

# Data Models and Query Languages for Linked Geospatial Data

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# Tutorial Organization

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**14:30 – 14:45** Introduction

**14:45 – 15:15** Background in geospatial data modeling

**15:15 – 16:00** Geospatial data in RDF - stSPARQL

**16:00 – 16:30** Coffee break

**16:30 – 16:45** Geospatial data in RDF - GeoSPARQL

**16:45 – 17:00** Implemented RDF Stores with geospatial support

**17:00 – 17:50** Geospatial information with description logics, OWL and rules

**17:50 – 18:00** Conclusions, questions, discussion

## Introduction

Presenter: Manolis Koubarakis



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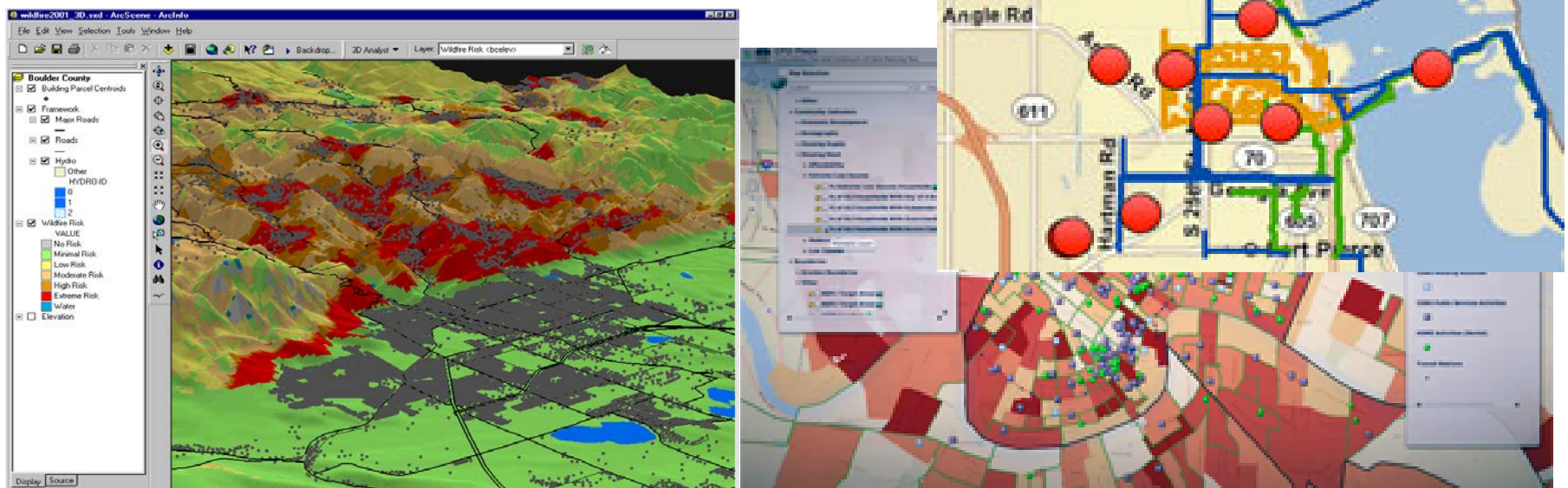
# Outline

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- Why should you be interested in geospatial information?
- Why should you attend this tutorial?

# Why Geospatial Information?

- **Geospatial**, and in general **geographical**, information is very important in reality: everything that happens, happens somewhere (**location**).
- **Decision making can be substantially improved** if we know where things take place.



# Geography

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- From <http://en.wikipedia.org/wiki/Geography>
  - **Geography** is the science that studies the lands, the features, the inhabitants and the phenomena of the Earth.
  - From the Greek word **γεωγραφία (geographia)** which means “describing the Earth”.

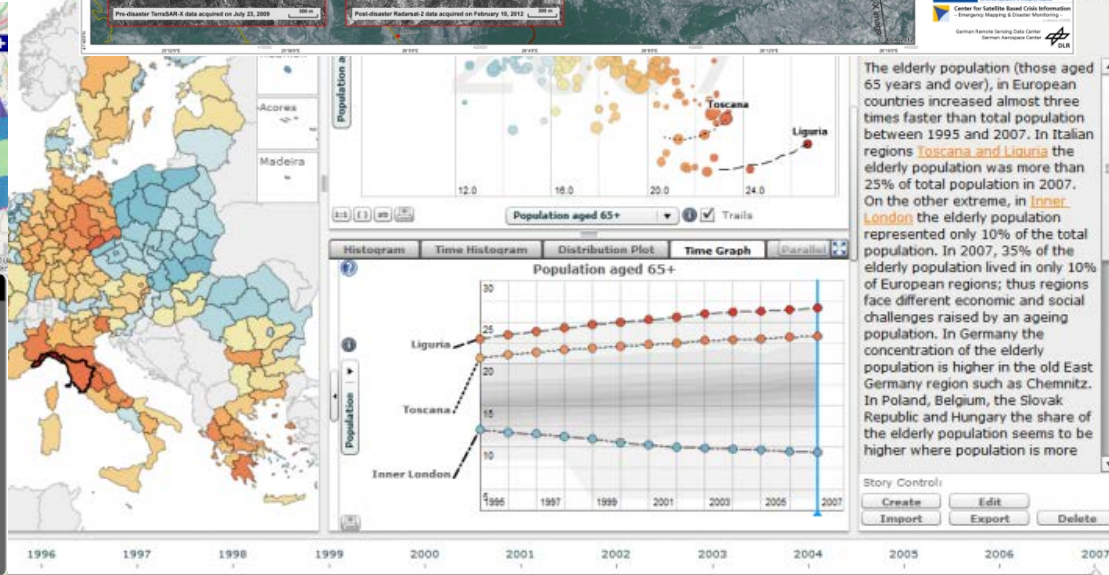
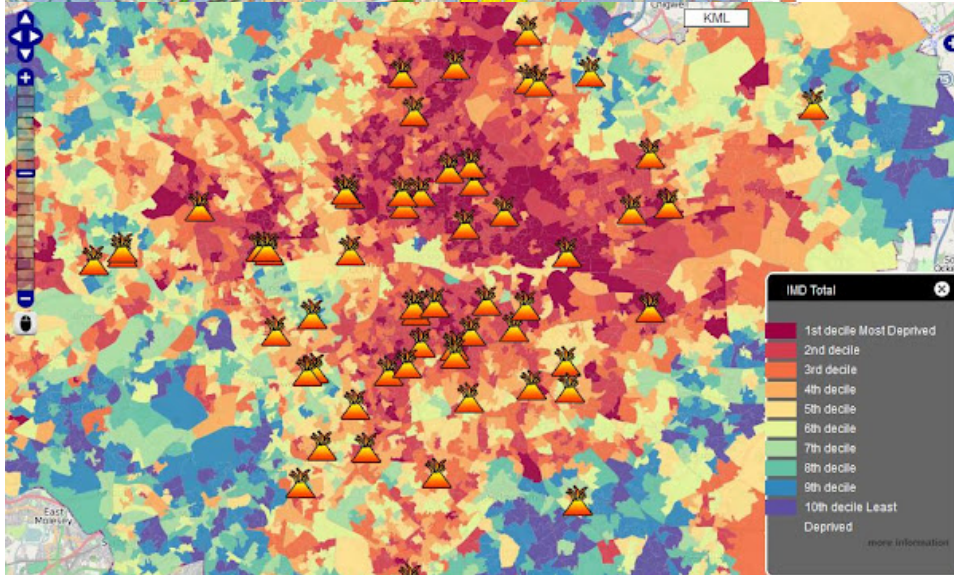
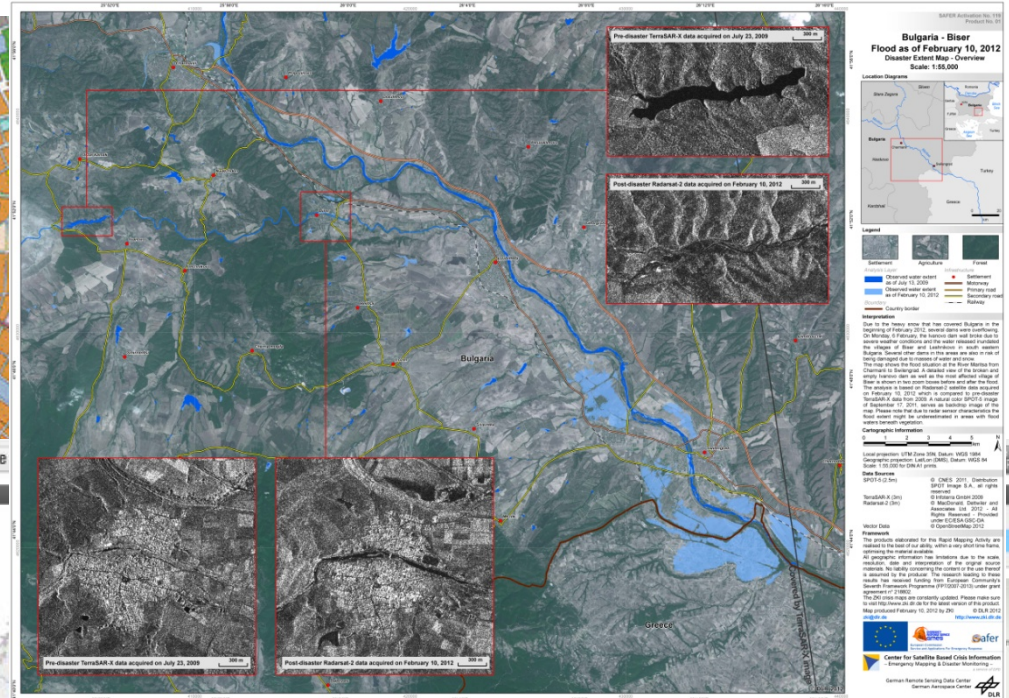
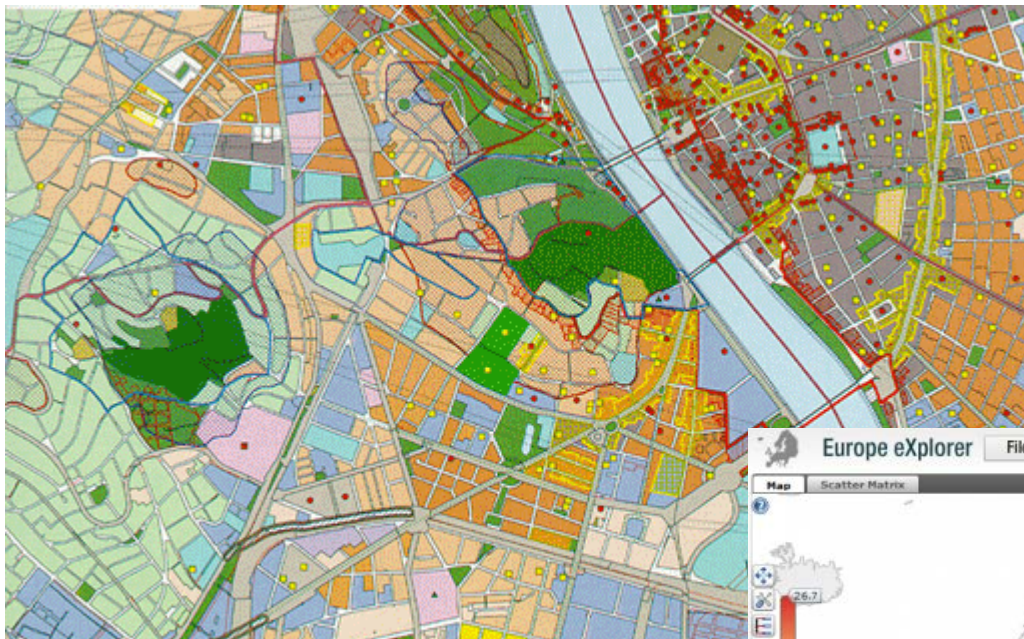


# Geographical Information Systems and Science

- A **geographical information system (GIS)** is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data.
- **GIS science** is the field of study for developing and using GIS.

The image displays two screenshots. On the left is the Esri website homepage, featuring the Esri logo with the tagline 'Understanding our world.' and navigation menus for 'Home', 'Industries', 'Products', and 'Training'. The 'ArcGIS 10' section is highlighted, with sub-links for 'Features', 'Demos', and 'Common'. Below this is a promotional banner for 'Geographic Information Systems and Science' (12th Edition) by Esri. The main content area includes sections for 'Increase Your Productivity', 'What's New', and 'Update: ArcGIS 10 Customers'. On the right is a screenshot of the ArcScene software interface. The title bar reads 'wildfire2001\_3D.sxd - ArcScene - ArcInfo'. The interface shows a 3D map of a landscape with a wildfire risk overlay. The 'Boulder County' layer is expanded, showing 'Building Parcel Centroids', 'Framework', 'Major Roads', 'Roads', 'Hydro', and 'Wildfire Risk VALUE'. The 'Wildfire Risk VALUE' legend indicates five risk levels: No Risk (grey), Minimal Risk (light green), Low Risk (yellow), Moderate Risk (orange), and High Risk (red). The map shows a city area with high risk (red) and surrounding areas with lower risk levels.

# Combining GIS Data for Decision Making



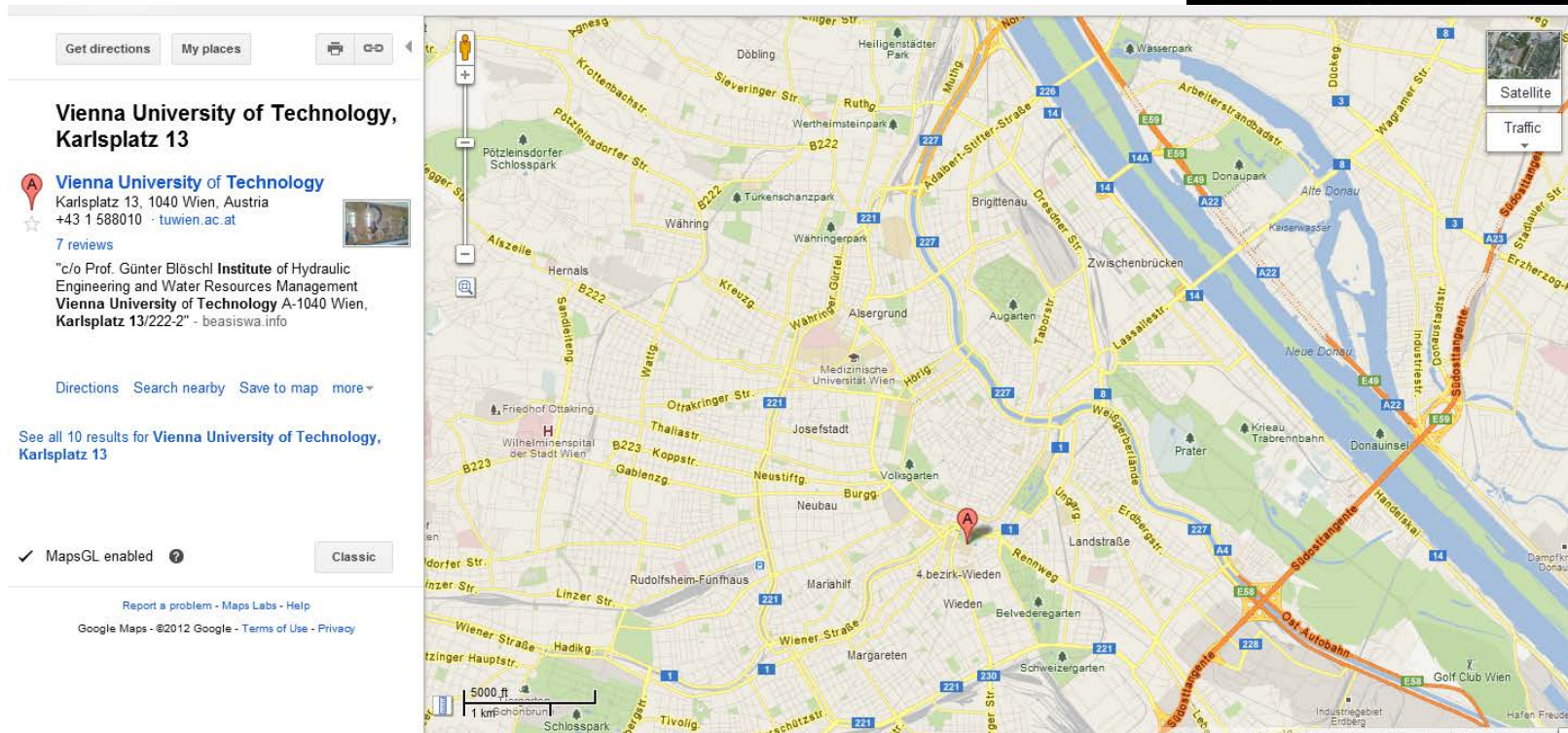
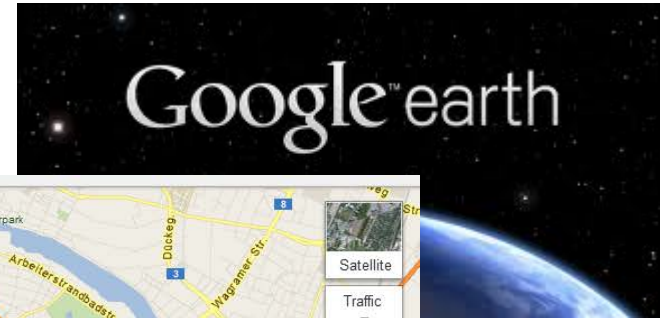


# Why this tutorial?

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- Lots of **geospatial data** is available on the Web today.
- Lots of **public data** coming out of open government initiatives is **geospatial**.
- Lots of the above data is quickly being **transformed into linked data!**
- People have started building **applications** utilizing linked data.

# Geospatial data on the Web



# Open Government Data

The image displays three overlapping screenshots of open government data portals:

- data.gov.uk (top left):** Features the HM Government logo, the text "data.gov.uk BETA Opening up government", and a navigation menu with "Data", "Apps", "Consultation", and "Forum". A search bar is visible with the text "Site search" and a "SEARCH" button. A large banner reads "HAPPY THIRD ANNIVERSARY, DATA.GOV!".
- dati.gov.it (bottom left):** Includes the logo "dati.gov.it I dati aperti della PA" and a navigation menu with "Home", "Cerco i dati", "Voglio capire di più", and "Condivido un d". A section titled "La piattaforma dei dati aperti del CNR" describes the CNR's open data platform.
- geodata.gov.gr (right):** Features the logo "geodata.gov.gr beta" and the text "ΔΗΜΟΣΙΑ ΔΕΔΟΜΕΝΑ, ΑΝΟΙΚΤΑ ΔΕΔΟΜΕΝΑ". It includes a search bar with the text "Αρχική", "Δεδομένα", "Λέξεις Κλειδιά", "Προσθήκη", "Χάρτες", "Πληροφορίες", "Νέα", and "Συμμετοχή". A section titled "Δημόσια, Ανοικτά Δεδομένα" provides information about the portal's mission and a list of services.

# Linked geospatial data – Ordnance Survey



OS OpenData™

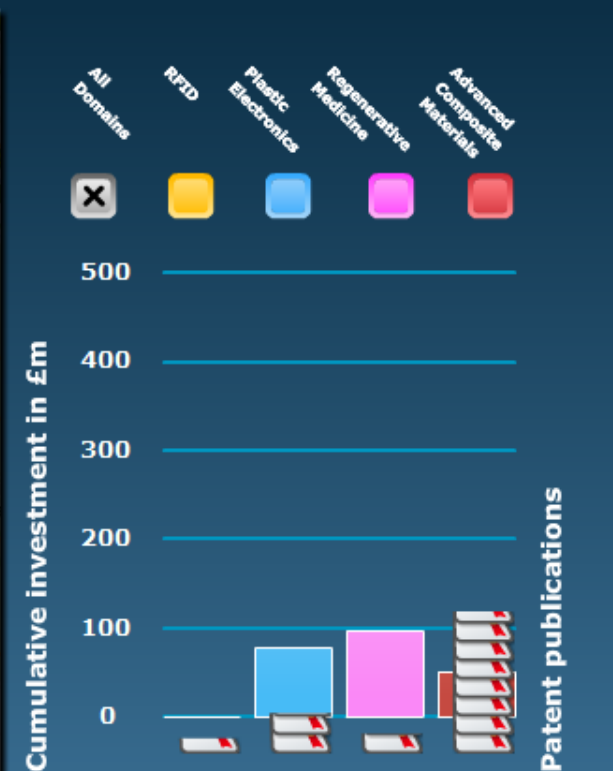


# Linked geospatial data – Research Funding Explorer

**BIS** Department for Business  
Innovation & Skills

Research Funding Explorer

Home About Regions Organisations Subjects



£150m  
£120m  
£90m  
£60m

# Linked geospatial data – Spain



# Linked geospatial data – Open Street Map

Instances Search: rKnossos Royal Village powered by Nominatim

1: Anissaras  
2: Hotel Oasis  
3: Robinson's Lyttos Beach  
4: Supermarkt  
5: Aldemar Royal Mare Village  
6: Supermarkt  
7: Hotel Galini  
8: Supermarkt  
9: Supermarkt  
10: Annabelle Village  
11: Aldemar Cretan Village  
12: Cretan Garden Apartment  
13: Aldemar Knossos Royal V  
14: Lidl  
15: Albatros Spa & Resort Ho  
16: Creta Maris  
17: Terra Maris  
18: Chrysalis Apartments  
19: Anna Maria Apartments  
20: Aquis Zorbas Village  
21: Kosta Mare Palace  
22: Anissa beach  
23: palace  
24: palace

Aldemar Knossos Royal Village  
Οδός Αγίου Γεωργίου

Facets  
Node (42)  
Place (1)  
Tourism (21)  
Amenity (19)  
Historic (2)  
Leisure (1)

hide  
Aldemar Knossos Royal Village  
<http://linkedgeodata.org/triplify/node417582584>

rdf:type <http://linkedgeodata.org/ontology/Node>  
rdf:type <http://linkedgeodata.org/ontology/Tourism>  
rdf:type <http://linkedgeodata.org/ontology/TourismHotel>  
lgdo:directType <http://linkedgeodata.org/ontology/TourismHotel>  
geo:geometry POINT(25.3832 35.3352)  
geo:lat 35.3351643  
geo:long 25.3832134  
lgdo:contributor <http://linkedgeodata.org/triplify/user46288>

AKSW  
25.36630, 35.3461

<http://browser.linkedgeodata.org/#>



# Conclusions

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- **Introduction**
  - Why should you be interested in geospatial information?
  - Why should you attend this tutorial?
- **Next topic:** Background in geospatial data modeling