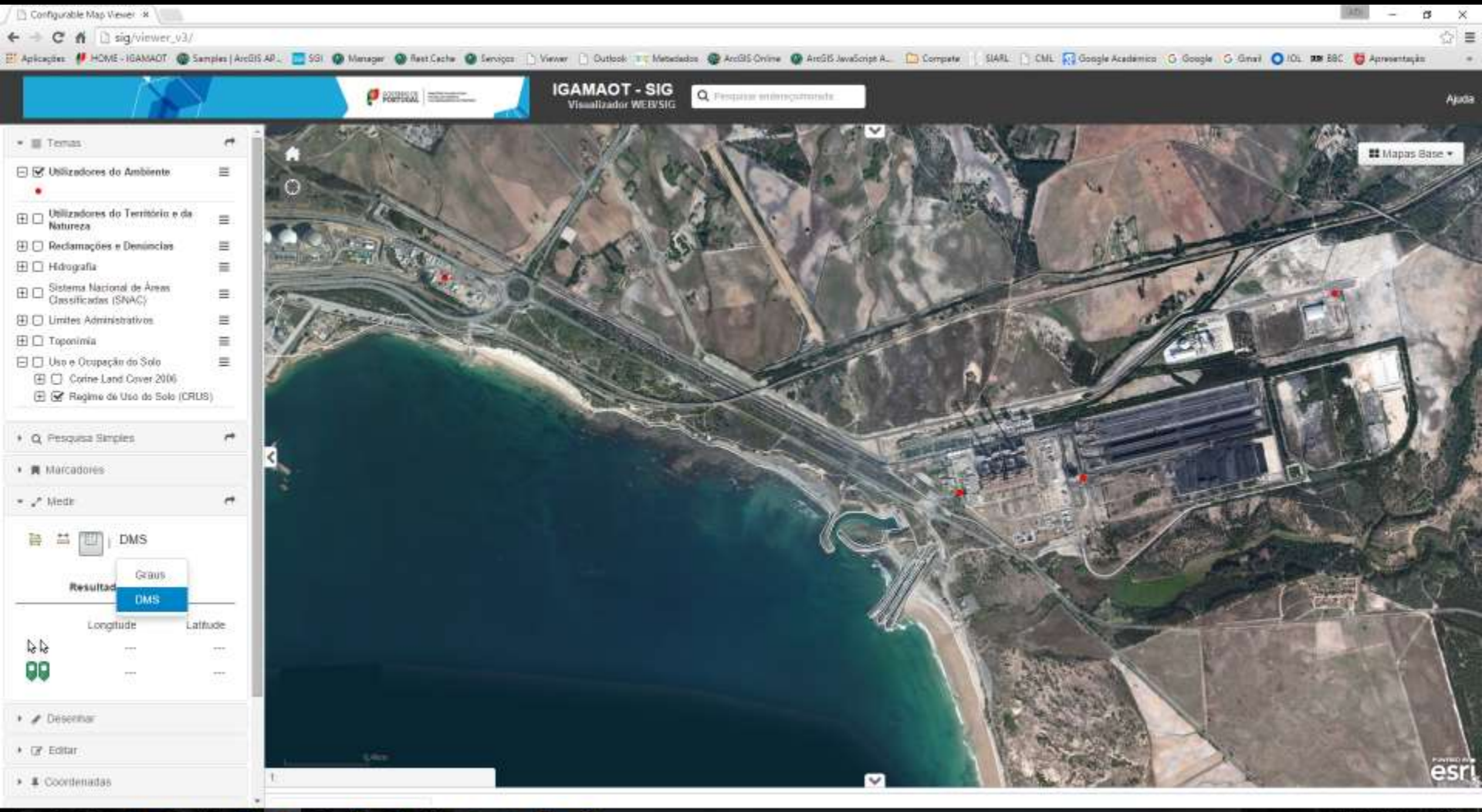
Viewer
Tools
Measurement: areas (different units)



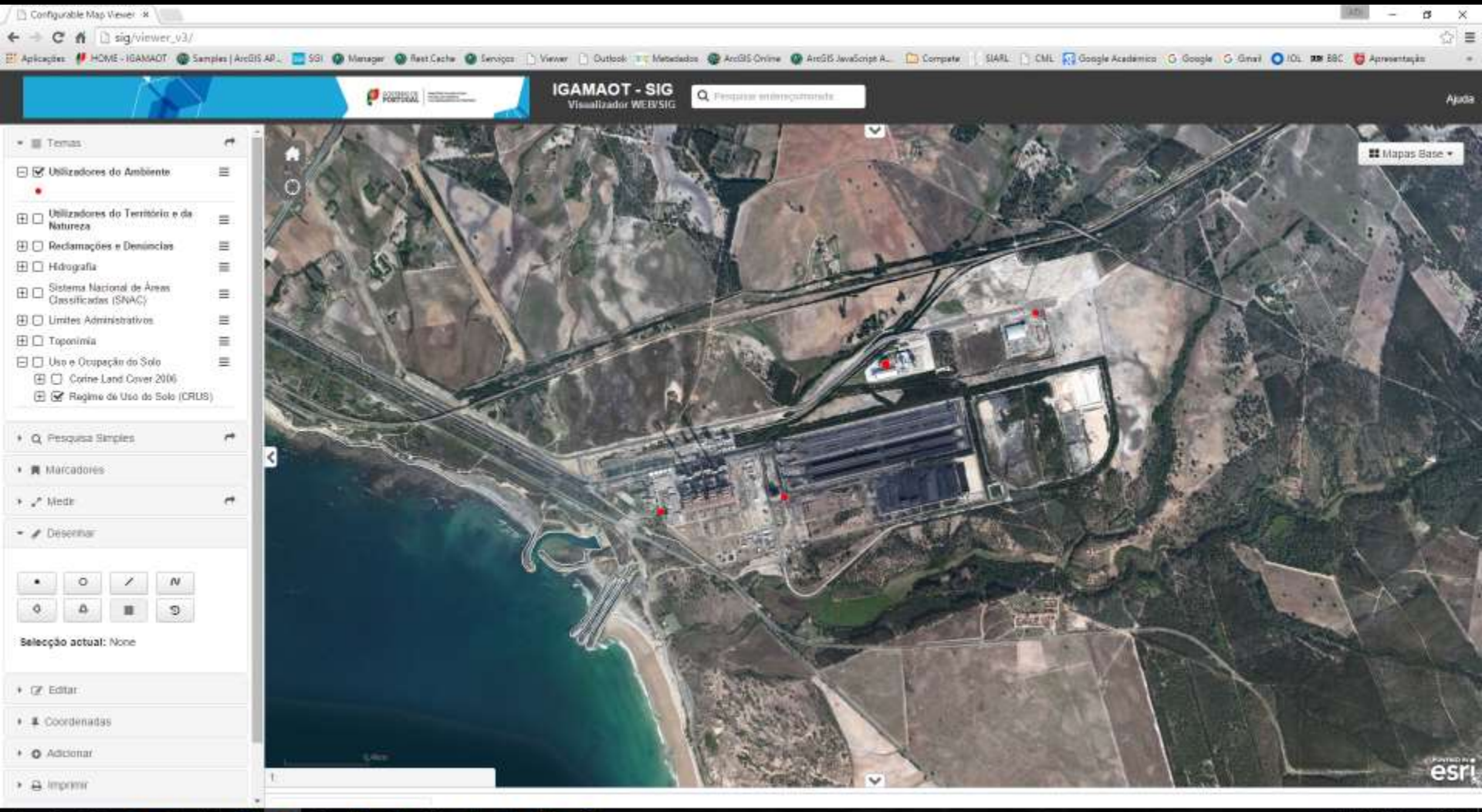
Viewer
Tools
Measurement: locate (get location coordinates)



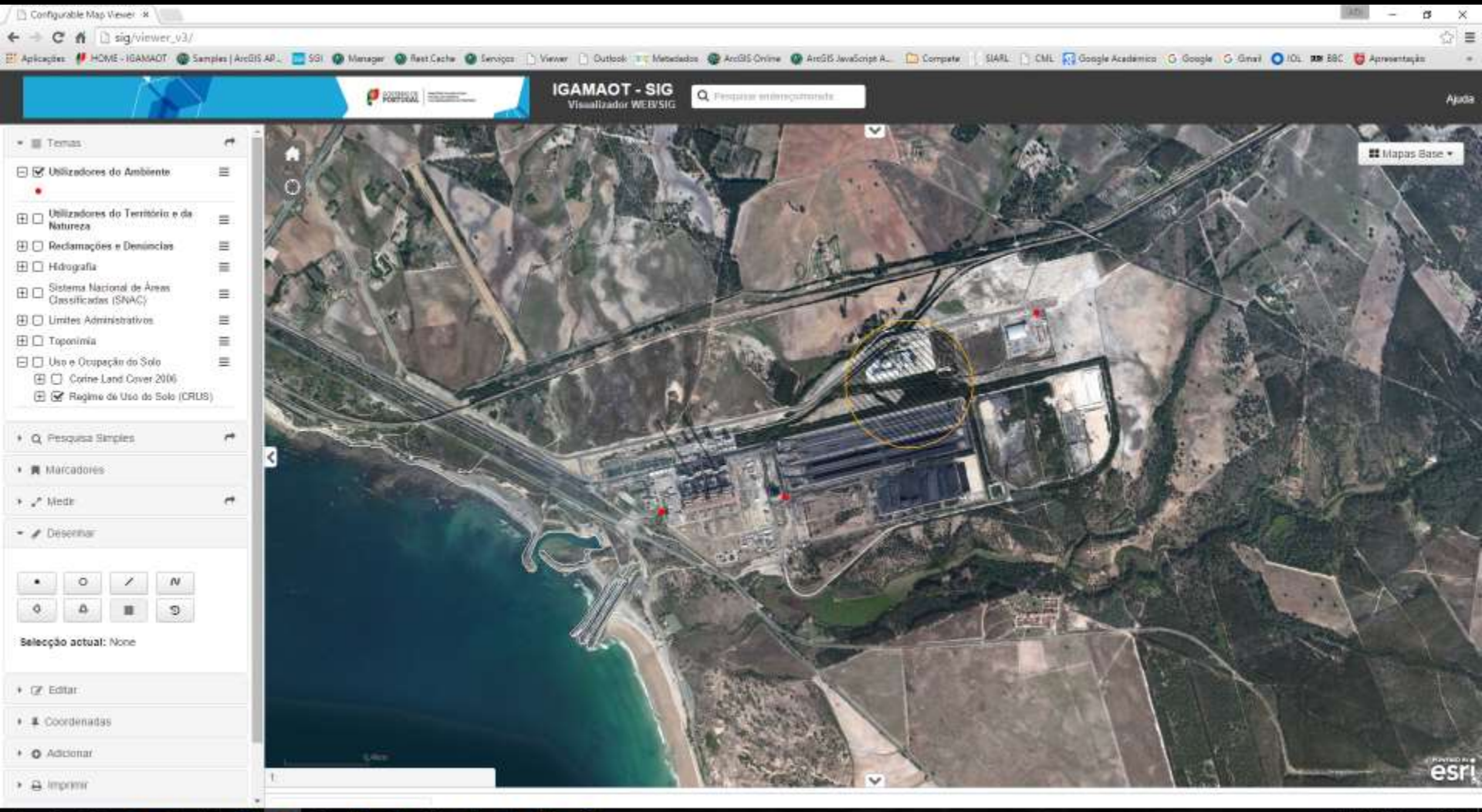
Viewer
Tools
Measurement: locate (get location coordinates in D°M'S" or DD)



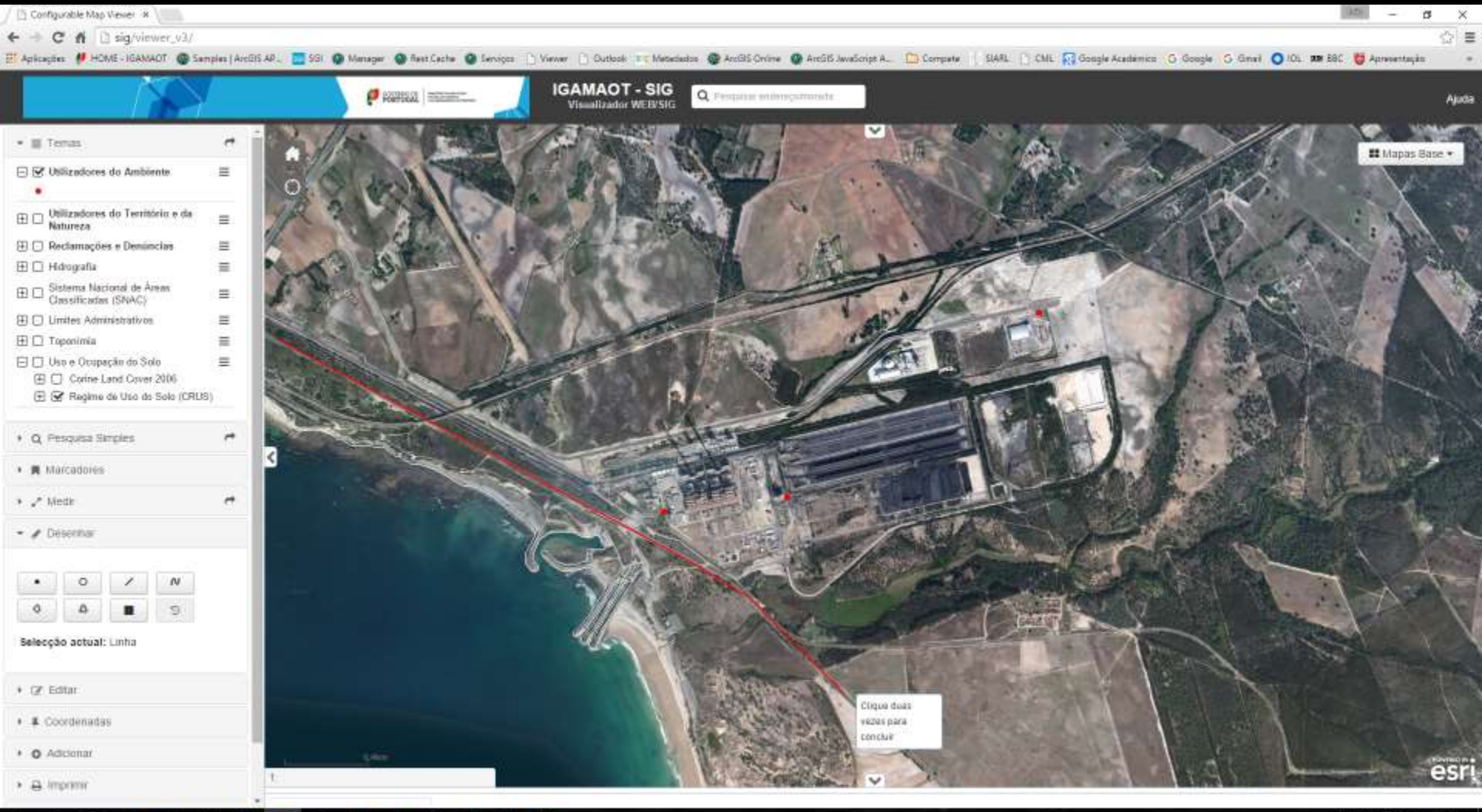
Viewer
Tools
Draw: point



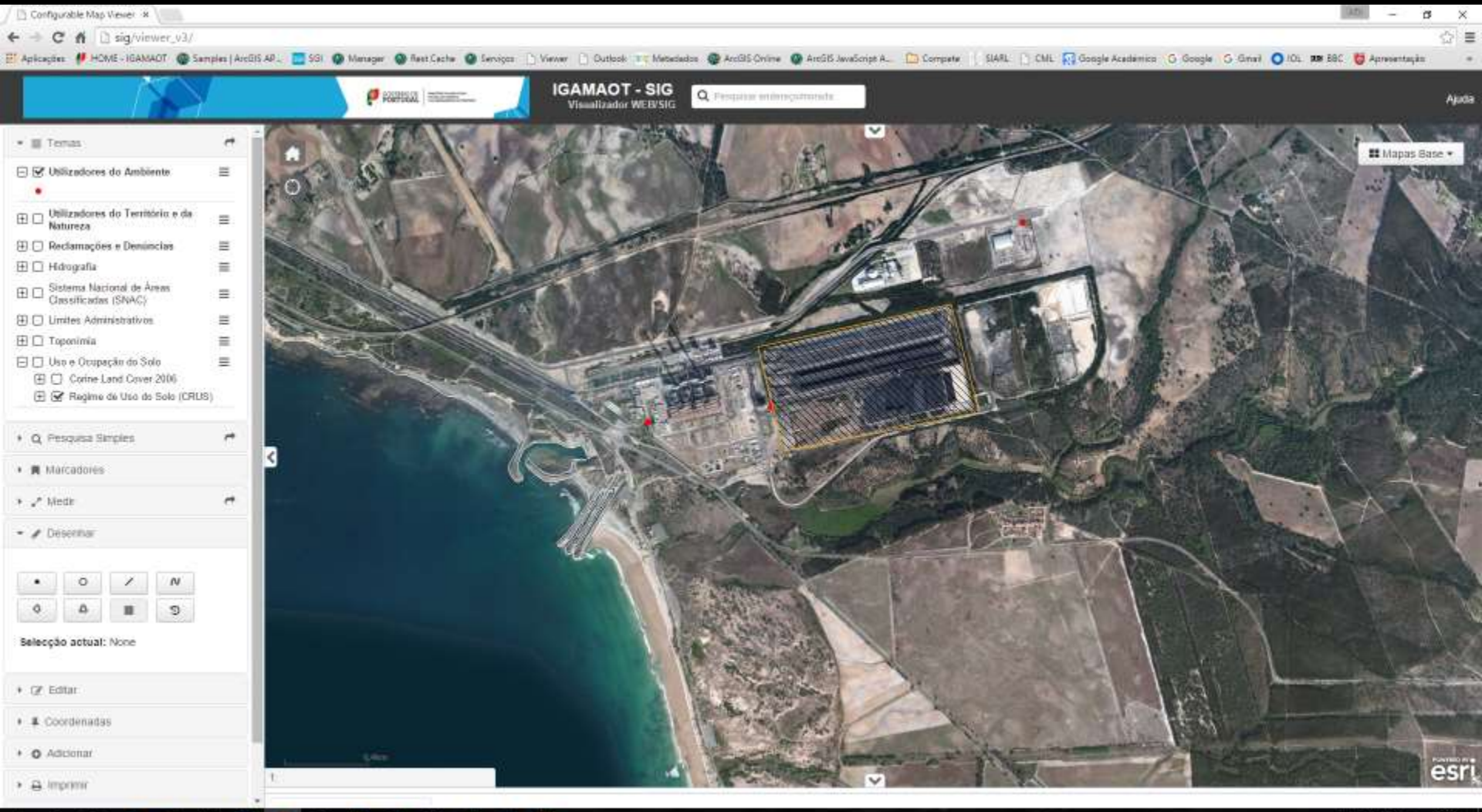
Viewer
Tools
Draw: circle



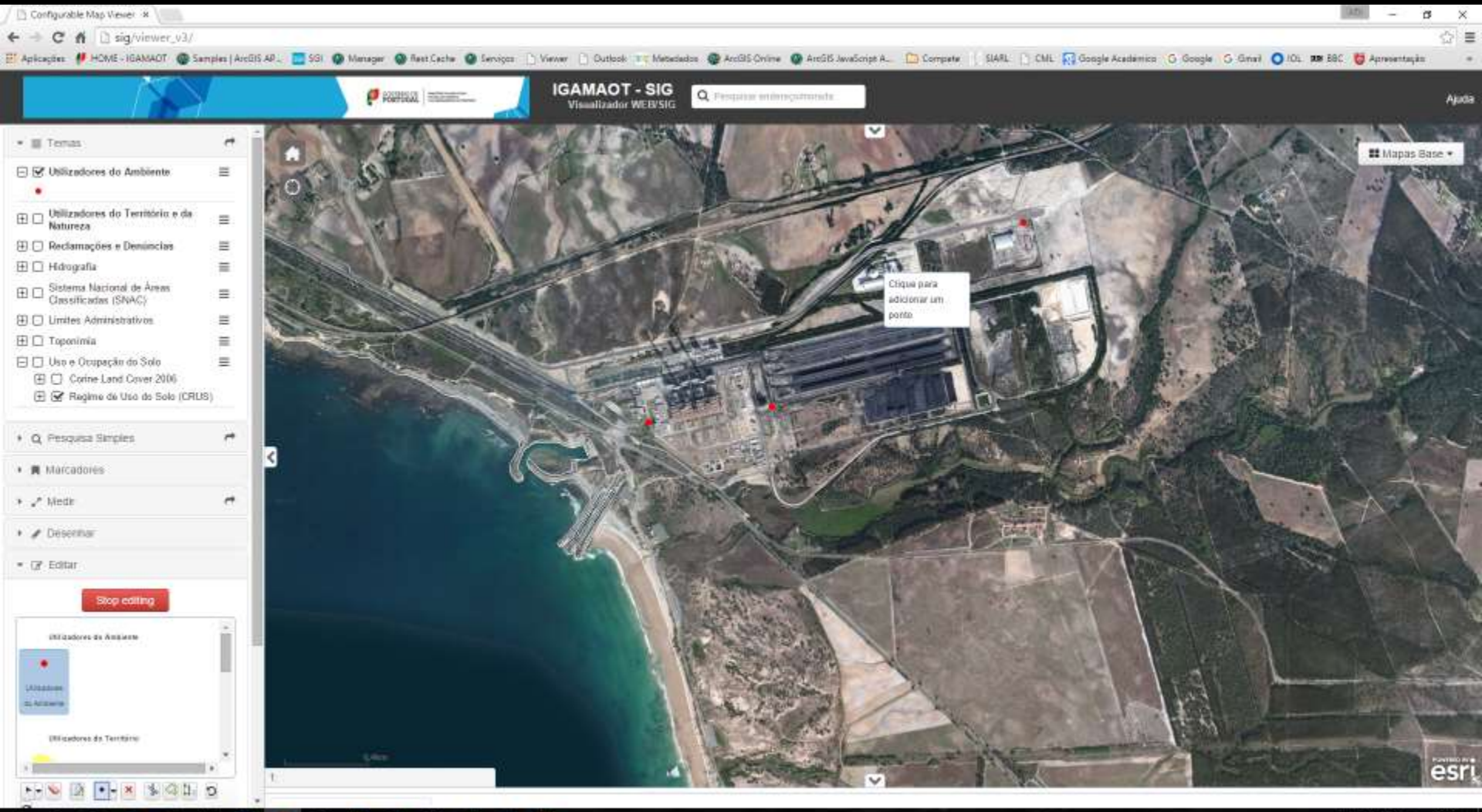
Viewer
Tools
Draw: line



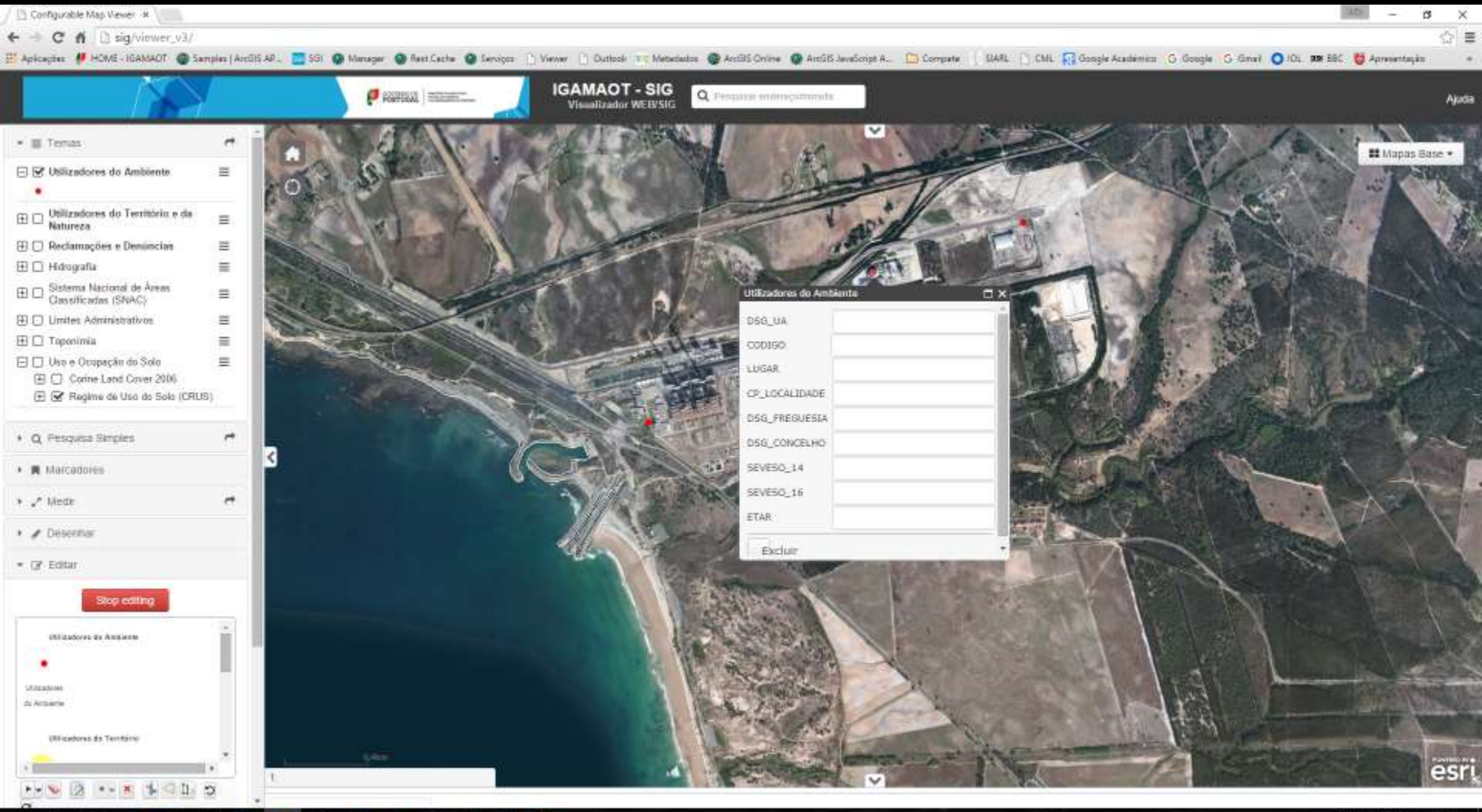
Viewer
Tools
Draw: polygon (area)



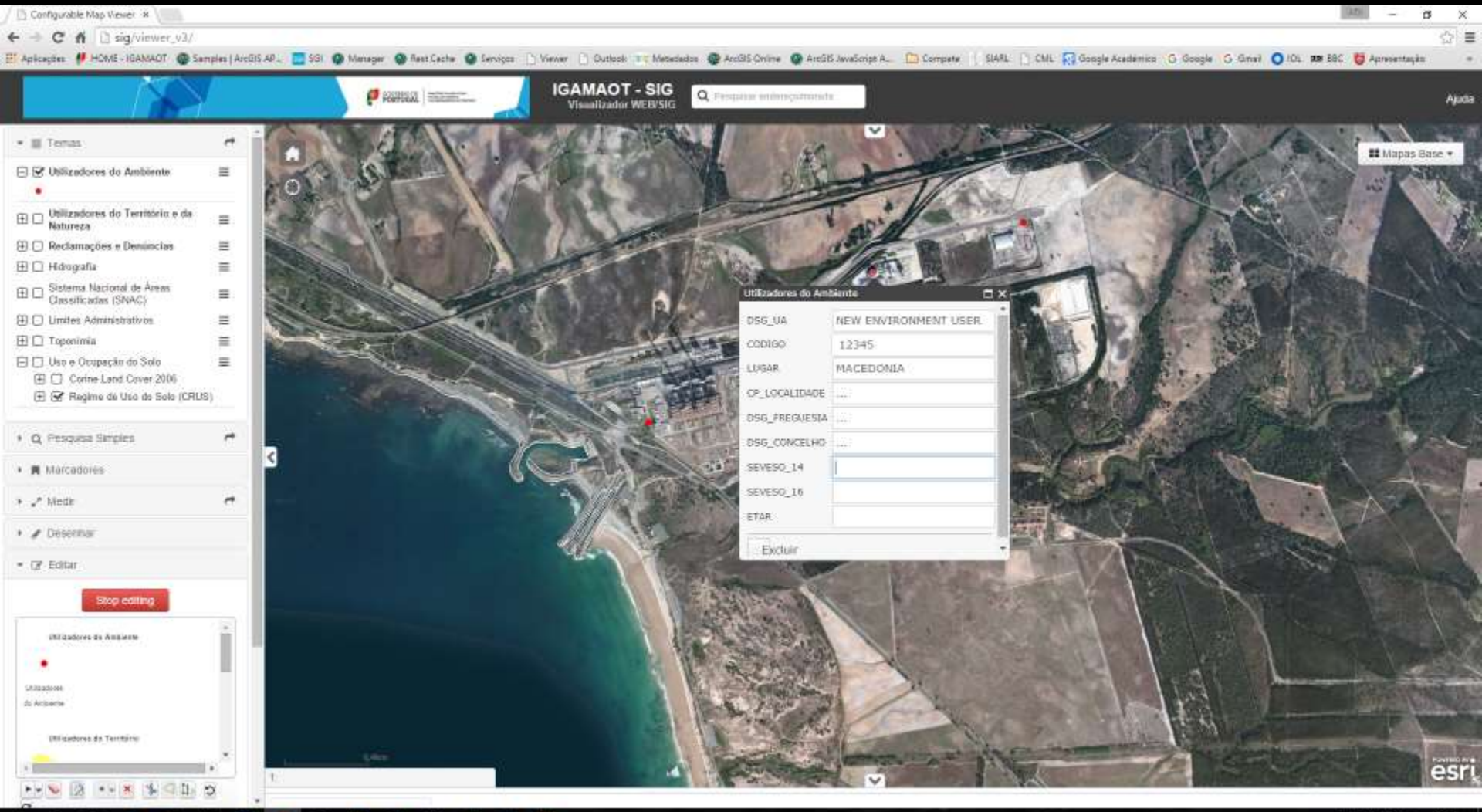
Viewer
Tools
Edit: editing in database – create a new record / dot



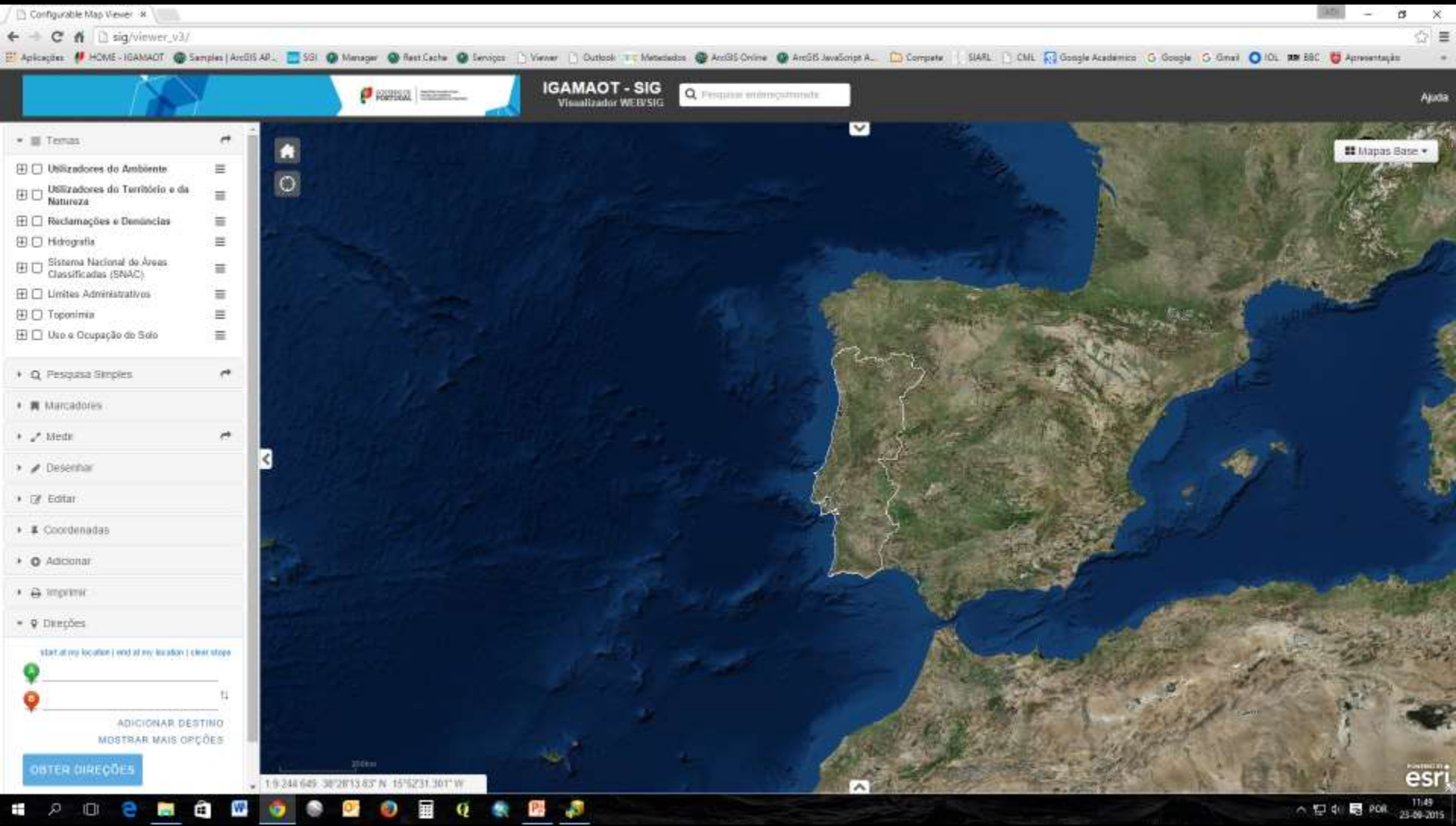
Viewer
Tools
Edit: editing in database – add data



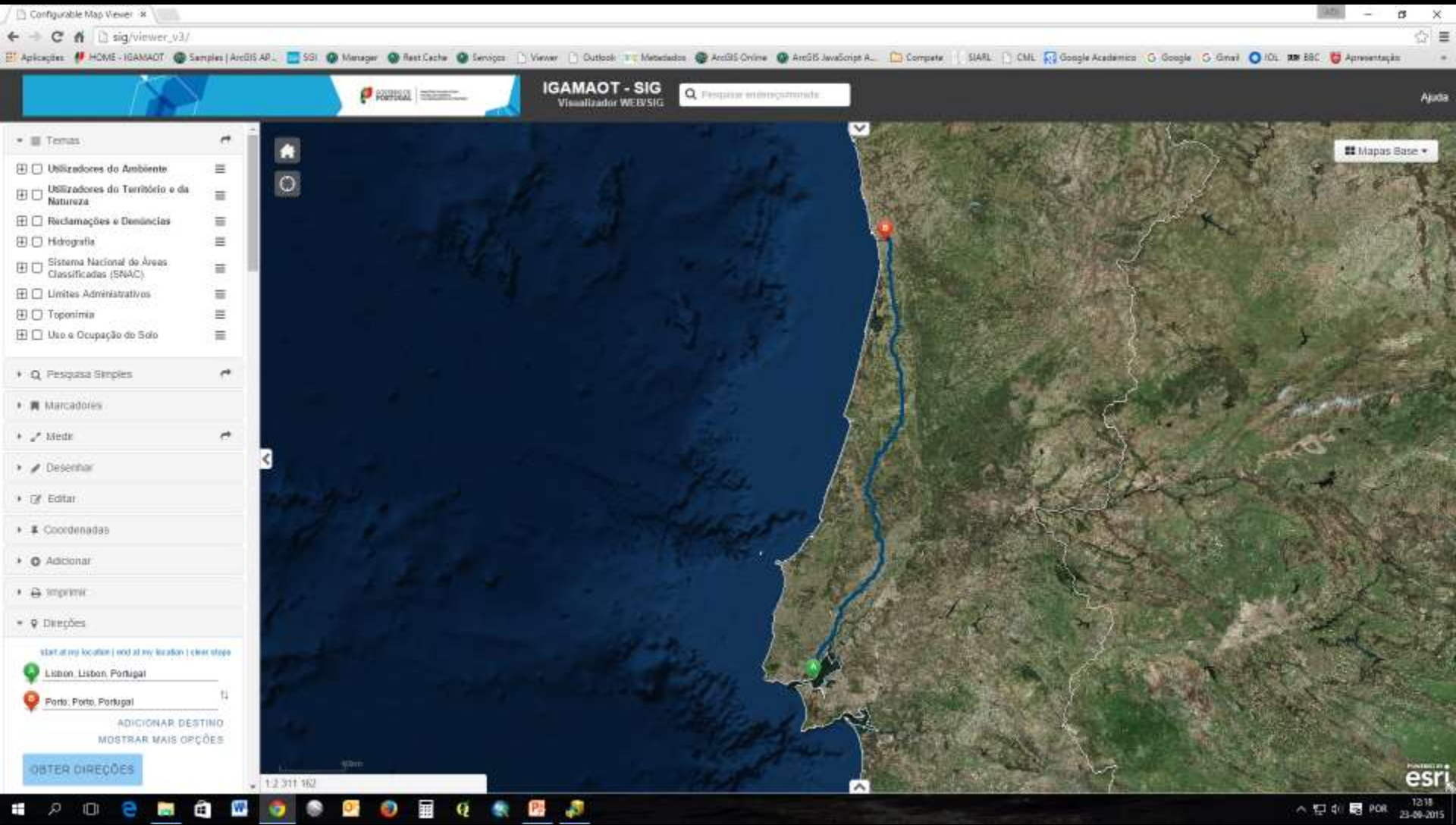
Viewer
Tools
Edit: editing in database – add data



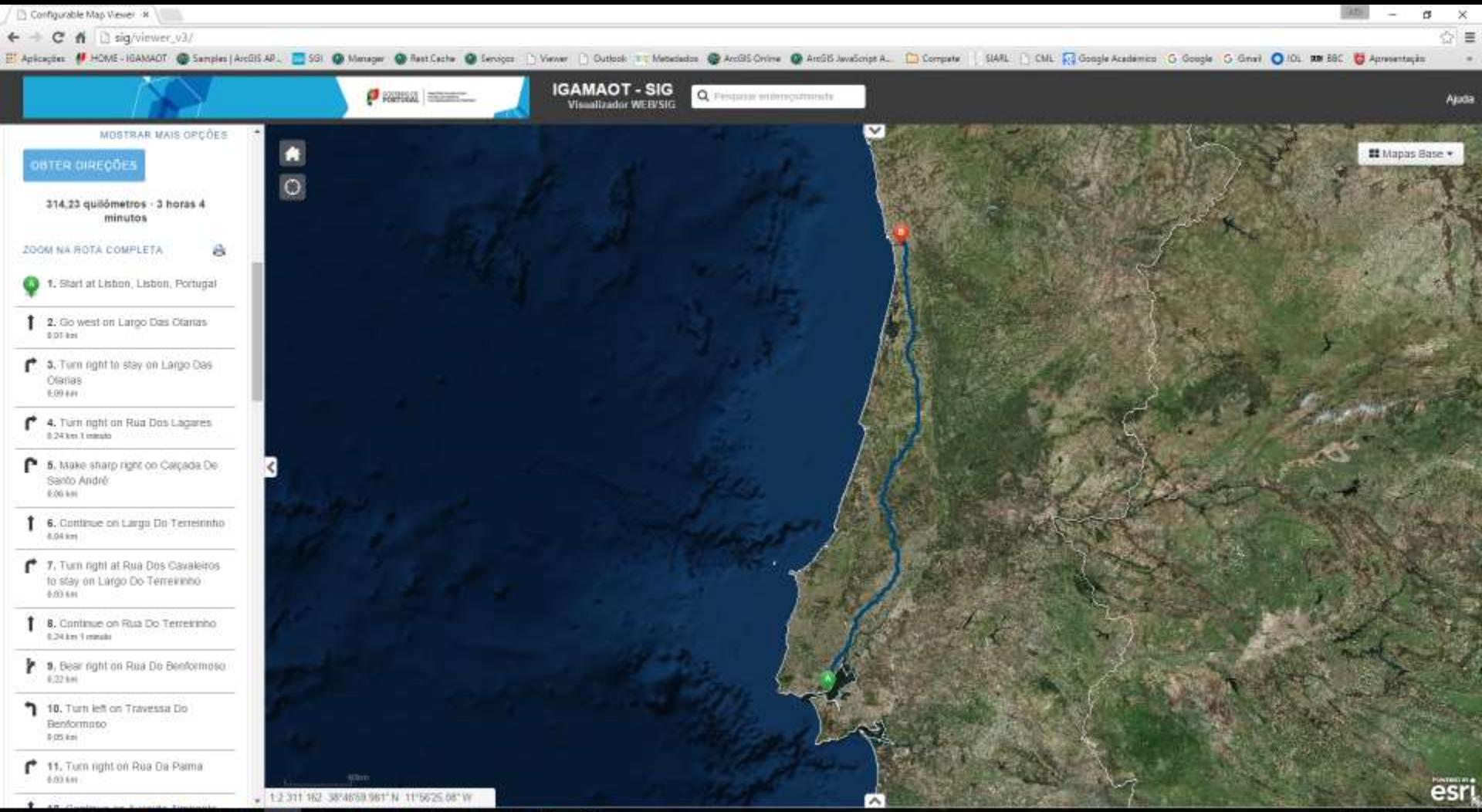
Viewer
Tools
Calculate route: point A to b



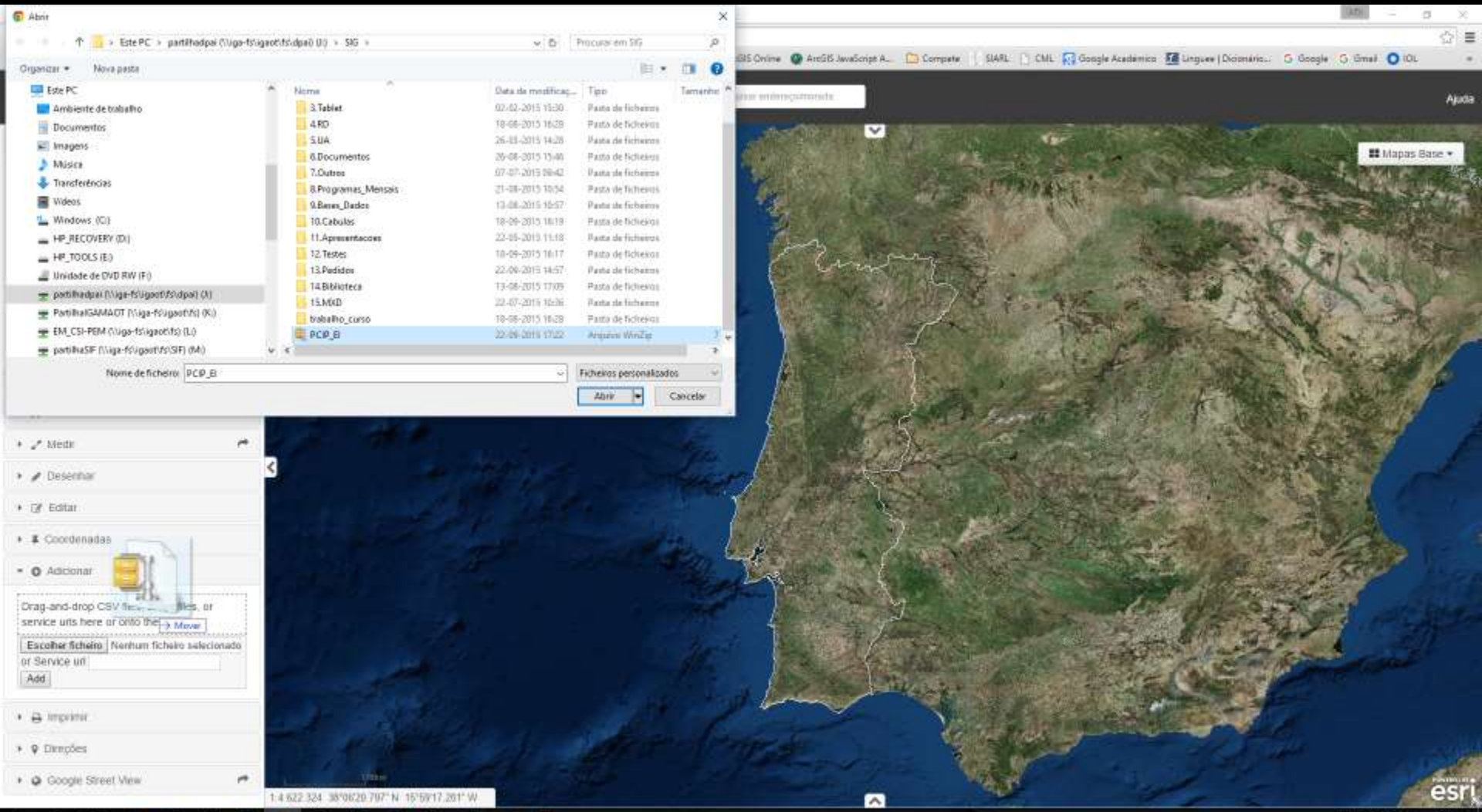
Viewer
Tools
Calculate route: point A to b (Lisbon – Oporto)



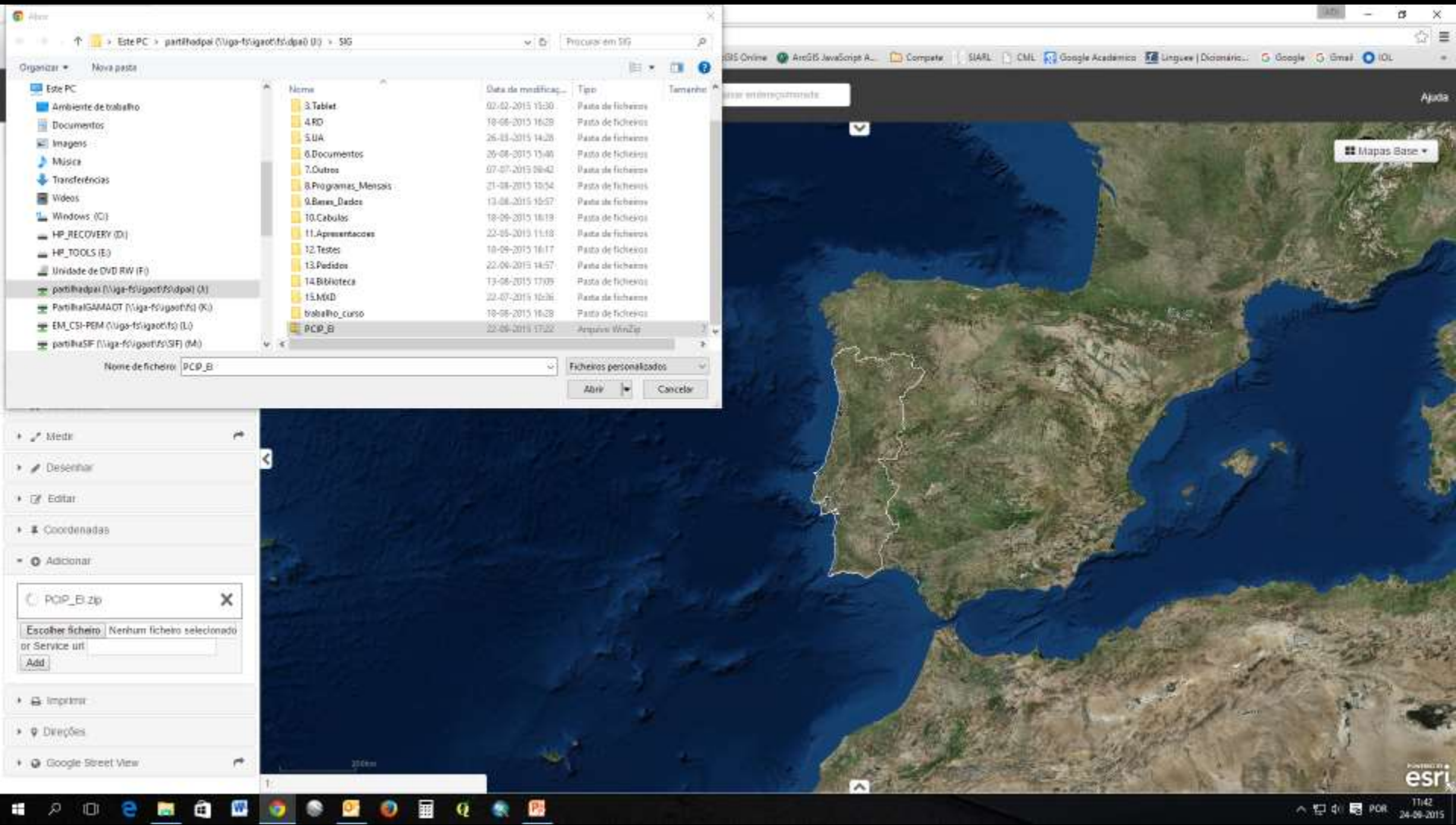
Viewer
Tools
Calculate route: point A to b (Lisbon – Oporto) - directions



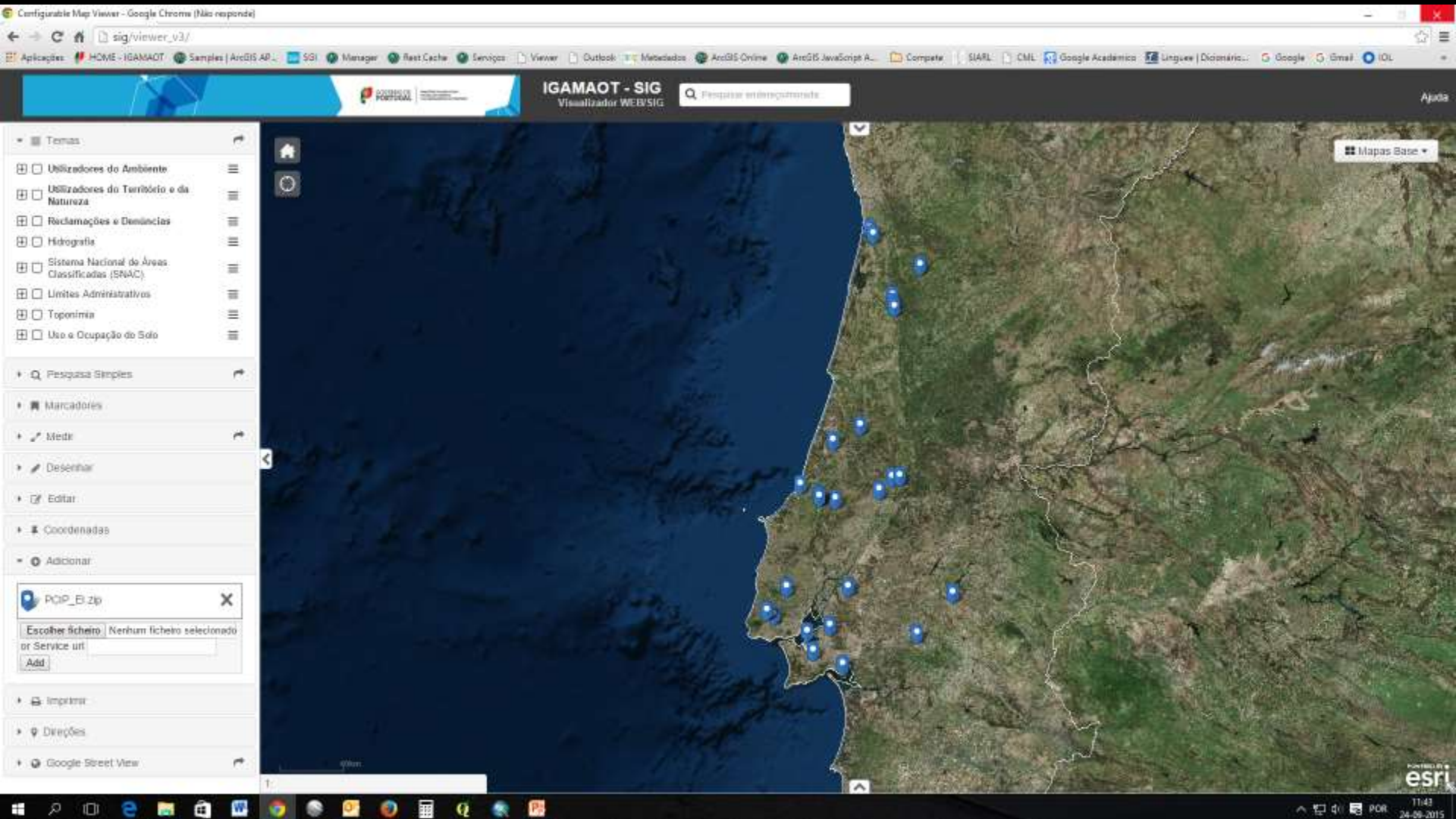
Viewer
Tools
Add data: different formats – Web Services / files (SHP / CSV)



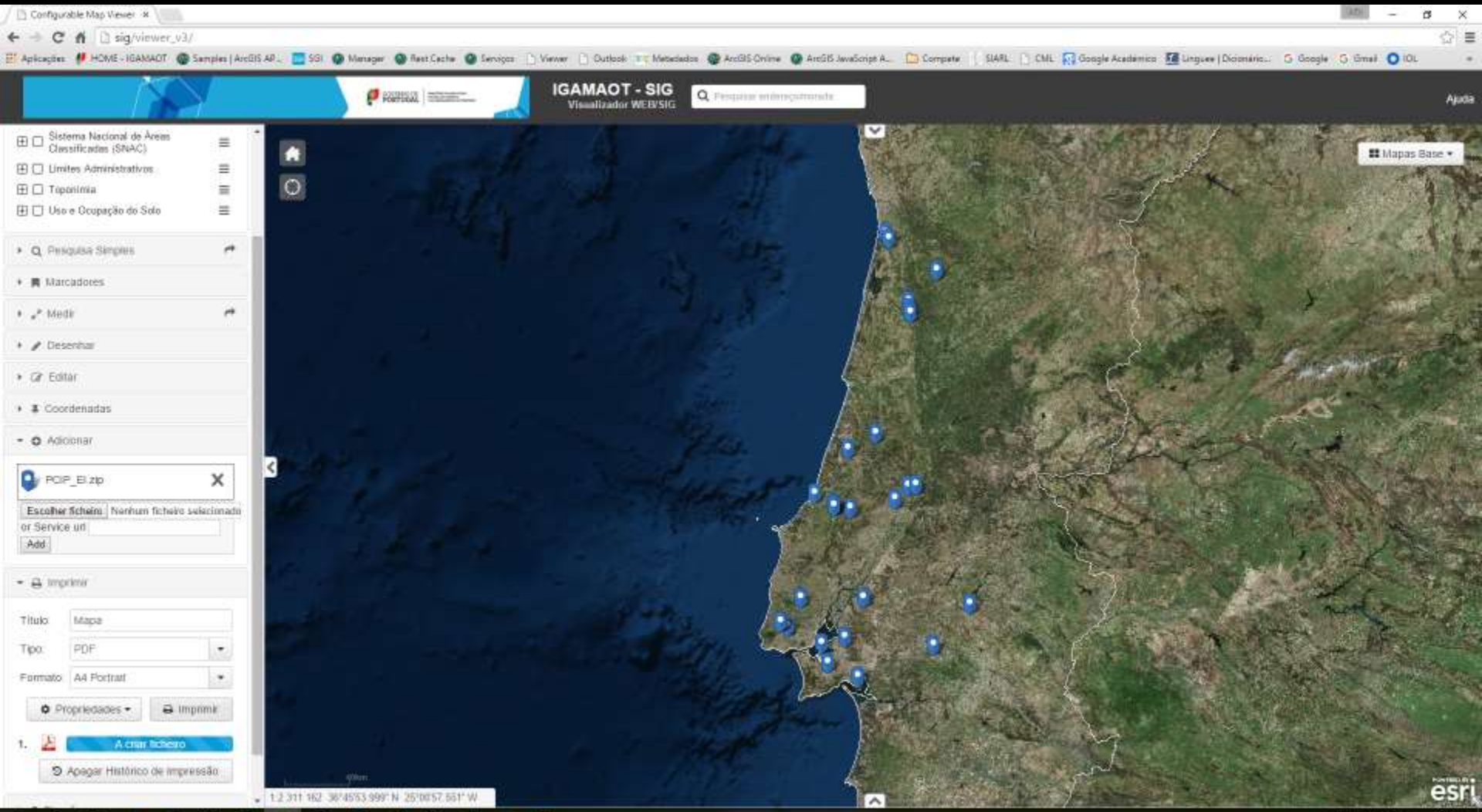
Viewer
Tools
Add data: different formats – Web Services / files (SHP / CSV)



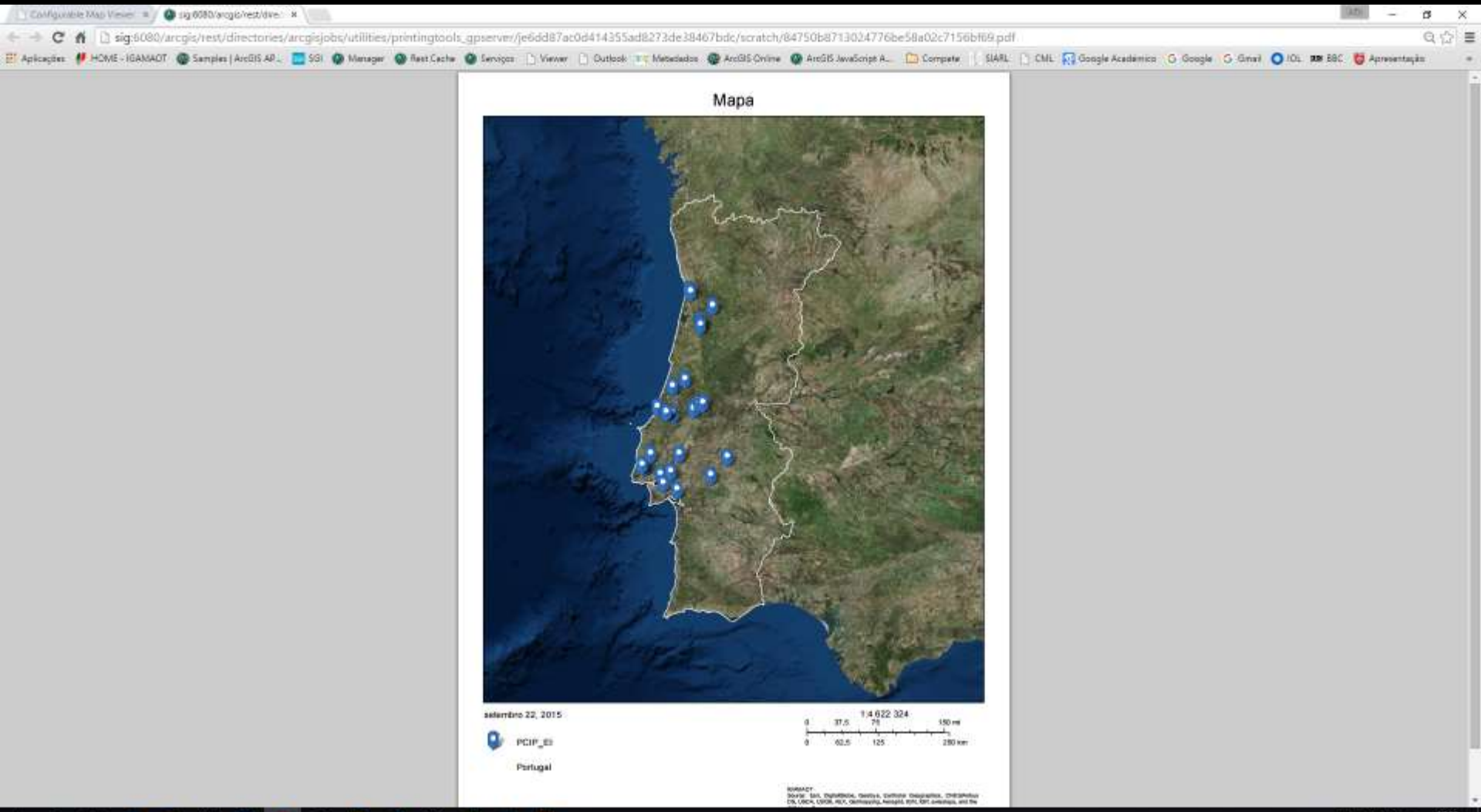
Viewer
Tools
Add data: different formats – Web Services / files (SHP / CSV)



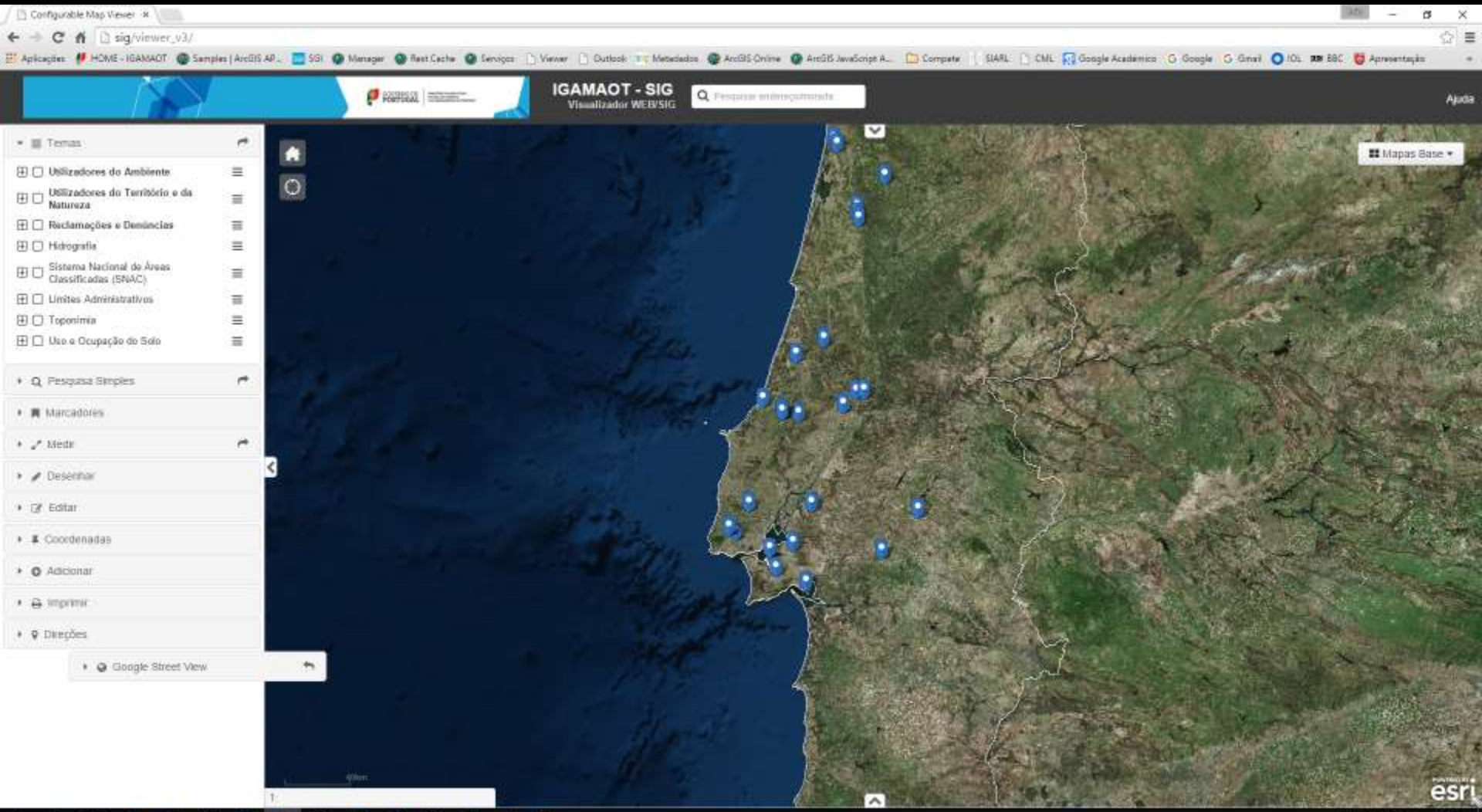
Viewer
Tools
Print



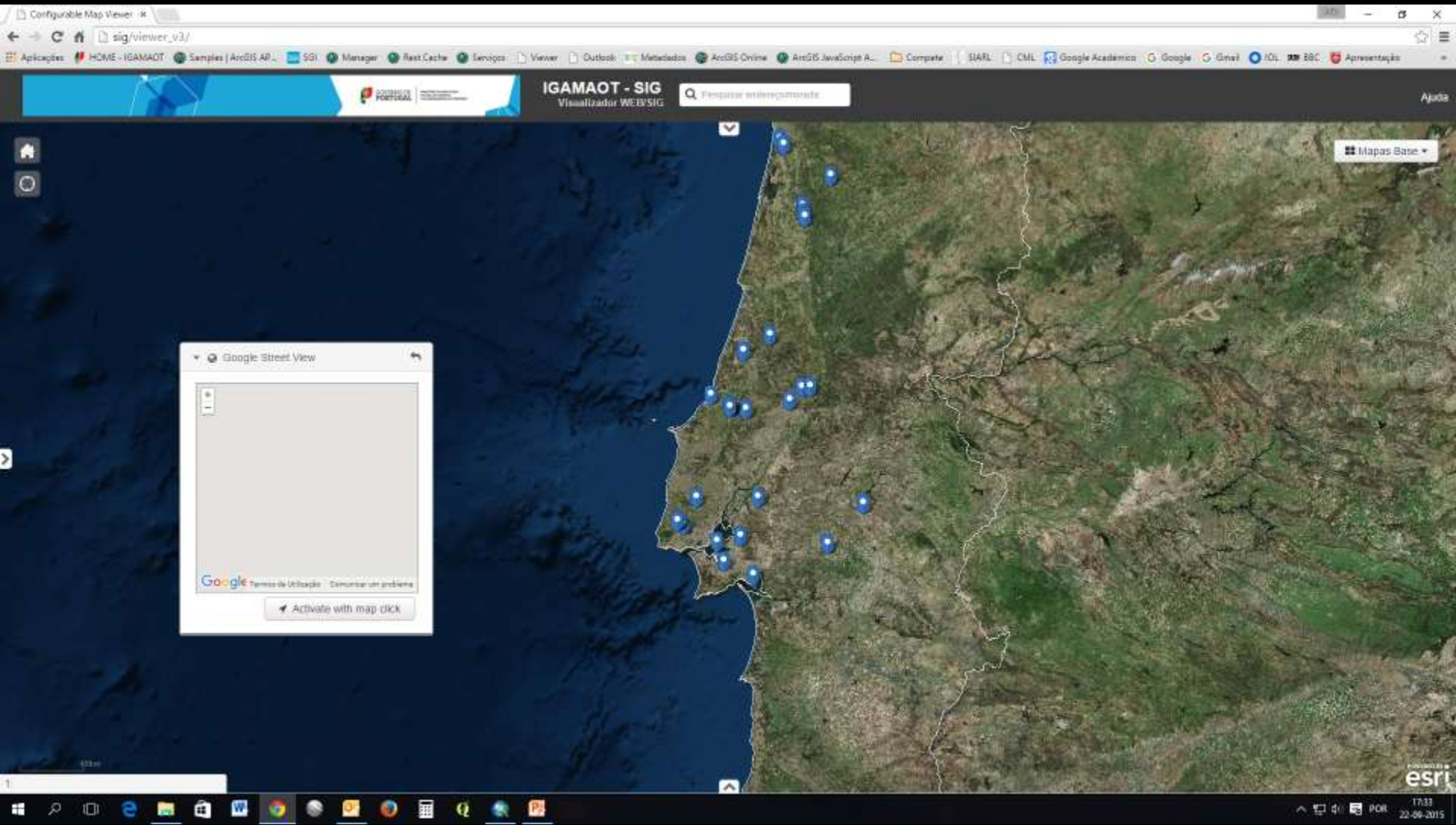
Viewer
Tools
Print



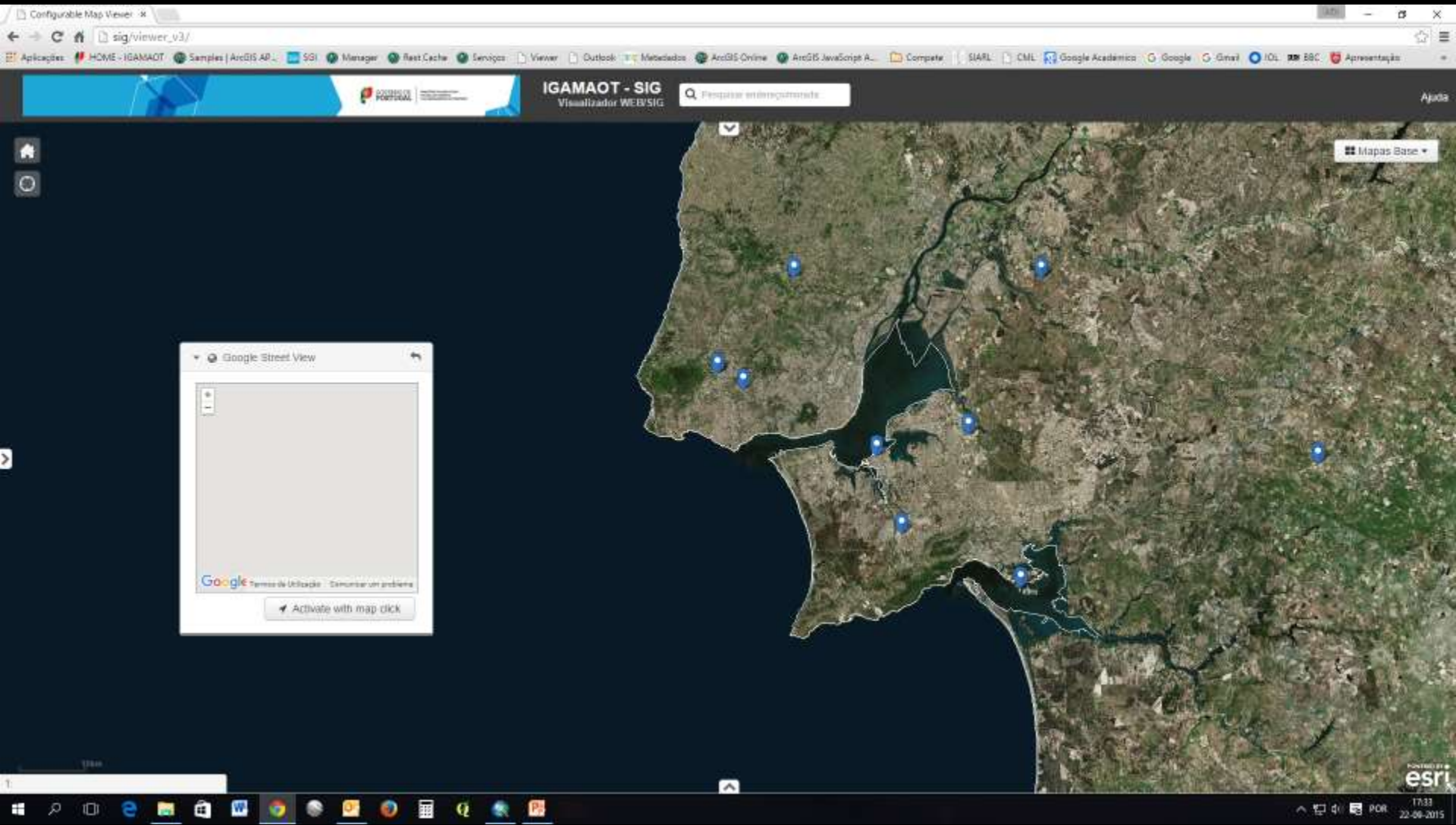
Viewer
Tools
Google Street View (floating toolbox)



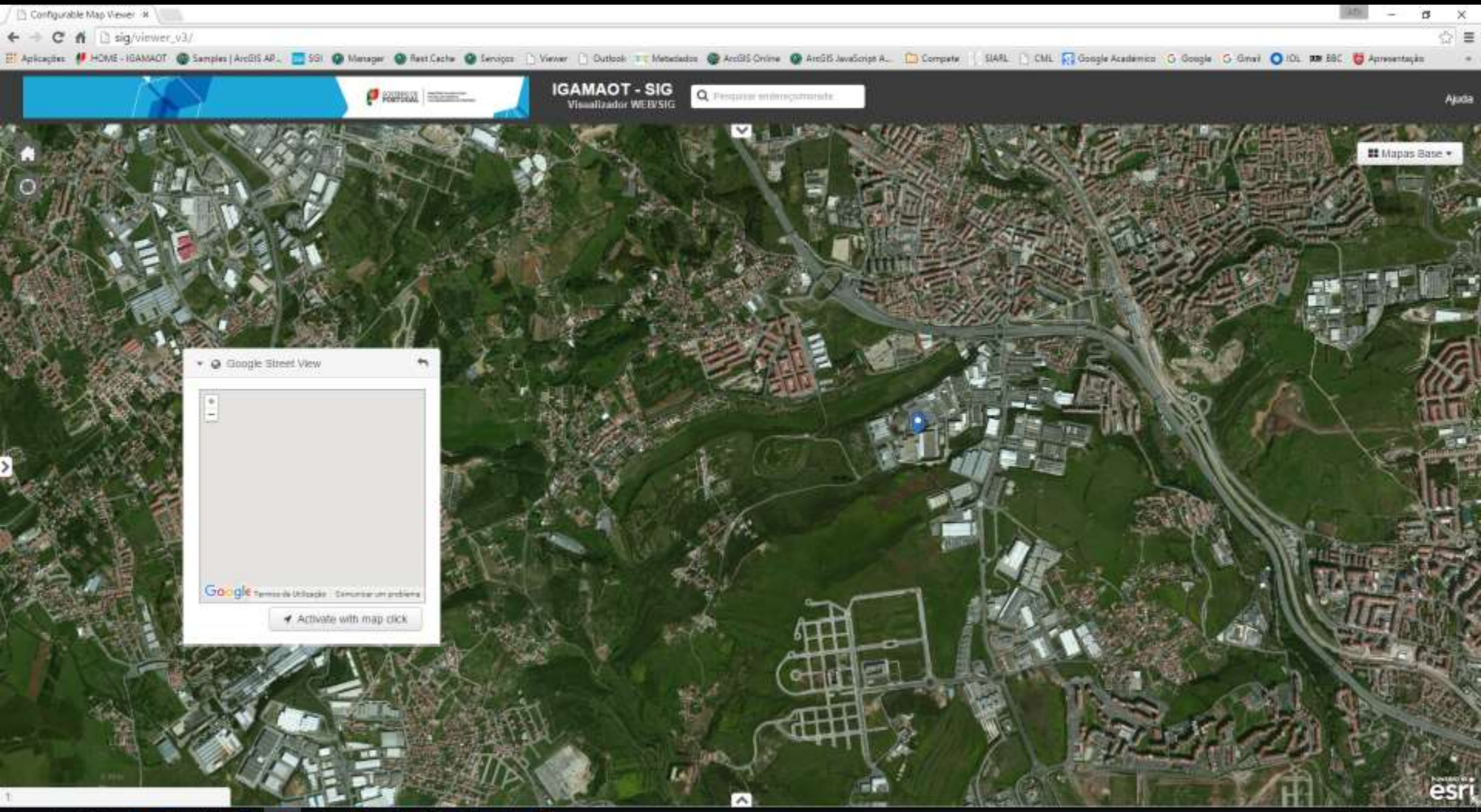
Viewer
Tools
Google Street View (floating toolbox)



Viewer
Tools
Google Street View (floating toolbox)



Viewer
Tools
Google Street View (floating toolbox)



Viewer
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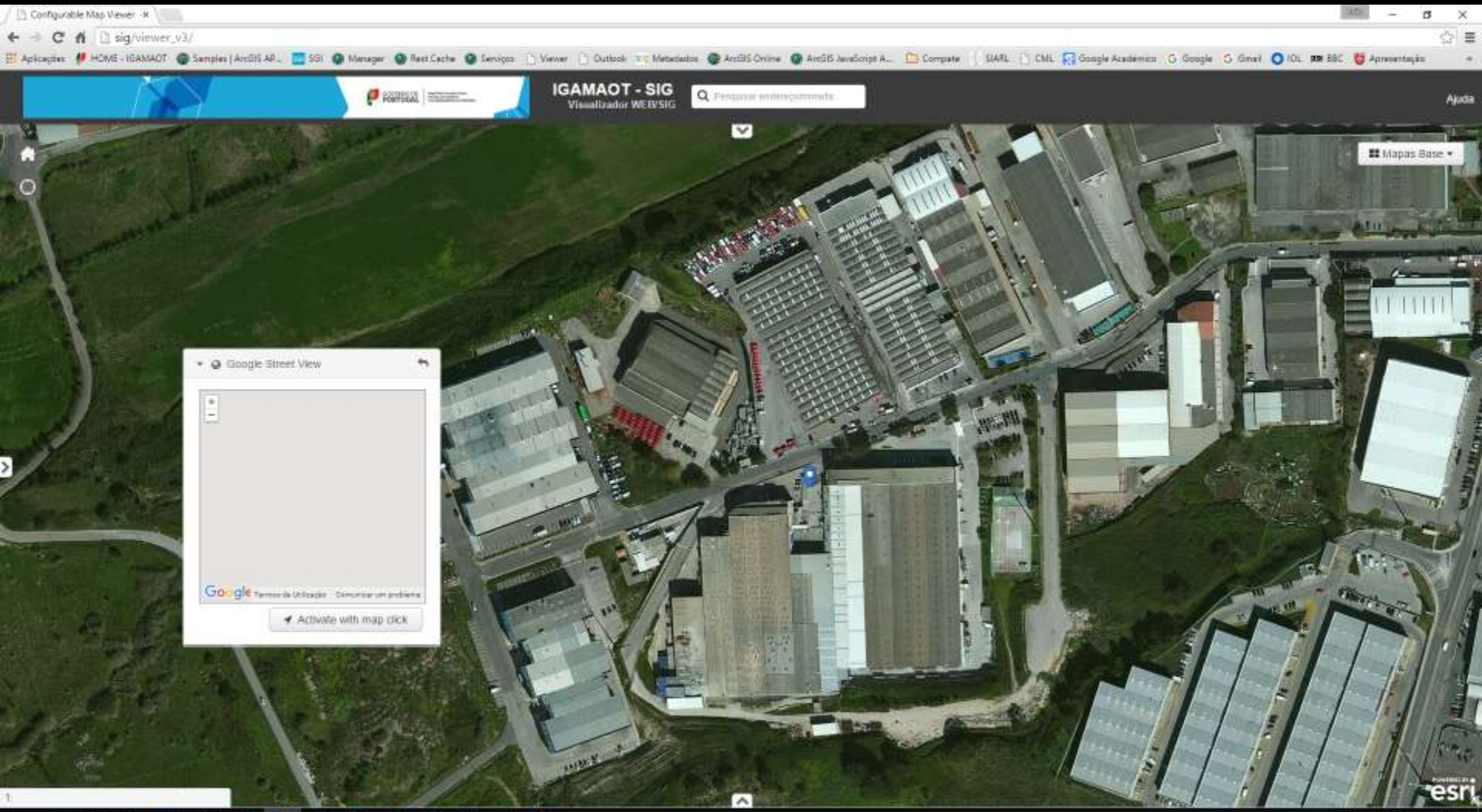
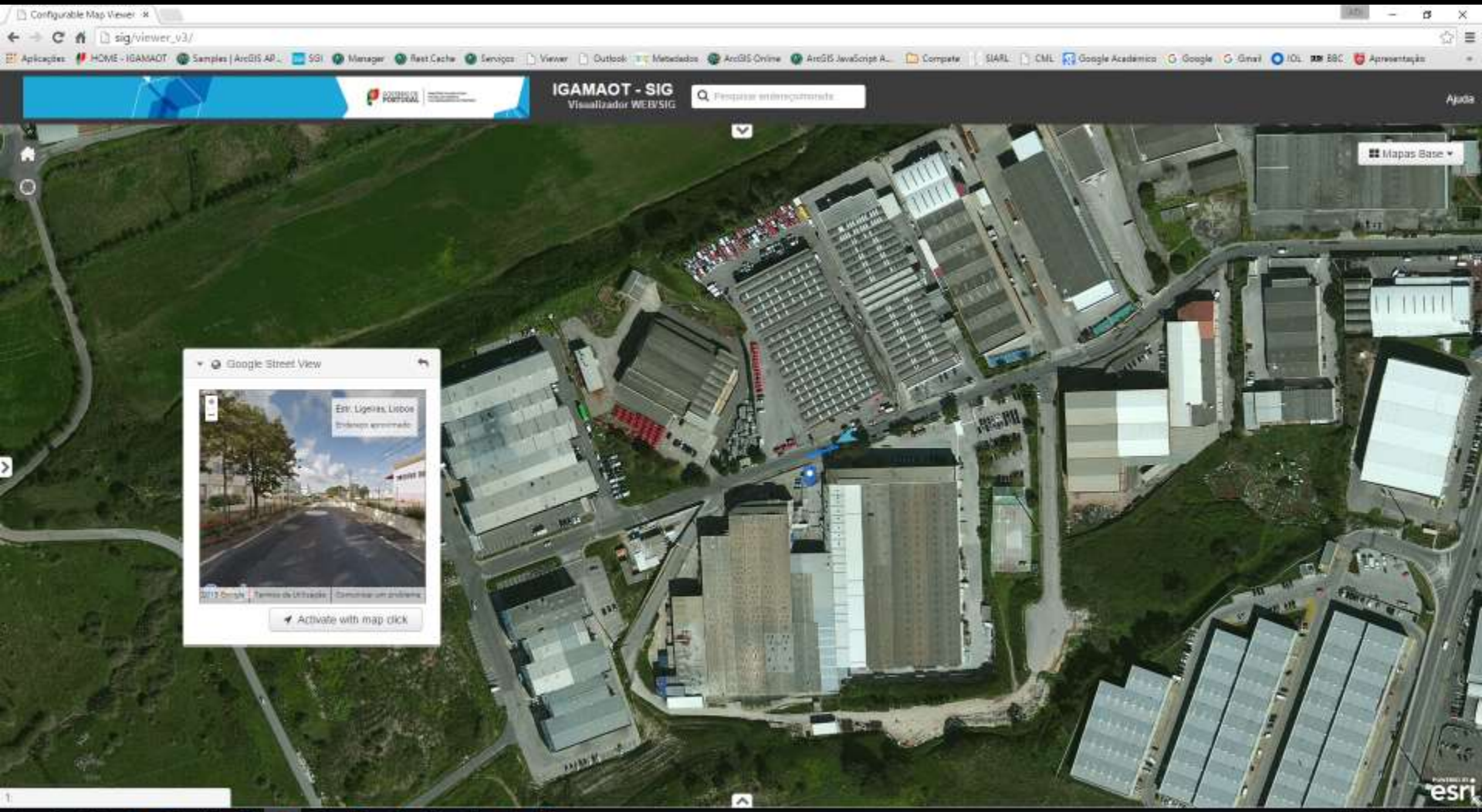
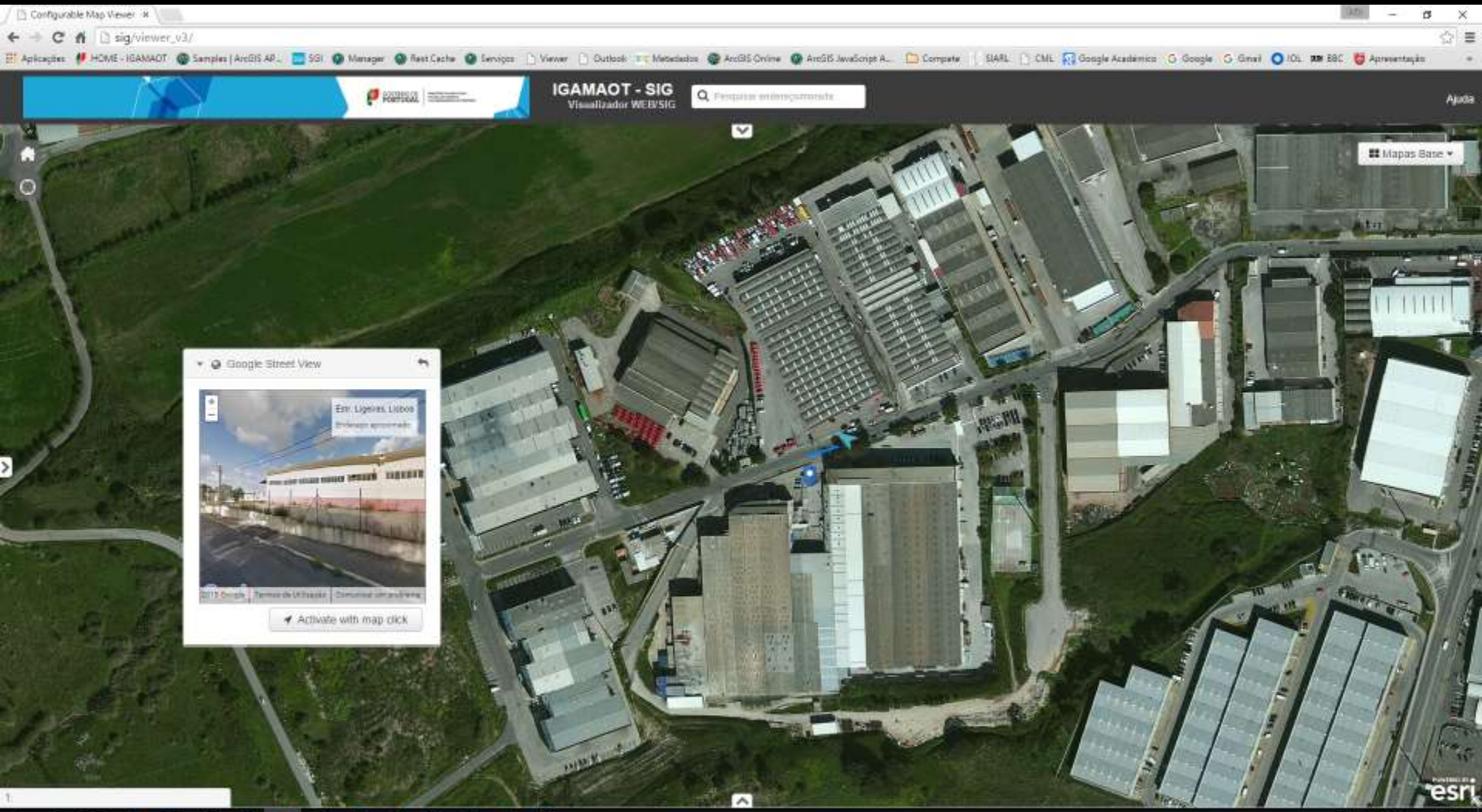
Google Street View (floating toolbox)



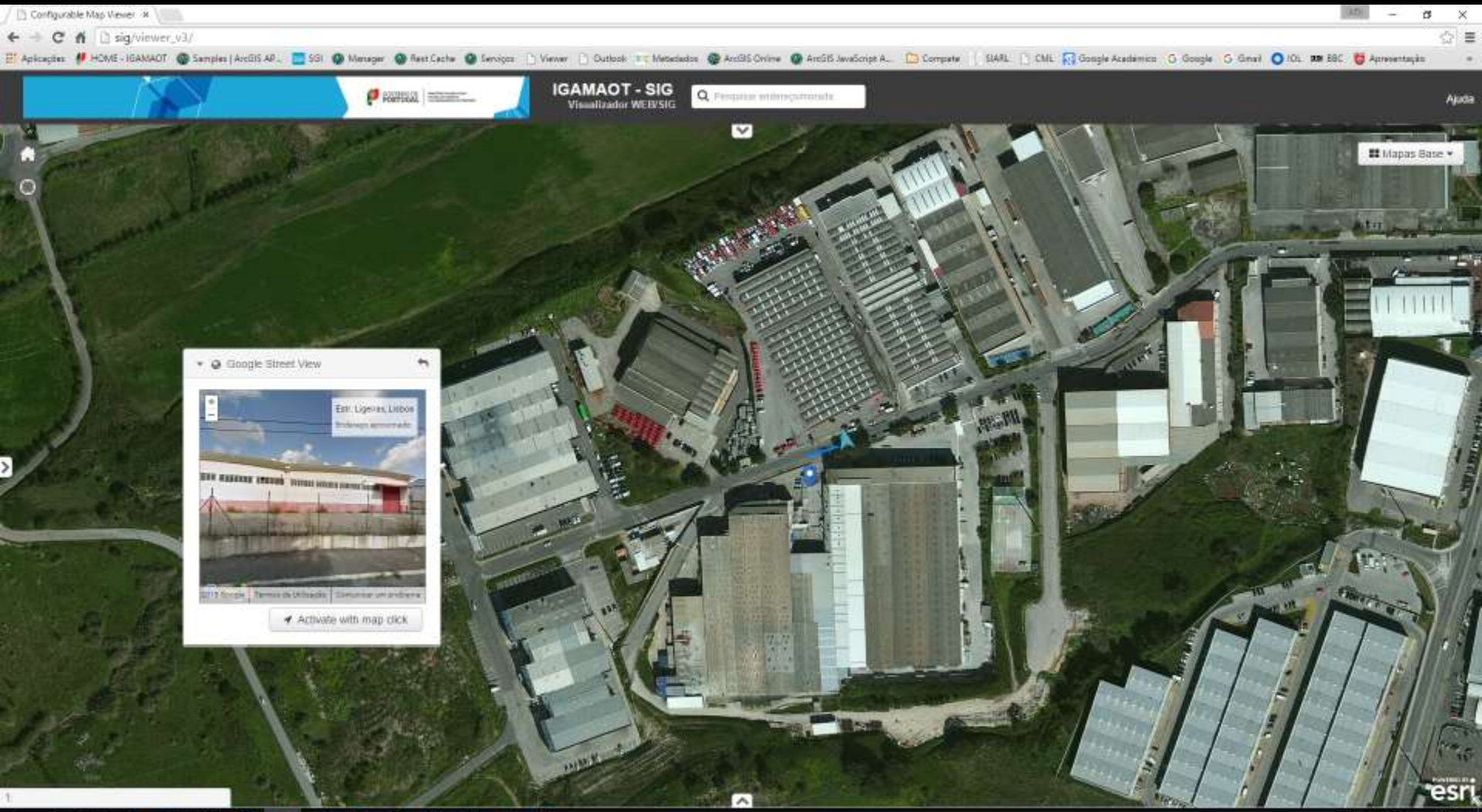
Viewer
Tools
Google Street View (floating toolbox)



Viewer
Tools
Google Street View (floating toolbox)

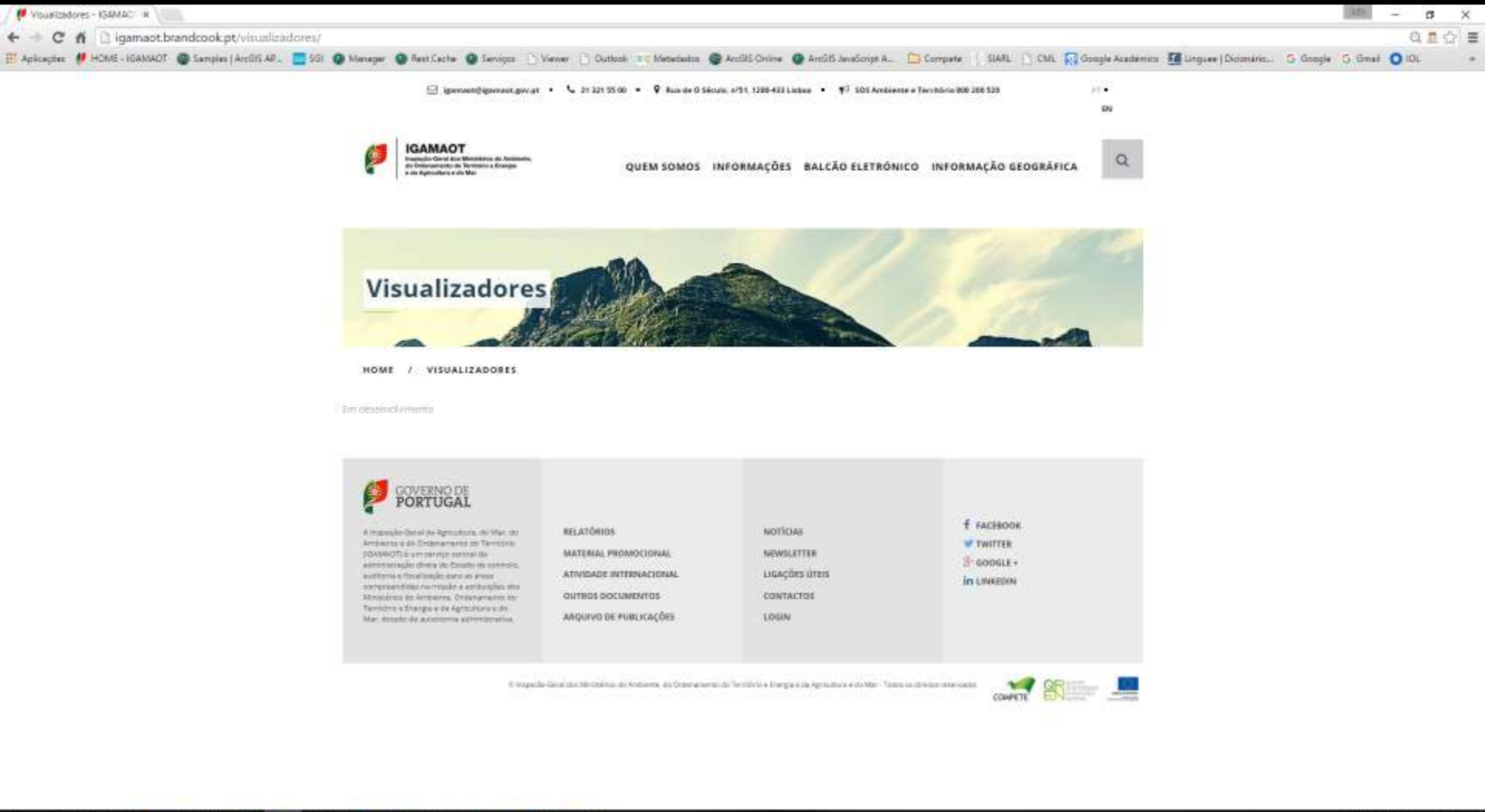


Viewer
Tools
Google Street View (floating toolbox)



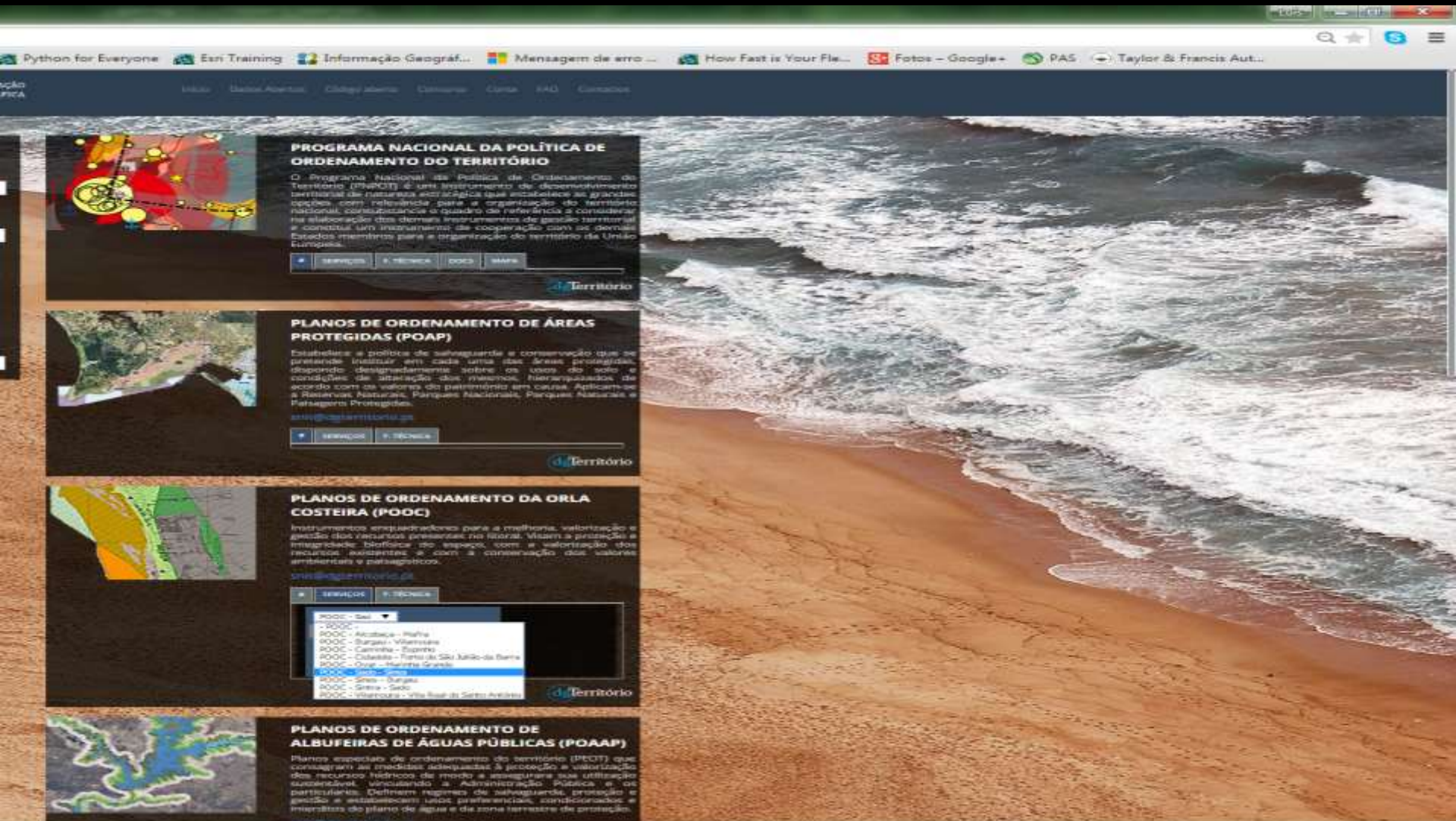
Viewer

… To be published in the IGAMAOT new internet Portal

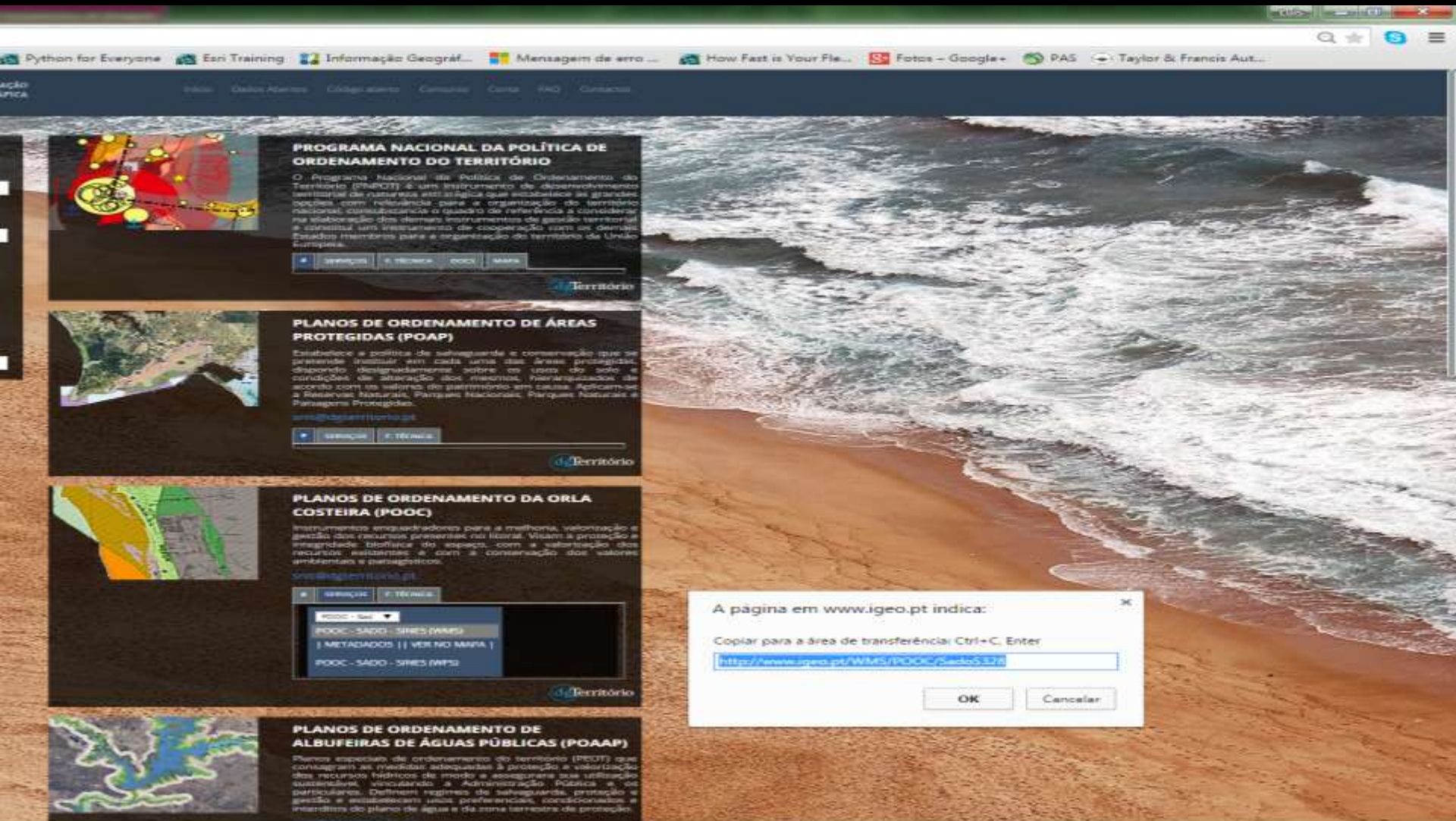


Data disseminations at national / international level

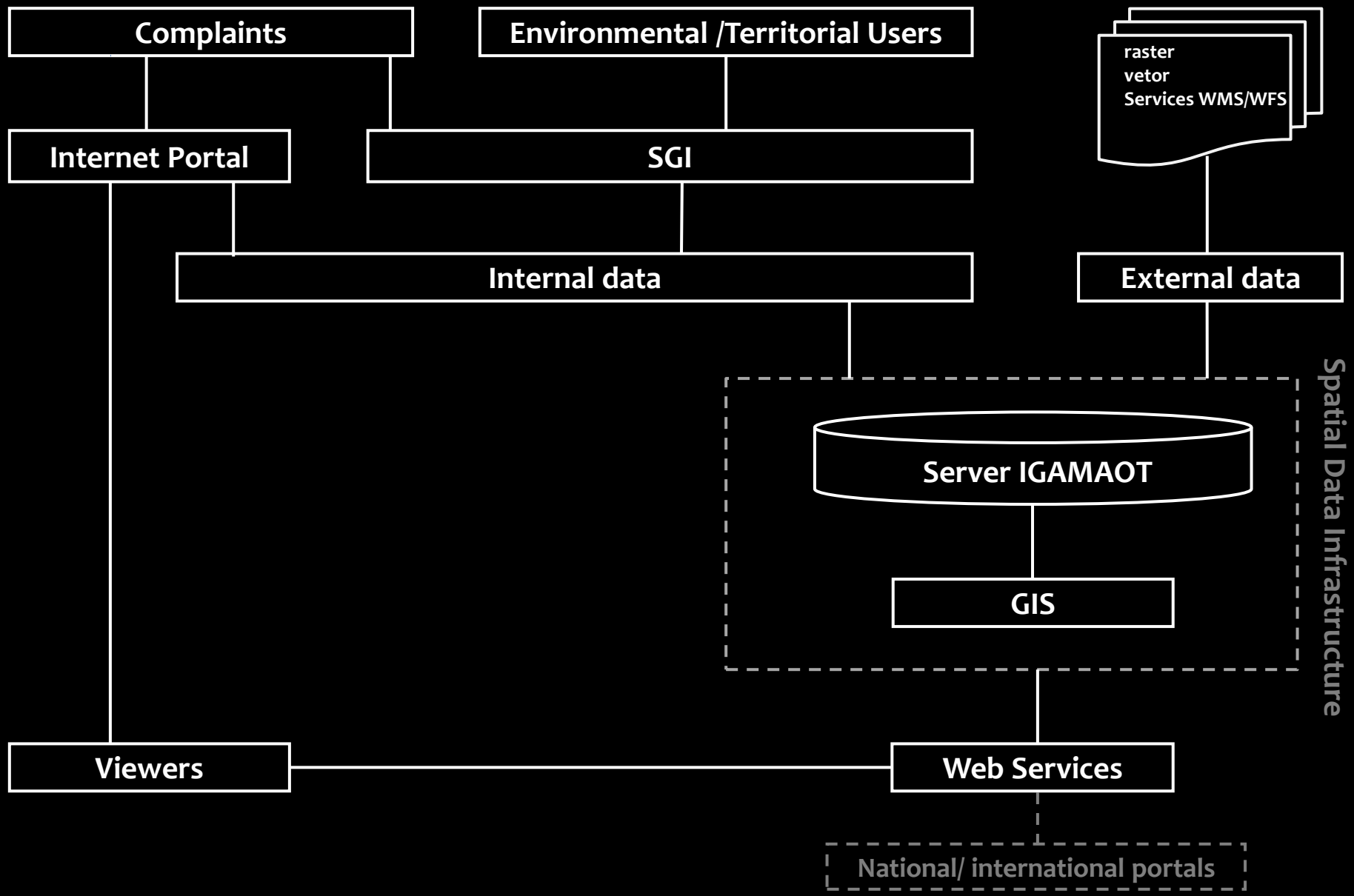
External portal WMS Connections



WMS Connections portal



IGAMAOT Integrated Systems - Schematic synthesis



Spatial Analysis and Conflict Detection Tools

Example of proximity analysis

- **Geoprocessing tools**

Final remarks

Present and future concerns

Geoprocessing Tools

- example: IPPC proximity to Protected Areas in Portugal

Geoprocessing Tools

- example: IPPC proximity to Protected Areas in Portugal

IPPC - Integrated Pollution Prevention and Control

Geoprocessing Tools

- example: IPPC proximity to Protected Areas in Portugal

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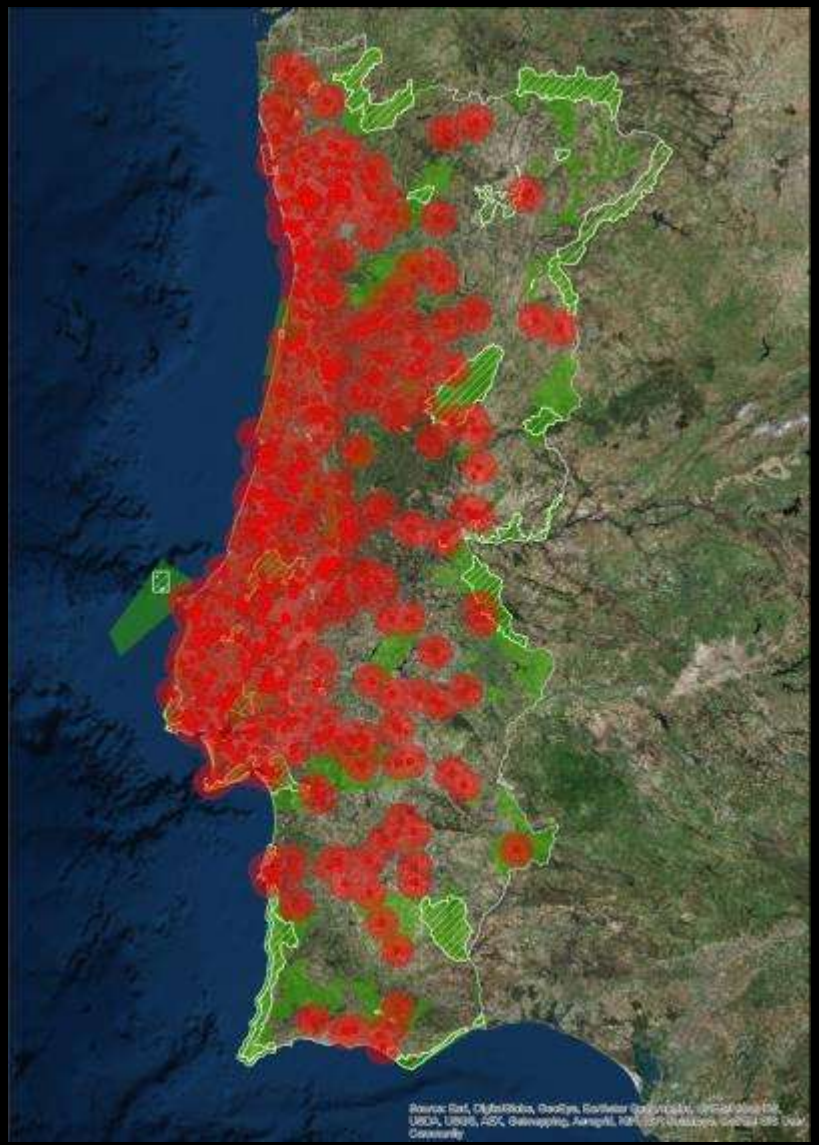
Geoprocessing Tools

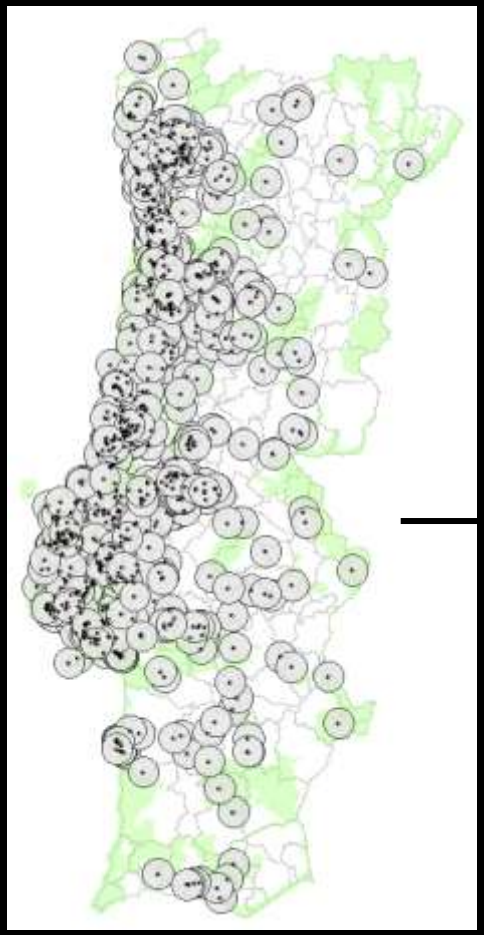
- example: IPPC proximity to Protected Areas in Portugal

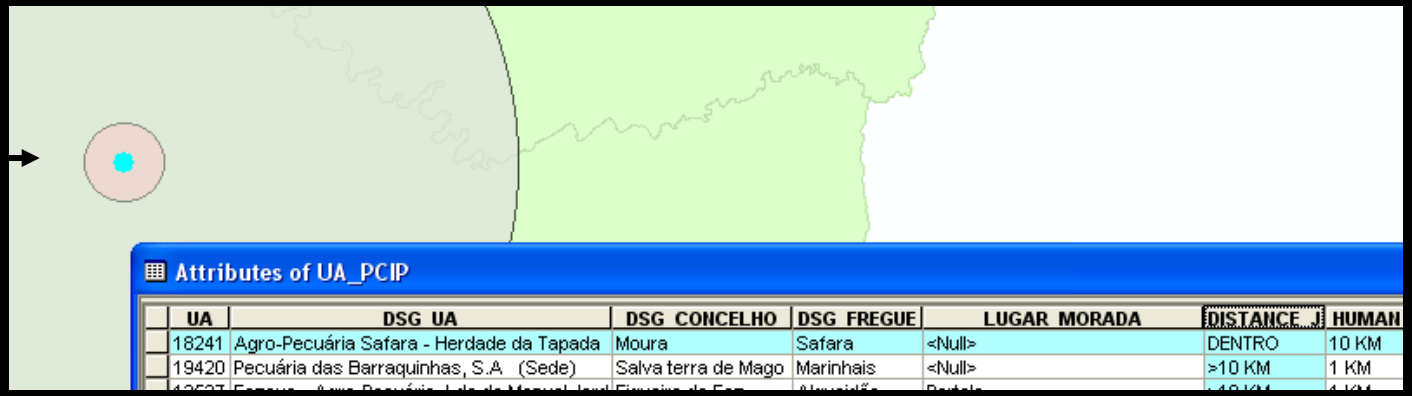


IPPC - Integrated Pollution Prevention and Control

Geoprocessing Tools

- How has it been done? (examples: distance to PA, SPA and SCI)



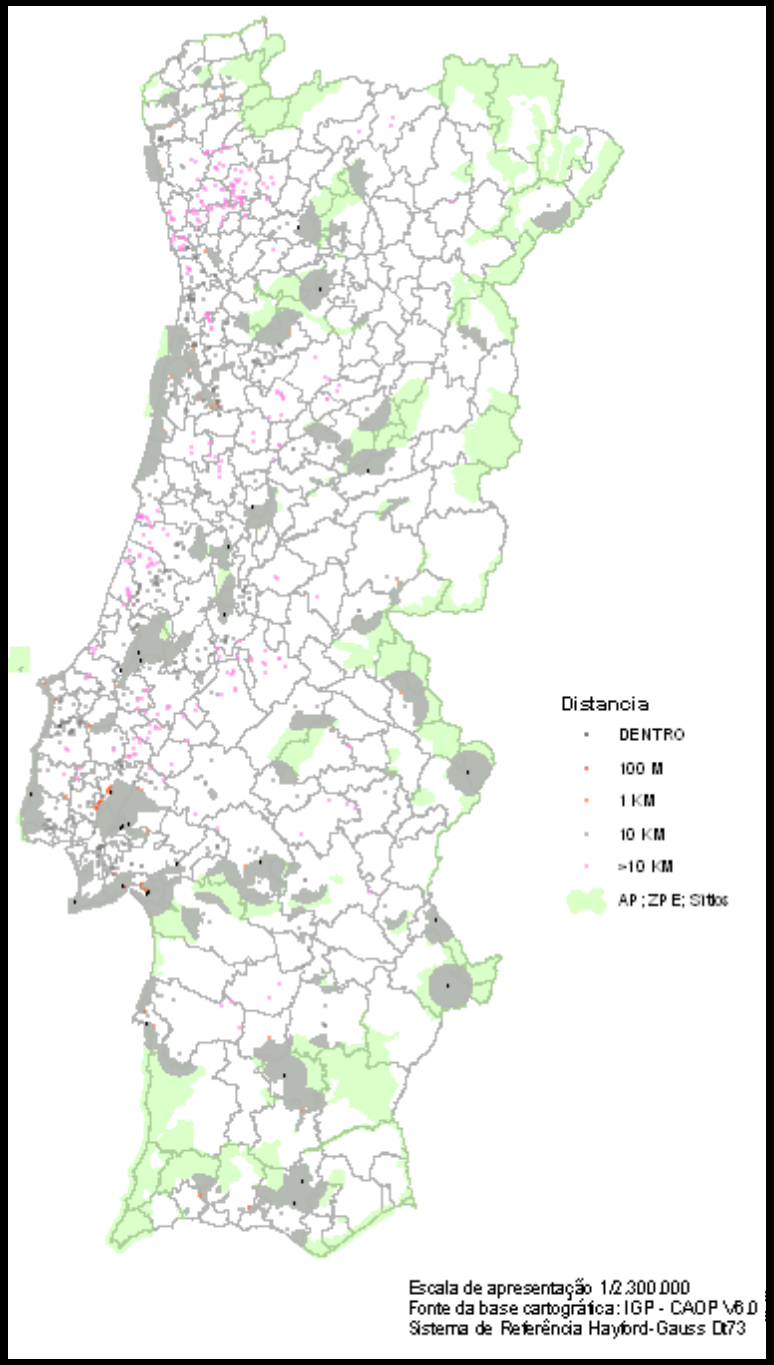


Attributes of UA_PCIP

UA	DSG_UA	DSG_CONCELHO	DSG_FREGUE	LUGAR_MORADA	DISTANCE_J	HUMAN
18241	Agro-Pecuária Safara - Herdade da Tapada	Moura	Safara	<Null>	DENTRO	10 KM
19420	Pecuária das Barraquinhas, S.A (Sede)	Salva terra de Mago	Marinhais	<Null>	>10 KM	1 KM

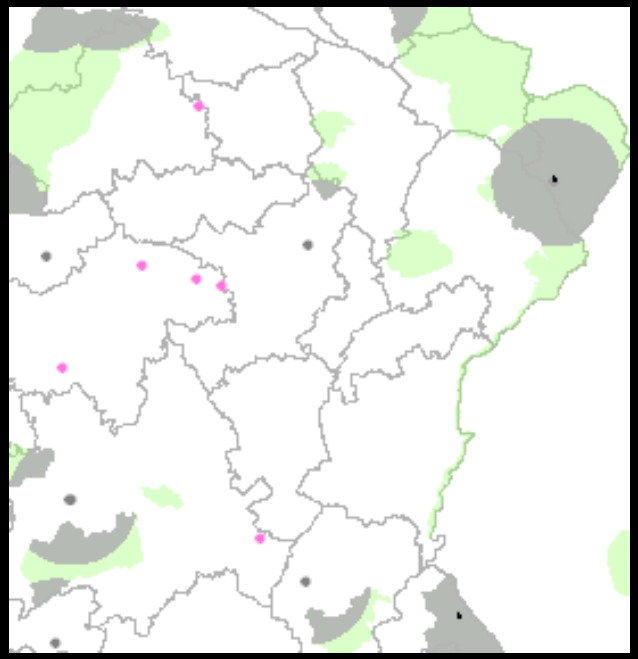
Geoprocessing Tools

- Proximity analysis for Portugal
  - IPPC vrs. Protected Areas



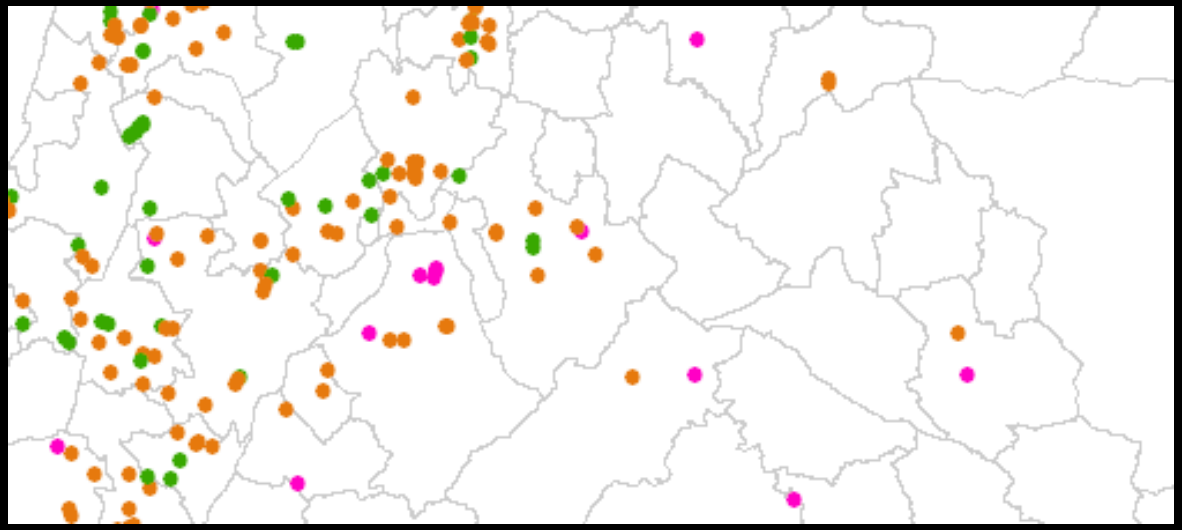
Geoprocessing Tools

- Proximity Analysis: Buffering IPPC Facilities distance to Protected Areas (PA), Special Protected Areas (SPA) and Sites of Community Importance (SCI)
  - Distance between facility and PA, SPA and SCI is:
    - less than 100 m
    - between 100 m and 1 km
    - between 1 km and 10 km
    - more than 10 km
    - within the boundaries of the sensitive area



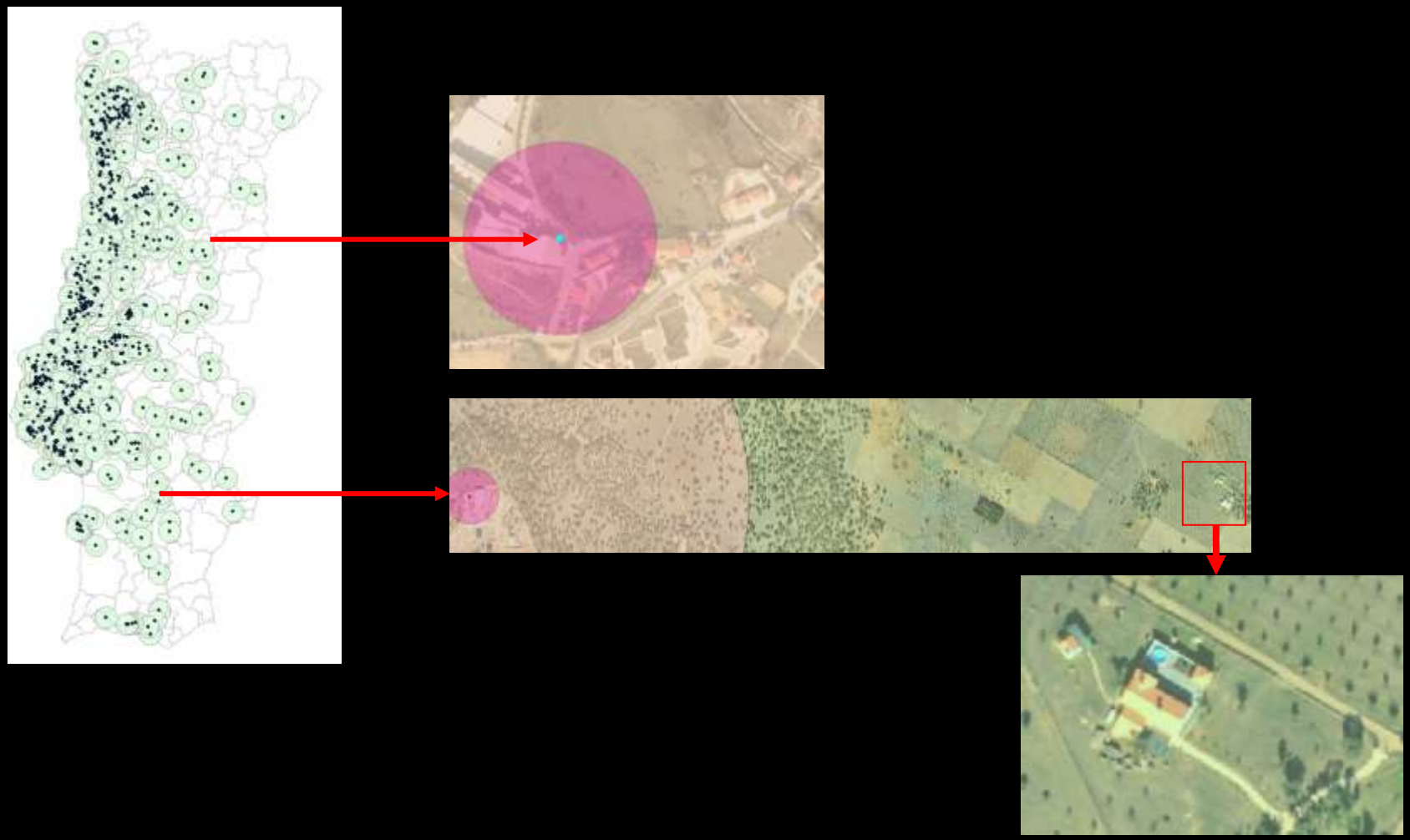
Geoprocessing Tools

- Proximity Analysis: Buffering IPPC Facility distance to Human occupation
  - less than 100 m
  - between 100 m and 1 km
  - between 1 km and 10 km
  - more than 10 km



Geoprocessing Tools

- How has it been done? (examples: distance to Human occupation)



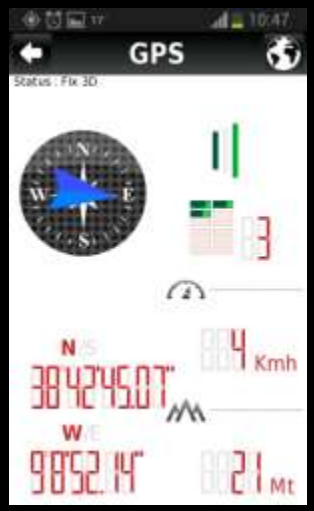
Main errors identified

Coordinates:

- Inappropriate response of GPS/GLONASS satellite;
- Bad position of aerial photo;
- Misunderstanding between Lat / Long or +/- ;
- Insertion error (cause: manual);
- Inexistence of user validation.

Main errors identified

Inappropriate response of GPS/GLONASS satellite



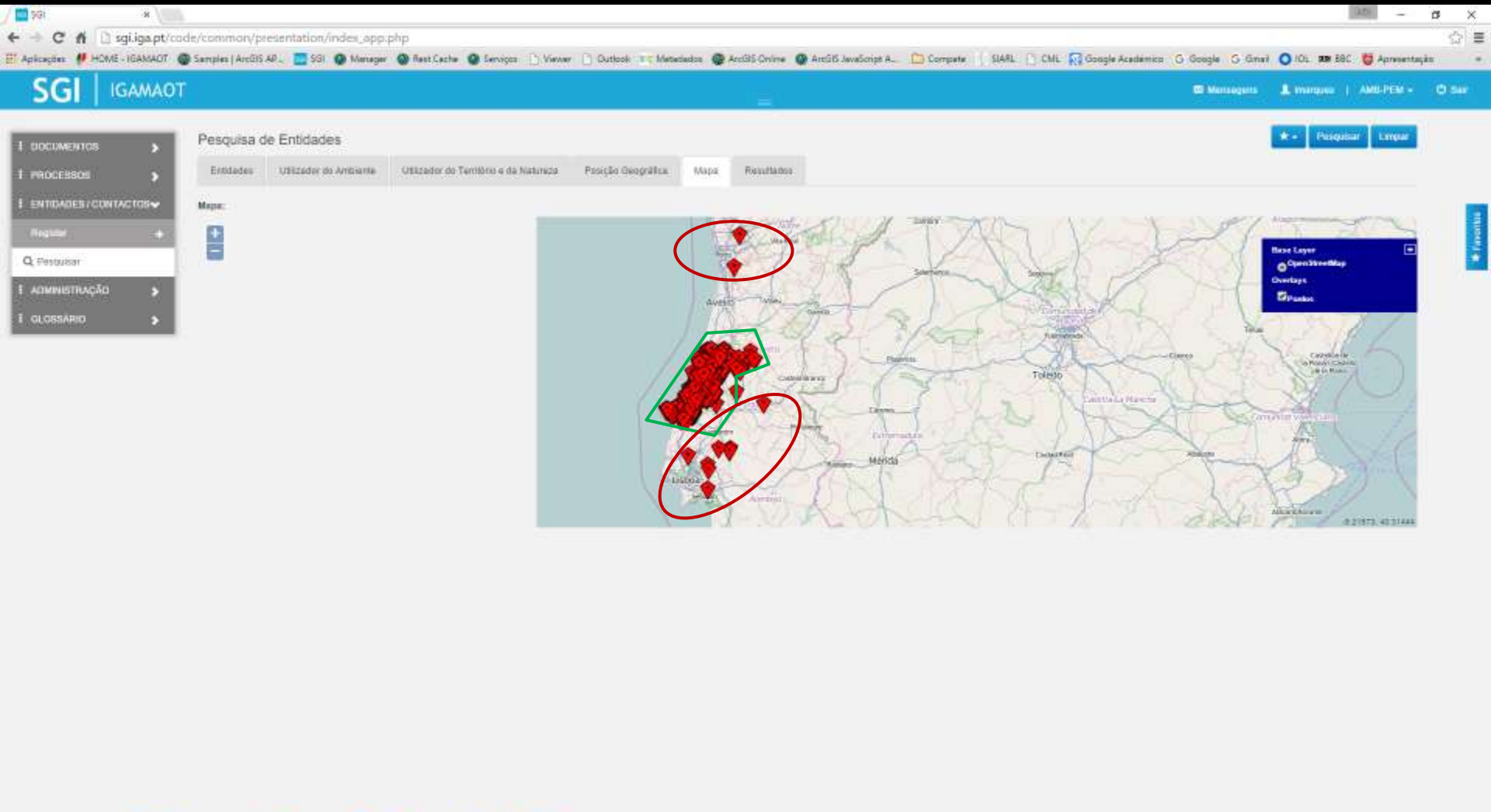
Main errors identified
Bad position of aerial photo

Main errors identified

Insertion error: Misunderstanding between Lat or Long / + or - …

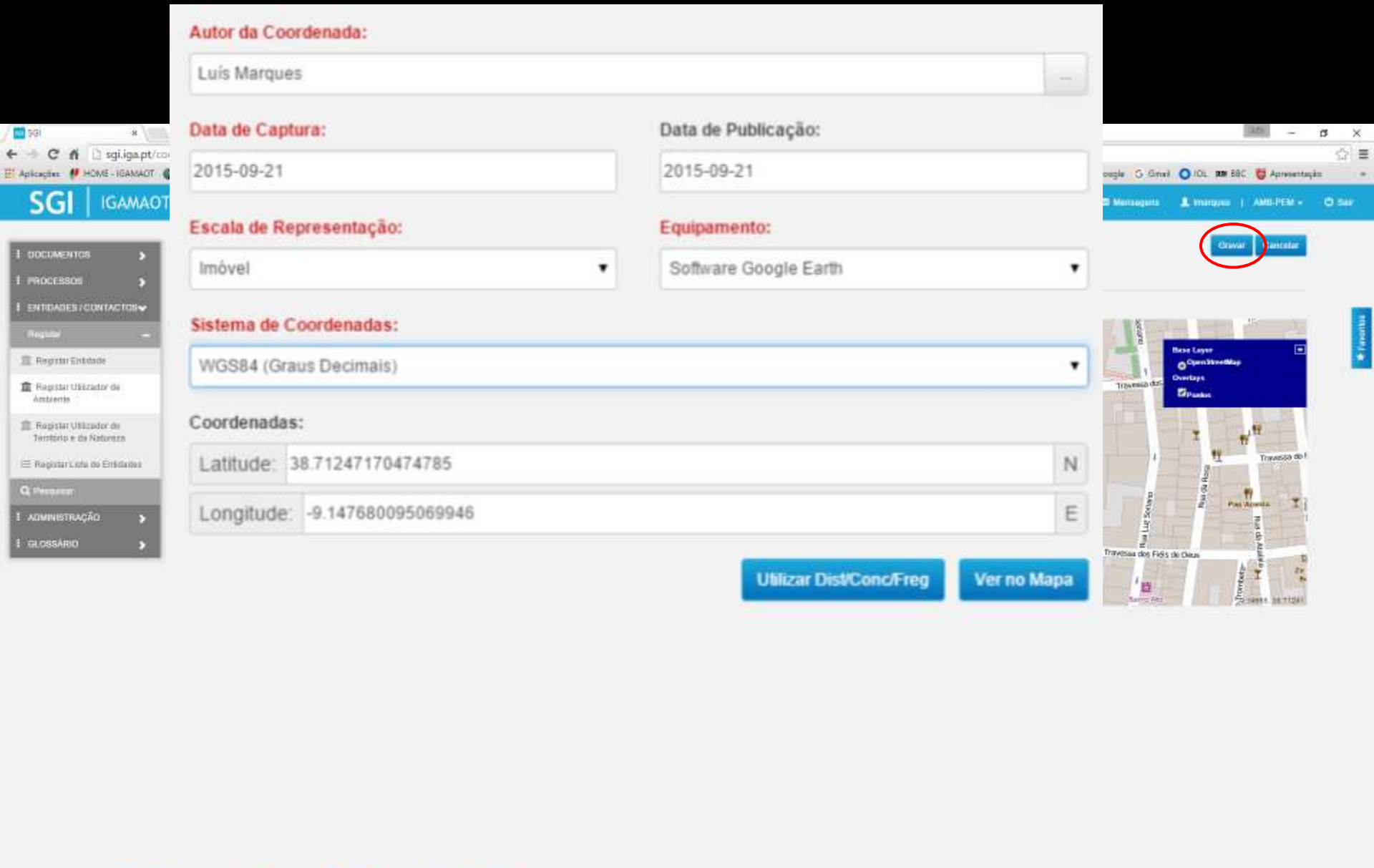
Search for Leiria district

Errors



Main errors identified

User validation (previous inexistence)



Final remarks

IGAMAOT is in a transition period concerning the system(s) data acquisition, integration and dissemination (Database, Spatial Data Infrastructure; GIS and Data Visualization through: Web Services / Viewers / Geobrowsers);

IGAMAOT developed the capability to publish (internal) and integrate (external) geographical information (national and international) directly from the producer in real time (WMS/WFS);

Improved cooperation between entities at national and international level through spatial data integration and interoperability;

The development of a Spatial Data Infrastructure is essential to spatial analysis and conflict detection, regarding IGAMAOT activity, especially concerning: Planning, Reporting and monitoring;

Final remarks

Better efficiency through the development of tools for systematic processes and routines, within GIS;

Provide tools for geographic information visualization and analysis for non GIS users by giving access to spatial data through IGAMAOT viewer or geobrowsers (such as Google Earth);

Implementation of common standards and metadata (within INSPIRE directive);

Gathering spatial data through geographical viewers (complaints);

The challenge is now to debate whether the information produced within IGAMAOT should be available to the main public.

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Susana Silva: ssilva@igamaot.gov.pt

Thank you

IGAMAOT – Inspeção-Geral dos Ministérios do Ambiente, ordenamento do território e Energia e da Agricultura e do Mar

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