

Conclusions

- **Semantic Geospatial Systems:**
 - Research Prototypes
 - Commercial Systems

- **Next topic:** Applications of Linked Geospatial Data

Applications of Linked Geospatial Data

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Existing applications of linked geospatial data (1/2)

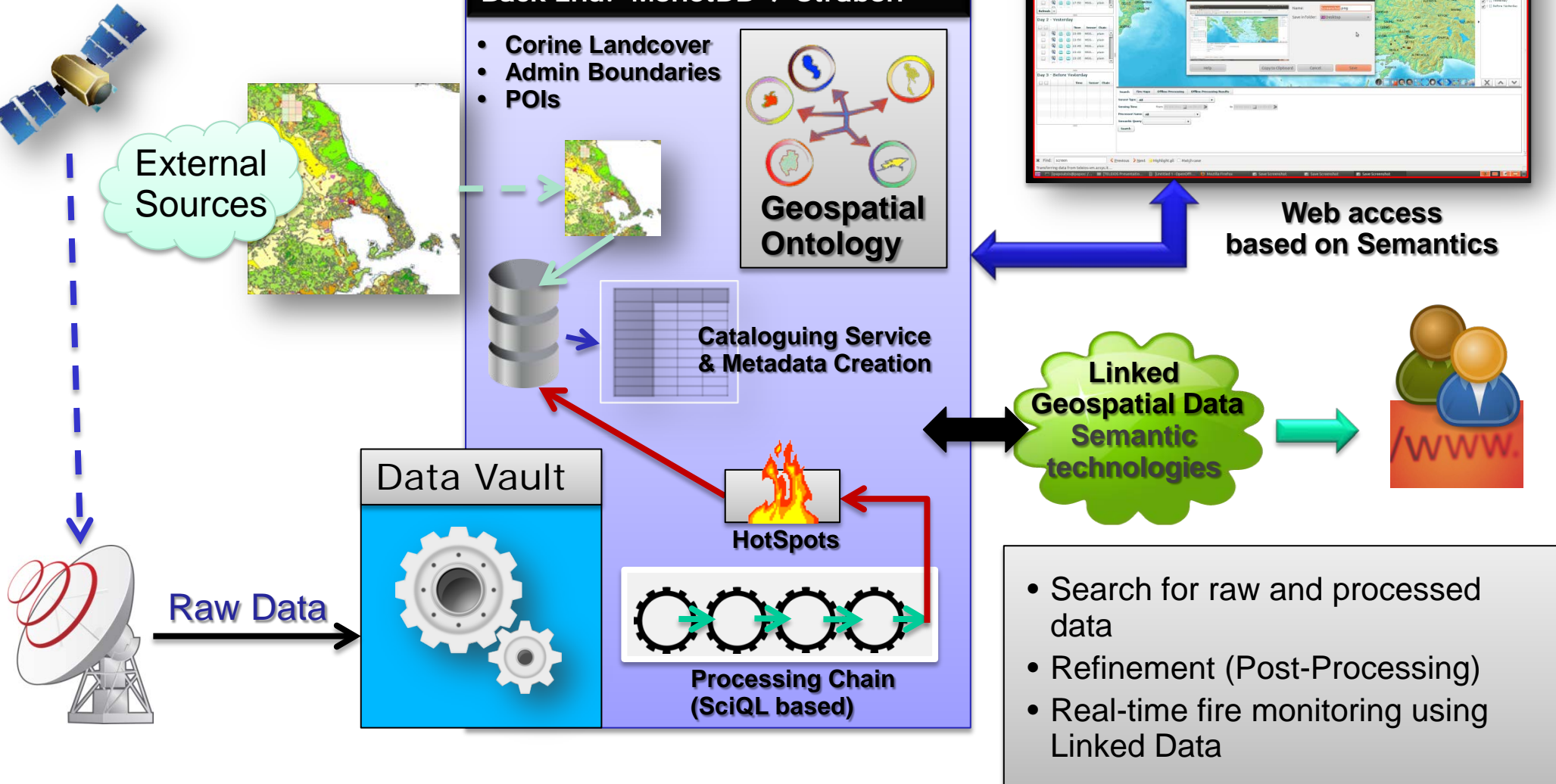
- Linked Sensor Middleware
 - Utilizing Virtuoso as backend
 - Available at <http://ism.deri.ie>
- Ordnance Survey
 - Utilizing an RDF store provided by Talis as backend
 - Available at <http://bis.clients.talis.com/>
- SensorGrid4Env
 - Utilizing Strabon as backend
 - Demo available at <http://webgis1.geodata.soton.ac.uk/flood.html>
- TELEIOS
 - Fire monitoring service performed by the National Observatory of Athens
 - Utilizing Strabon as backend
 - Demo available at <http://test.strabon.di.uoa.gr/NOA/>
- ...

Fire Monitoring Service - Objective

- Design, implement, and validate a **fully automatic fire monitoring processing chain**, for **real time fire monitoring and rapid mapping**, that combines in real-time:
 - i) Volumes of Earth Observation image acquisitions.
 - ii) Volumes of fire monitoring products.
 - iii) Models/Algorithms for data exchange and processing.
 - iv) Auxiliary geo-information.
 - v) Human evidence, in order to draw reliable decisions and generate **highly accurate fire products**.

Fire Monitoring Service

Eumetsat @ 9.5°East

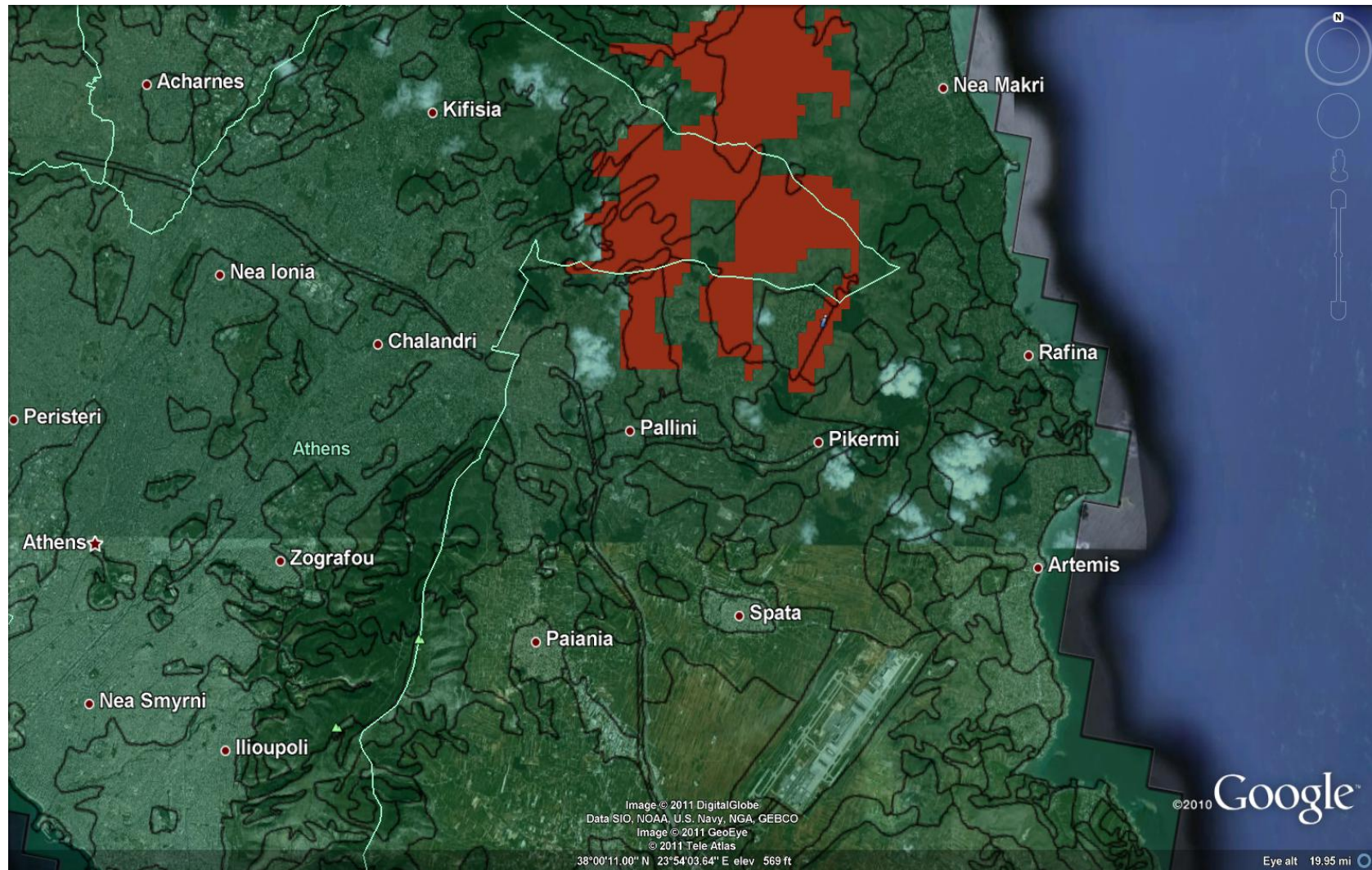


- Search for raw and processed data
- Refinement (Post-Processing)
- Real-time fire monitoring using Linked Data

Requirements of the Fire Monitoring Service

- Need for modeling of
 - Geospatial information
 - Temporal information
 - Product metadata
 - Product content
- Need to link to other data sources
 - GIS data
 - Other information on the Web

Linked Data in the context of TELEIOS

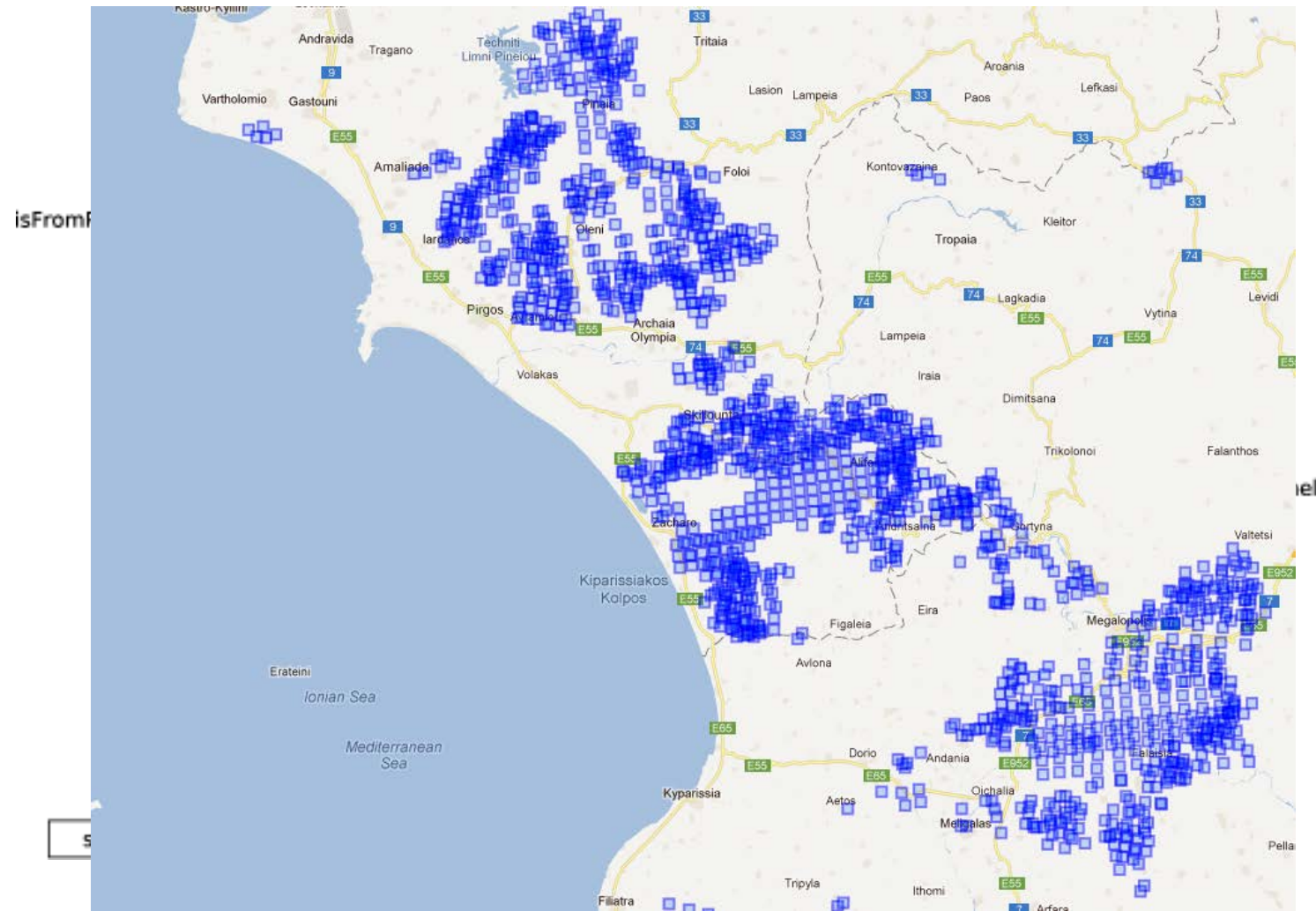


Linked Data used in the Fire Monitoring Service

- Hotspots detected by the National Observatory of Athens (NOA) and other authorities
- Administrative Regions of Greece
- Corine Land Use / Land Cover Nomenclature
- LinkedGeoData
- GeoNames

Linked Open Data (1/4)

- Hotspots



Hotspots

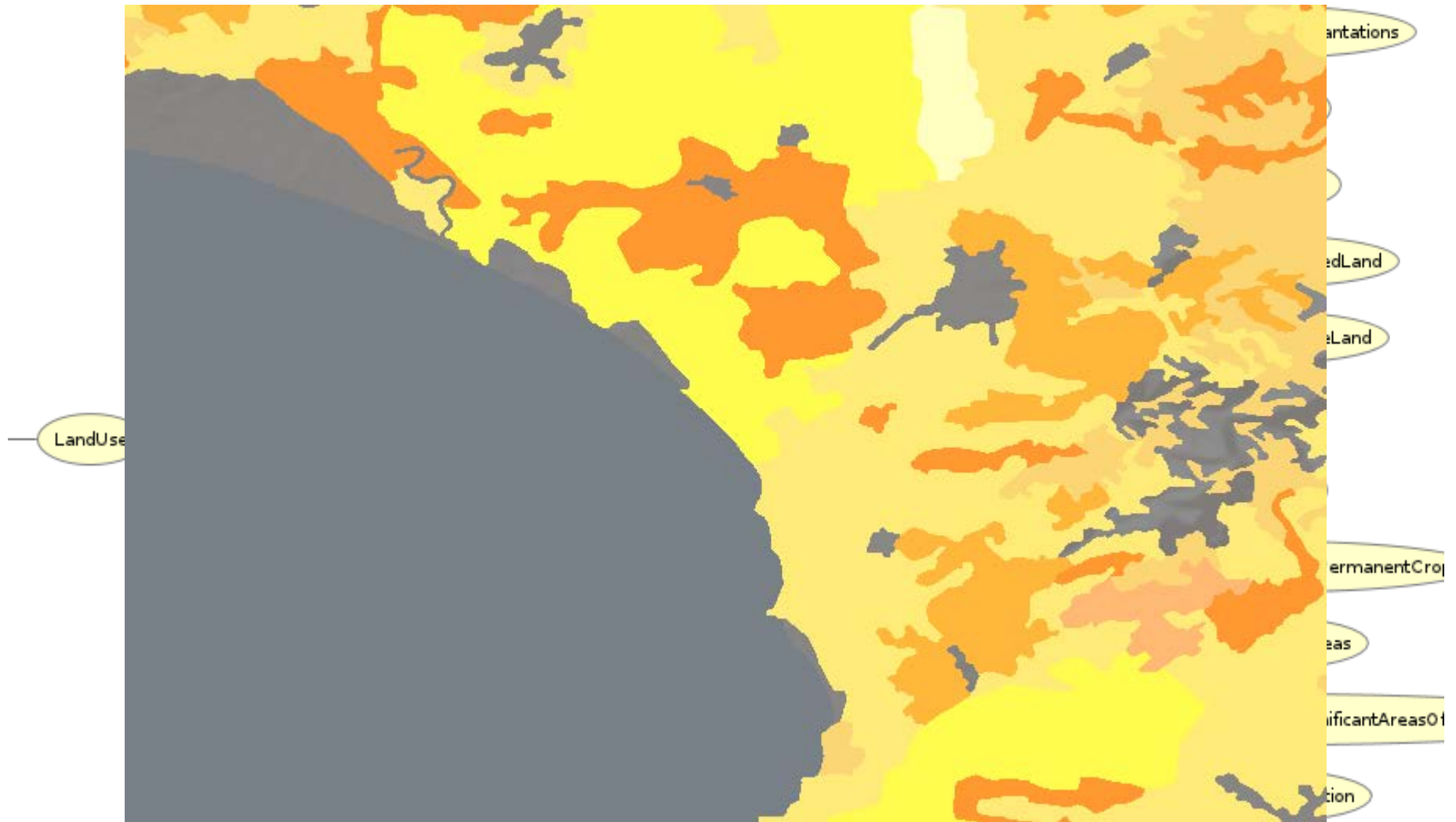
```
noa:Hotspot_15145 rdf:type noa:Hotspot;
noa:isDerivedFromSatellite "METEOSAT9"^^xsd:string;
noa:isDerivedFromSensor "MSG2"^^xsd:string;
noa:hasAcquisitionTime "2007-08-24T14:45:00"
                        ^^xsd:dateTime;
noa:producedFromProcessingChain "StaticThresholds"
                                ^^xsd:string;
noa:hasConfirmation noa:unknown;
noa:hasConfidence "0.5"^^xsd:double;
noa:hasGeometry
    "POLYGON((393801.42 4198827.92, ...,
             393801.42 4198827.92));
    <http://www.opengis.net/def/crs/EPSSG/0/2100>"
    ^^strdf:WKT.
```


Greek Administrative Geography

```
gag:gag003000009002 rdf:type owl:NamedIndividual ;
  rdf:type gag:Dhmos;
  rdfs:label "ΔΗΜΟΣ ΧΕΡΣΟΝΗΣΟΥ"@el;
  rdfs:label "Hersonissos";
  noa:hasYpesCode "9309"^^xsd:integer;
  strdf:hasGeometry "MULTIPOLYGON (((25.37
                                35.34, ..., 25.21
                                35.47)))"^^strdf:WKT;
  gag:isPartOf gag:gag003000000101.
```

Linked Open Data (3/4)

- Corine Land Use / Land Cover

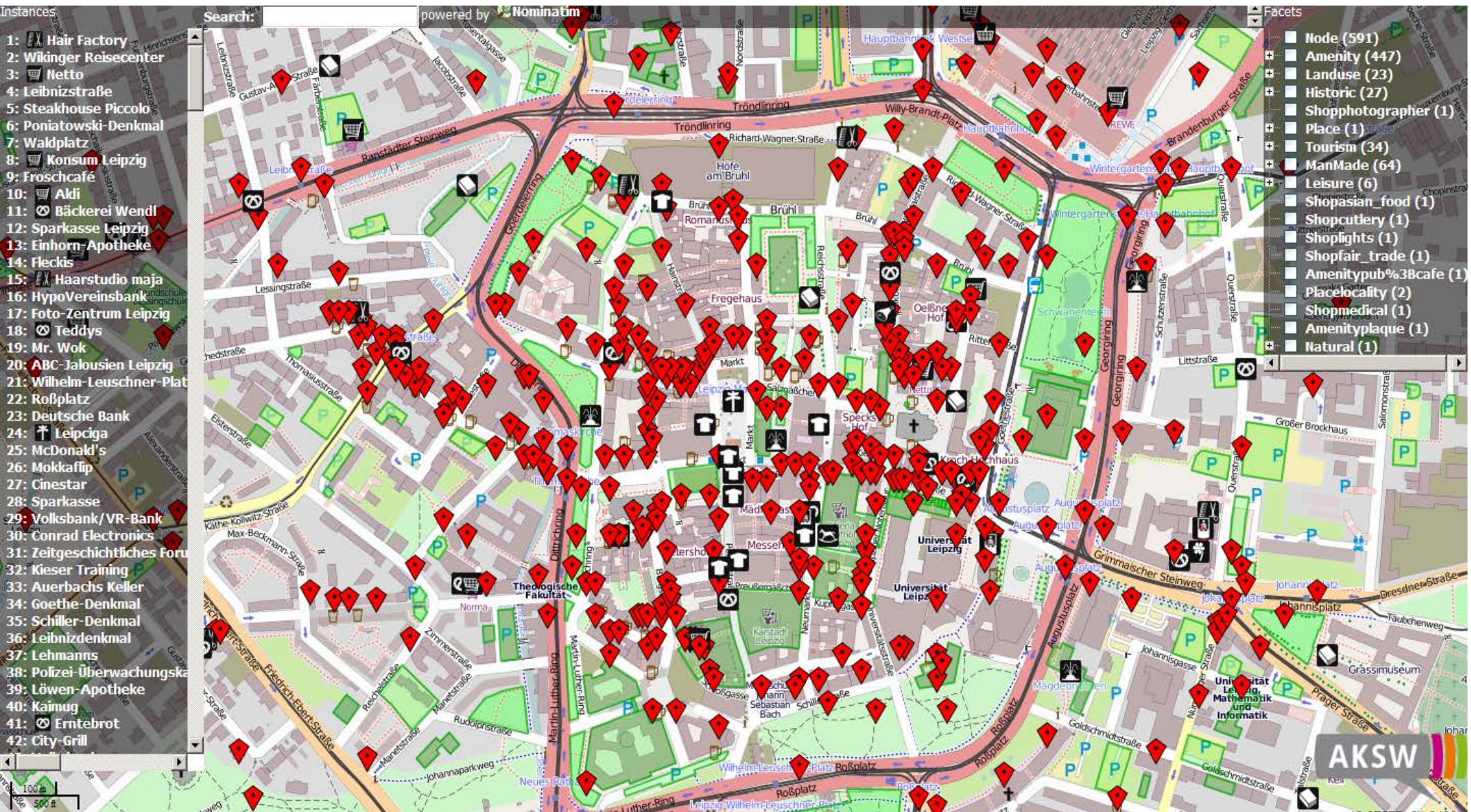


Corine Land Use / Land Cover

```
noa:Area_24015134    rdf:type noa:Area ;  
                    noa:hasCode "312"^^xsd:decimal;  
                    noa:hasID "EU-203497"^^xsd:string;  
                    noa:hasArea_ha "255.580790497"^^xsd:double;  
                    noa:hasGeometry "POLYGON((15.53 62.54, ...,  
                                           15.53 62.54))"^^strdf:WKT;  
                    noa:hasLandUse noa:coniferousForest.
```


Linked Open Data (4/4)

- LinkedGeoData



LinkedGeoData

```
lgd:node741703450 rdf:type lgdo:Node;
                  rdf:type lgdo:Place;
                  rdf:type lgdo:Town;
                  rdfs:label "Зοφορι"@ru;
                  rdfs:label "Ζωφόροι"@el;
                  rdfs:label "Zofori"@en;
                  lgdo:directType lgdo:Town;
                  wgs84:geometry "POINT(25.2704
                                   35.2061)"^^virtrdf:Geometry;
                  wgs84:lat "35.2060912"^^xsd:double;
                  wgs84:long "25.2703858"^^xsd:double;
                  lgdo:contributor lgd:user153221 .
```

Discovering raw data and products

- Retrieve shapefiles that contain acquisitions taken between 12:00 and 12:30 of August 26, 2007 and acquired by sensor MSG2

```
SELECT ?filename
WHERE {
  ?file rdf:type noa:ShpFile .
  ?file noa:hasFilename ?filename .
  ?file noa:hasAcquisitionTime ?sensingTime .
  FILTER( str(?sensingTime) >= "2007-08-26T12:00:00" ) .
  FILTER( str(?sensingTime) <= "2007-08-26T12:30:00" ) .
  ?file noa:isDerivedFromSensor ?sensor .
  FILTER( str(?sensor) = "MSG2" ) .
  ?file noa:producedFromProcessingChain ?chain .
  FILTER( str(?chain) = "StaticThresholds" ) . }
```

Discovering raw data and products

- Retrieve shapefiles that contain acquisitions taken between 12:00 and 12:30 of August 26, 2007 and acquired by sensor MSG2

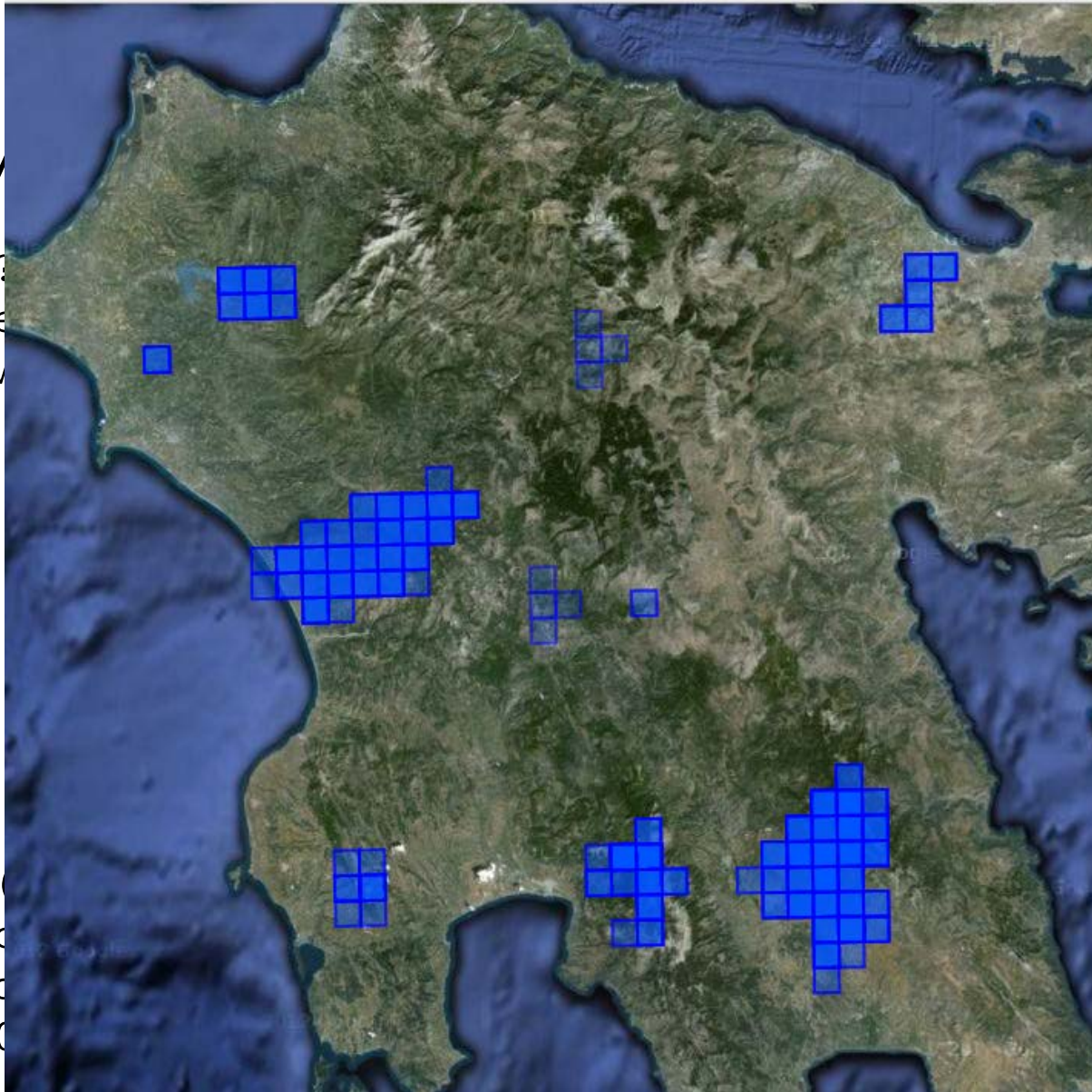
?filename
MSG2_07-08-26_12:00_StaticThresholds.shp
MSG2_07-08-26_12:15_StaticThresholds.shp
MSG2_07-08-26_12:30_StaticThresholds.shp

Creating a map (1/4)

- Get all
24/08/

```
SELECT ?h ?  
?hSatellite  
<http://www  
WHERE { ?h
```

```
FILTER(str  
FILTER(?hAc  
FILTER(str  
36.05, 21.0
```



se at

```
hSensor  
(geo)
```

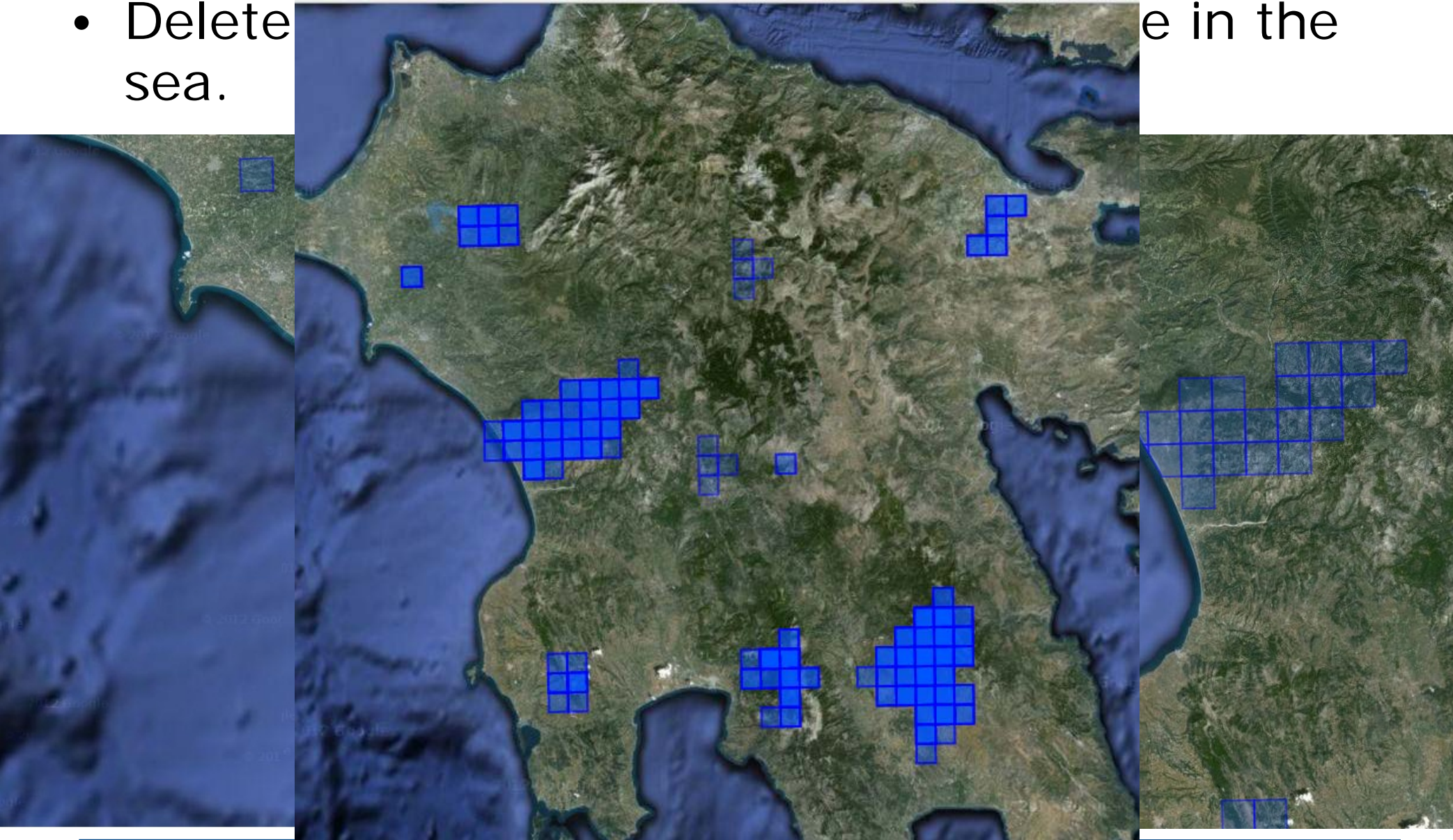
```
;  
n .
```

```
(Time) .  
7 38.36, 23.77  
hGeo)) .
```


Improve product accuracy

- Delete
sea.

e in the



Creating a map (2/4)

- Get all

```
SELECT ?  
WHERE { ?
```



```
?  
F
```

```
F
```

```
F
```

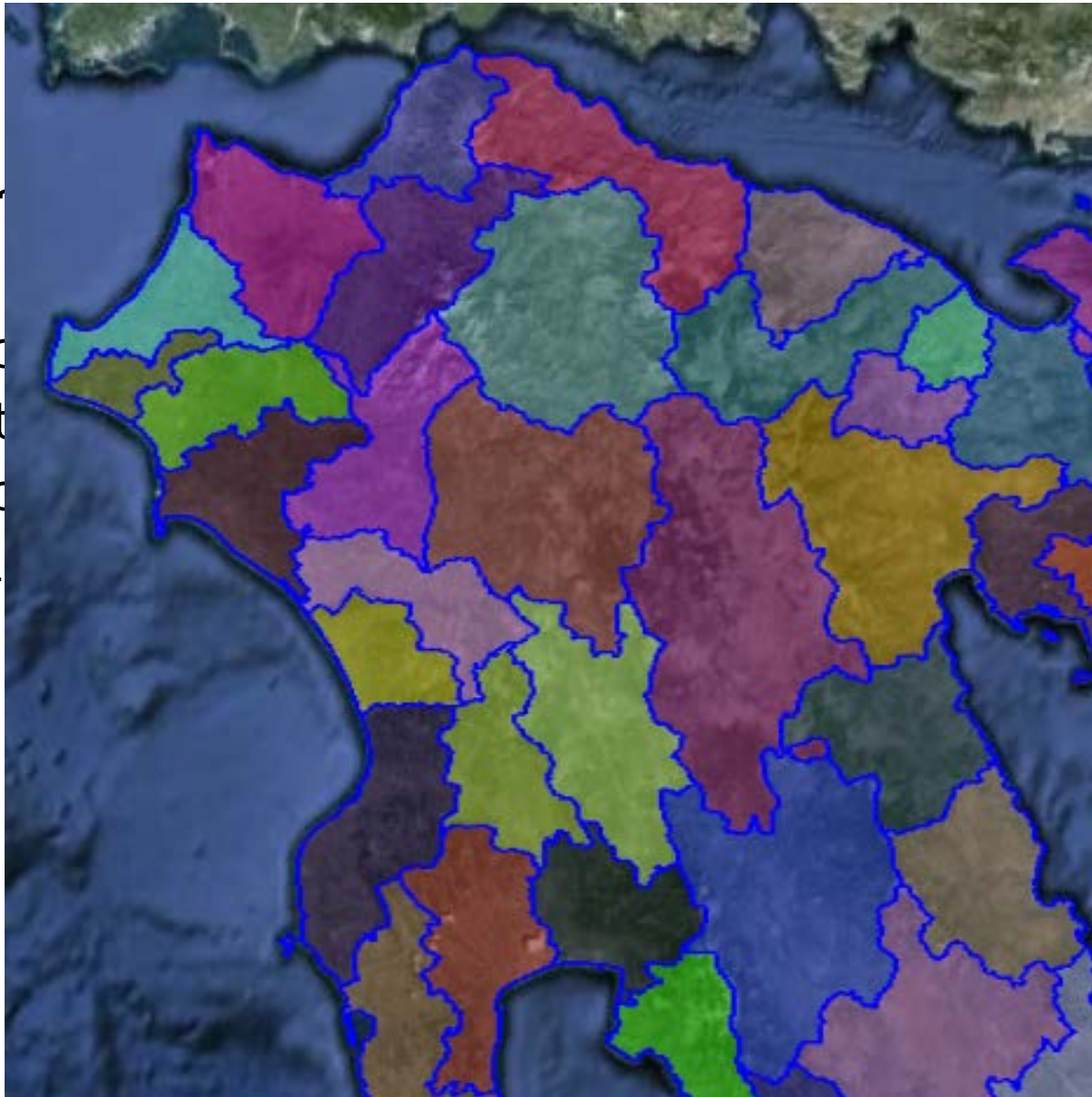
e.

```
( 21.027  
7 36.05,  
36 ) ) "
```

Creating a map (3/4)

- Get all

```
SELECT  
WHERE {  
  ?d rdfs:domain  
  FILTER  
}  
}
```

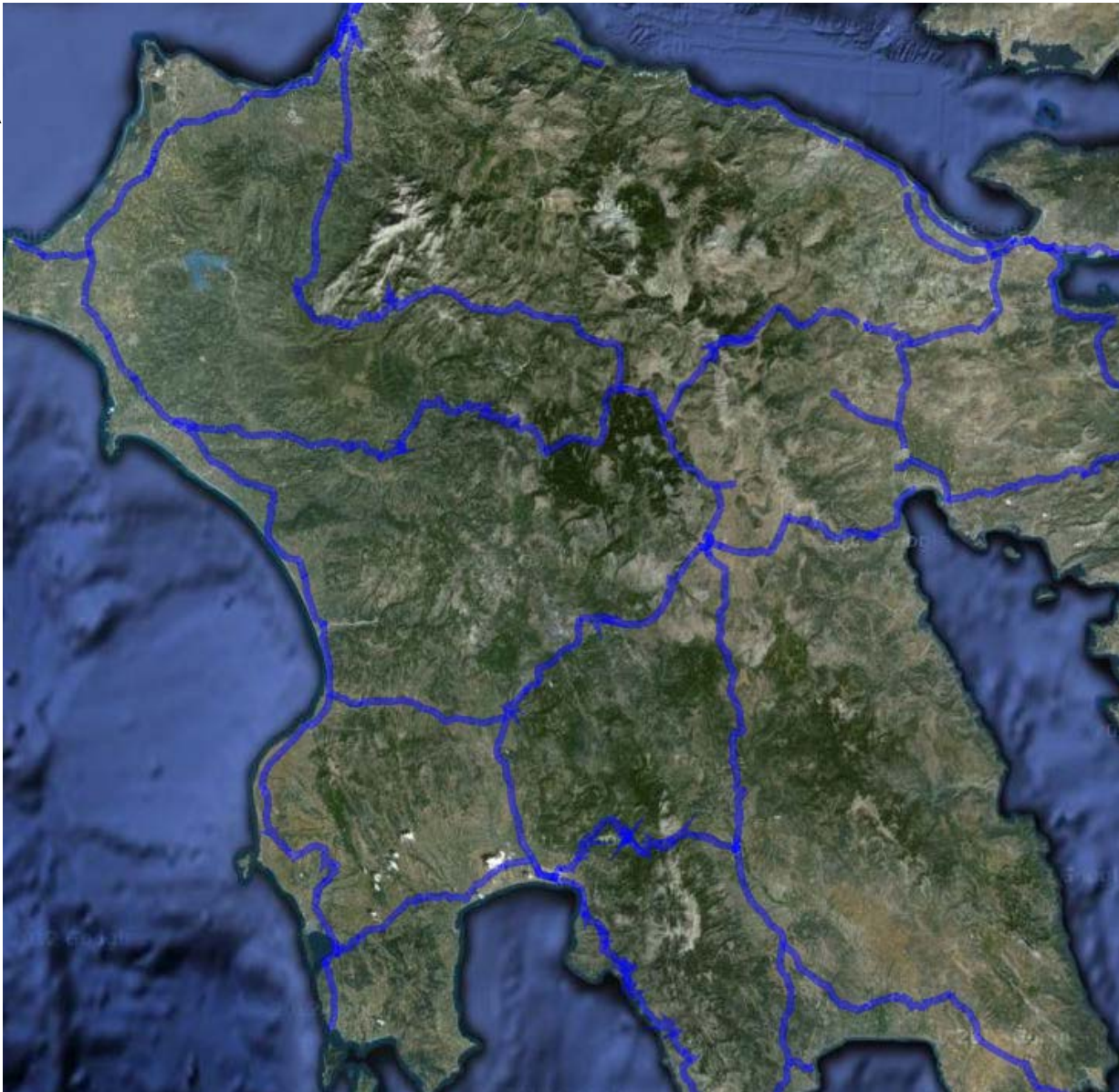


```
027  
.05,  
"^^  
dGeo) ).
```


Creating a map (4/4)

- Get a

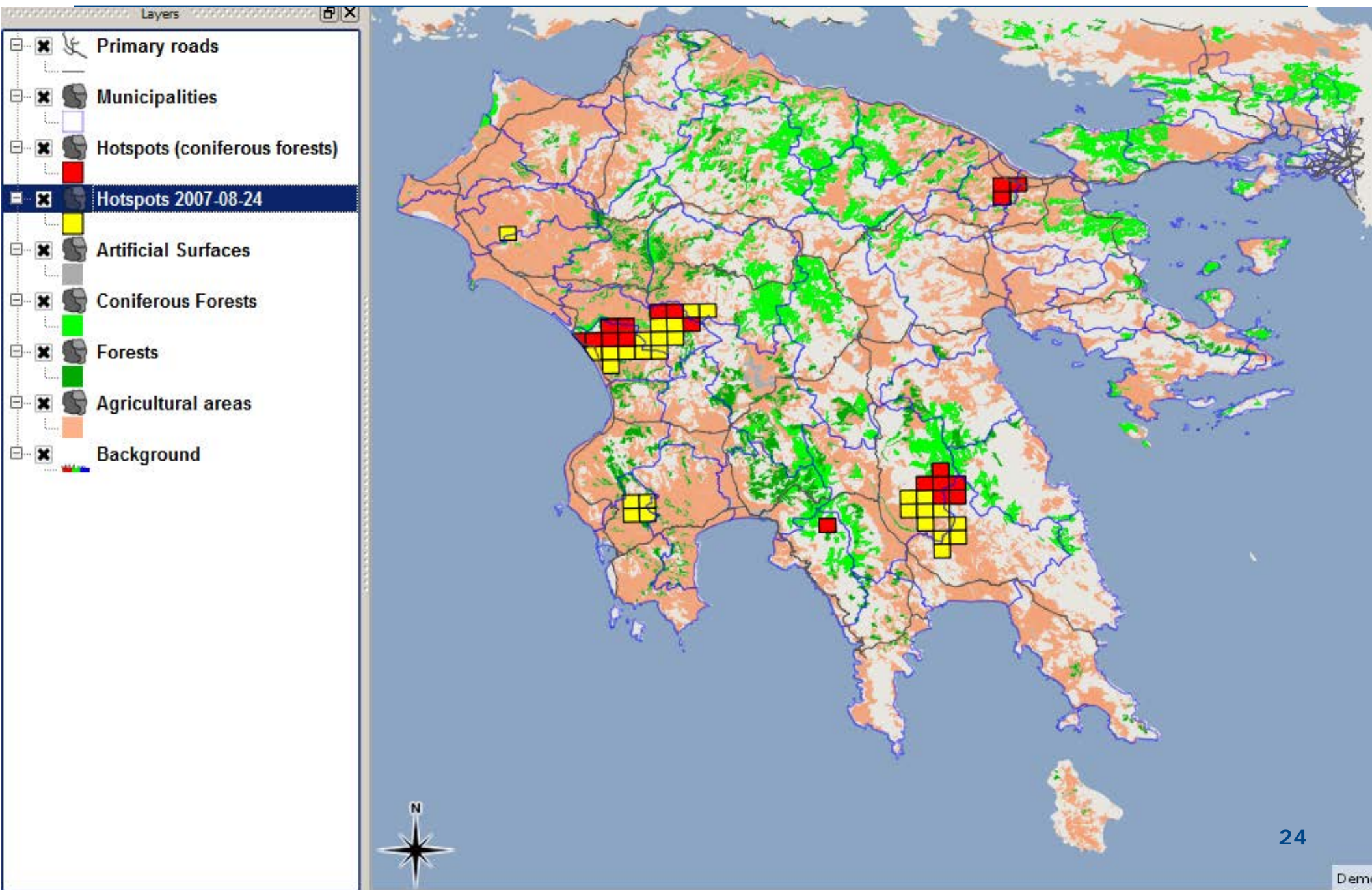
```
SELECT  
WHERE {
```



```
y) .  
GON ( (  
8.36 ,  
6.05 ,  
f : WKT ,
```

```
}
```

Final map



Conclusions

- **Applications using Linked Geospatial Data**
 - **Examples of applications**
 - **NOA Hotspot Detection and Fire Monitoring Service**
 - Datasets used
 - Queries leading to final map creation