

PROJET COFINANCE  
PAR L'UNION EUROPEENNE

# CARTODATA subproject

## SUMMARY OF THE PRECEDING MEETING



University of Molise

Valbonne, 27-28 February – 1 March 2007

Pierfederico De Pari



## IN ATHENS WE DISCUSSED ON

---

- The themes to be faced
- The kind of data to retrieve
- The logical run for the definition of the priorities
- The assignments and the competences of the partners
- The implementation of GIS
- The software to be used
- The geographic system of reference





## IN MARSEILLE WE DISCUSSED ON

- A common language among the partners (hazard, vulnerability and risk)
- The specificities of every territorial context
- An exchange of experiences
- The base software
- The methodology of validation of the data





## IN CAMPOBASSO WE DISCUSSED ON

- The base software
- The choice of the geographical system of reference
- Methods of conversion of the coordinates
- Datasets present nearby Molise Region
- Molise and natural disaster: some examples
- The importance of the knowledge of the hazard
- The importance of the knowledge of the vulnerability
- The importance of the knowledge of the risk



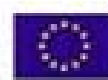
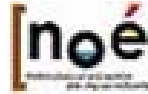


## IN PORTO WE DISCUSSED ON

---

- The structure of SITRA
- Datasets and GIS: what detail?
- The choice of the scale of representation
- State of the art in the job: a 70% progress
- Methods of conversion of the coordinates for final GIS (UTM to WGS84)
- Metadata





PROJET COFINANCE  
PAR L'UNION EUROPEENNE

# Valbonne 27-28 february, 1 march CARTODATA subproject

THE SITRA

(acronym of Geographical Information System  
for Enviromental Risk)



University of Molise

Valbonne, 27-28 February – 1 March 2007

Pierfederico De Pari



## FOUR MONTHS BEFORE END

---

- The necessary activities for the realization of the “SITRA” (acronym of Territorial Informative System for the Environmental Risks – in italian) are almost completed.
- After the first phase of data retrieval in the local authorities, we have proceeded to homogenize all the informations and to create all informative layers of SITRA.
- The informative layers have been separate in informative layers of base and informative layers of work.





# FOUR MONTHS BEFORE END

---

The informative layers of base are:

- Land use (completed)
- Geology, geomorphology and hydrogeology (completed)
- Lifelines (completed)
- Infrastructures of public utility (completed)
- Architectural-historical buildings (completed)
- Environmental resources (completed)
- Industries and productive firms (completed)
- Works of captation for hydrogeological resource (completed)







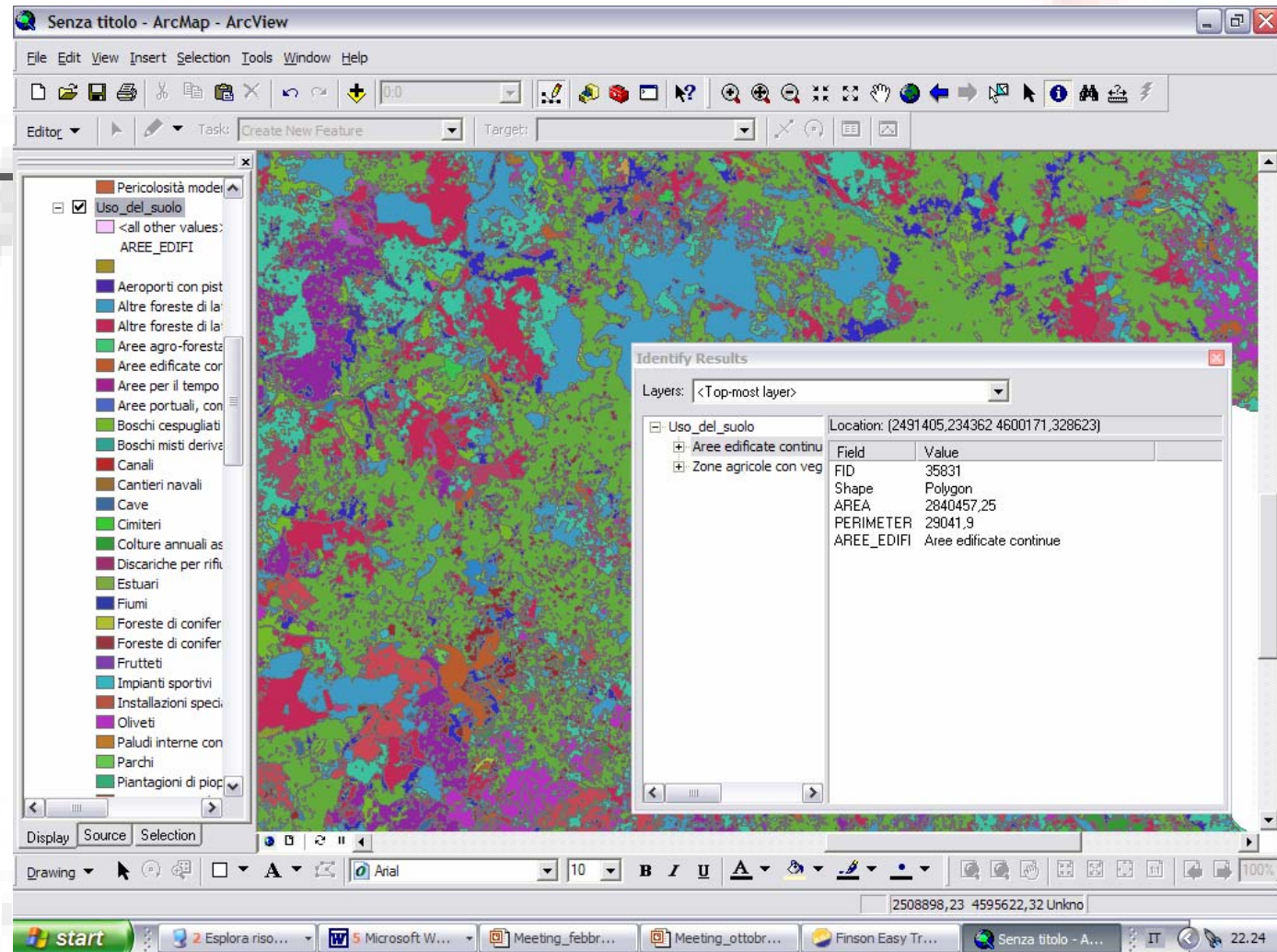
# FOUR MONTHS BEFORE END

---

The informative layers of base are:

- Land use (completed)
- Geology, geomorphology and hydrogeology (completed)
- Lifelines (completed)
- Infrastructures of public utility (completed)
- Architectural-historical buildings (completed)
- Environmental resources (completed)
- Industries and productive firms (completed)
- Works of captation for hydrogeological resource (completed)







## LAND USE

---

In the land-use map the coding Corine Land Cover of quarter order has been used

The most important elements in the land-use map are the agronomic use, builds and lifelines

The knowledge of the actual land-use is fundamental for the economic evaluation of the elements at risk





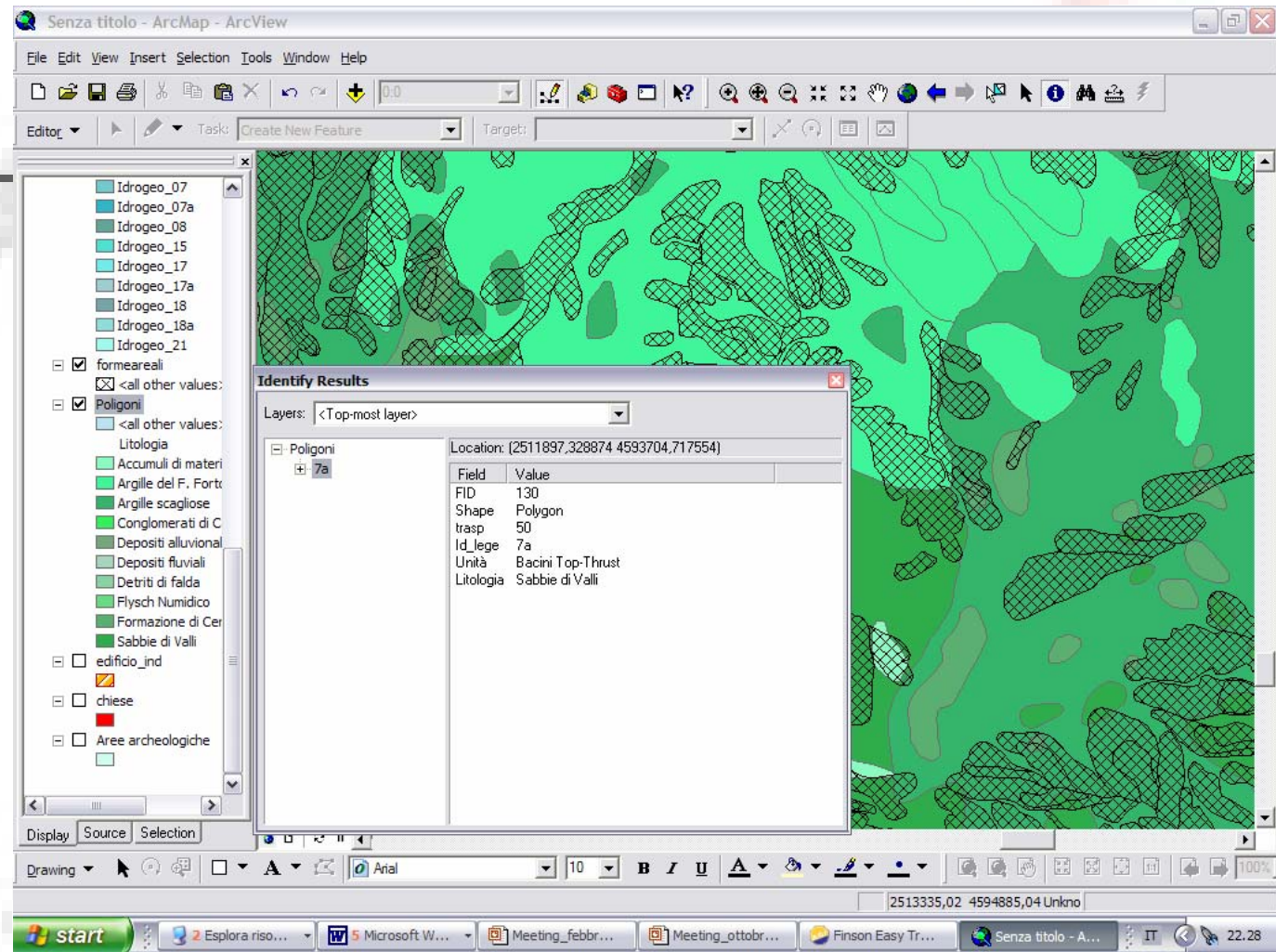
# FOUR MONTHS BEFORE END

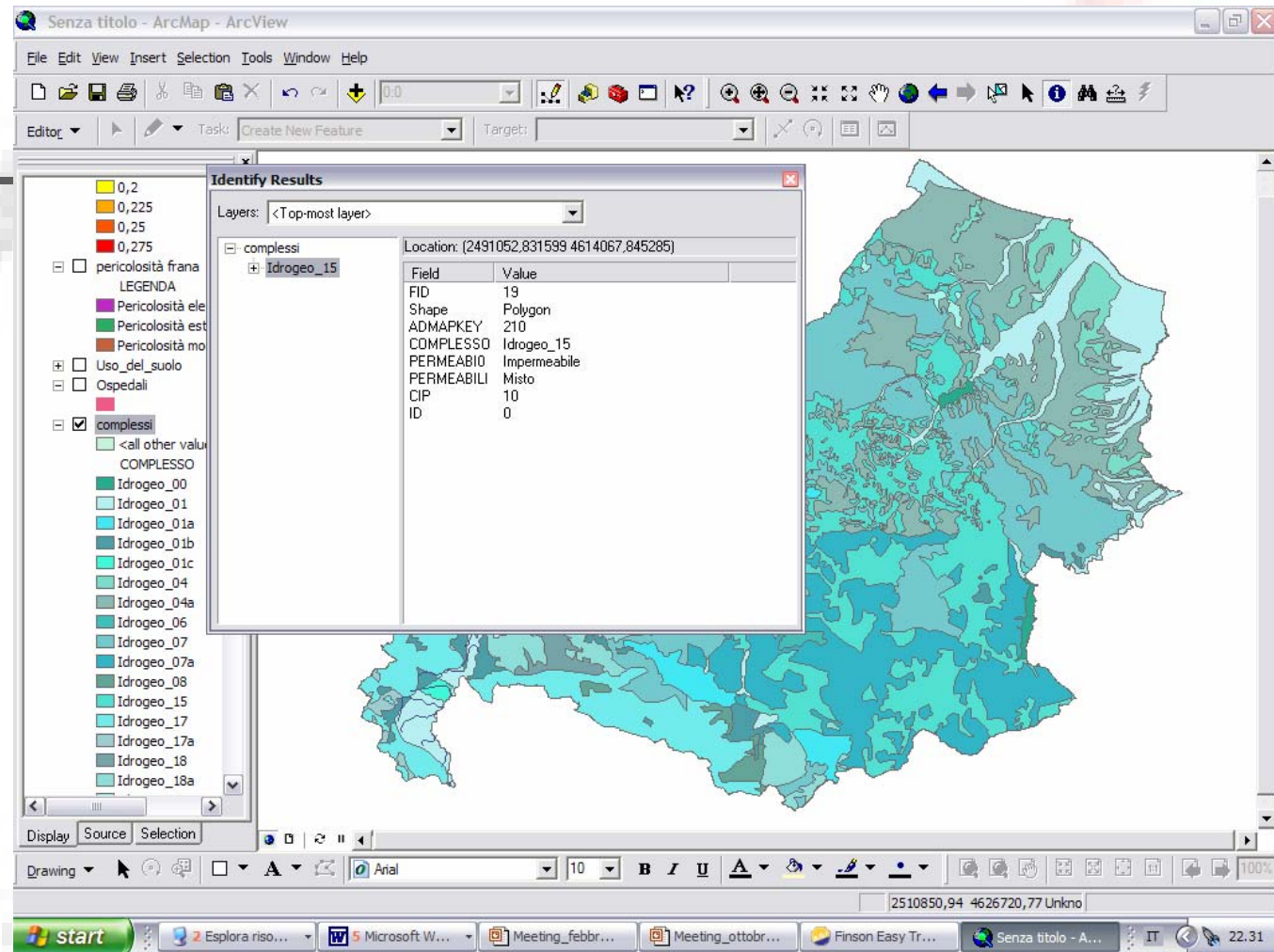
---

The informative layers of base are:

- Land use (completed)
- **Geology, geomorphology and hydrogeology (completed)**
- Lifelines (completed)
- Infrastructures of public utility (completed)
- Architectural-historical buildings (completed)
- Environmental resources (completed)
- Industries and productive firms (completed)
- Works of captation for hydrogeological resource (completed)







# GEOLOGY, GEOMORPHOLOGY AND HYDROGEOLOGY

Geologic, geomorphologic and hydrogeologic scenarios are the first footstep in the study of natural disasters and of natural hazard.

A good knowledge of the physical territory and of its evolution is asked before whatever evaluation of the risk

To be able to define with precision the hazard of base is necessary to observe the phenomena in the time and to statistically define its frequency of event





# FOUR MONTHS BEFORE END

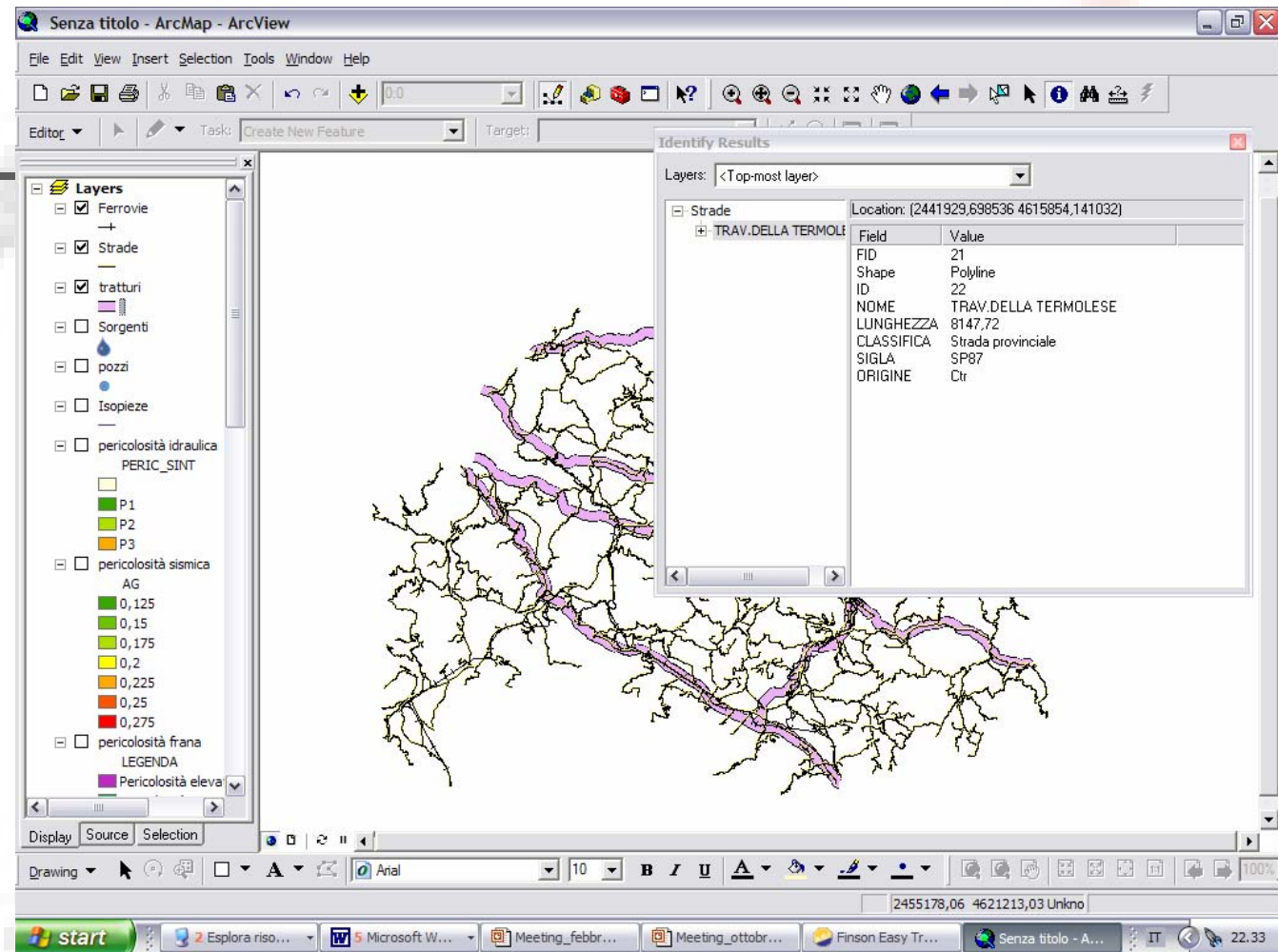
---

The informative layers of base are:

- Land use (completed)
- Geology, geomorphology and hydrogeology (completed)
- Lifelines (completed)
- **Infrastructures of public utility (completed)**
- Architectural-historical buildings (completed)
- Environmental resources (completed)
- Industries and productive firms (completed)
- Works of captation for hydrogeological resource (completed)









# INFRASTRUCTURE OF PUBLIC UTILITY

---

The infrastructures of public utility are among the elements mostly statements to the natural phenomena.

A complete knowledge of the elements and the possibility to appraise its economic value allow to calculate with good reliability the specific risk

The infrastructures are linear or punctual (polygonal).

Are linear infrastructures the roads, the railways, the aqueducts, the electric nets, etc.; are punctual (polygonal) infrastructures the barrackses, the hospitals, etc.

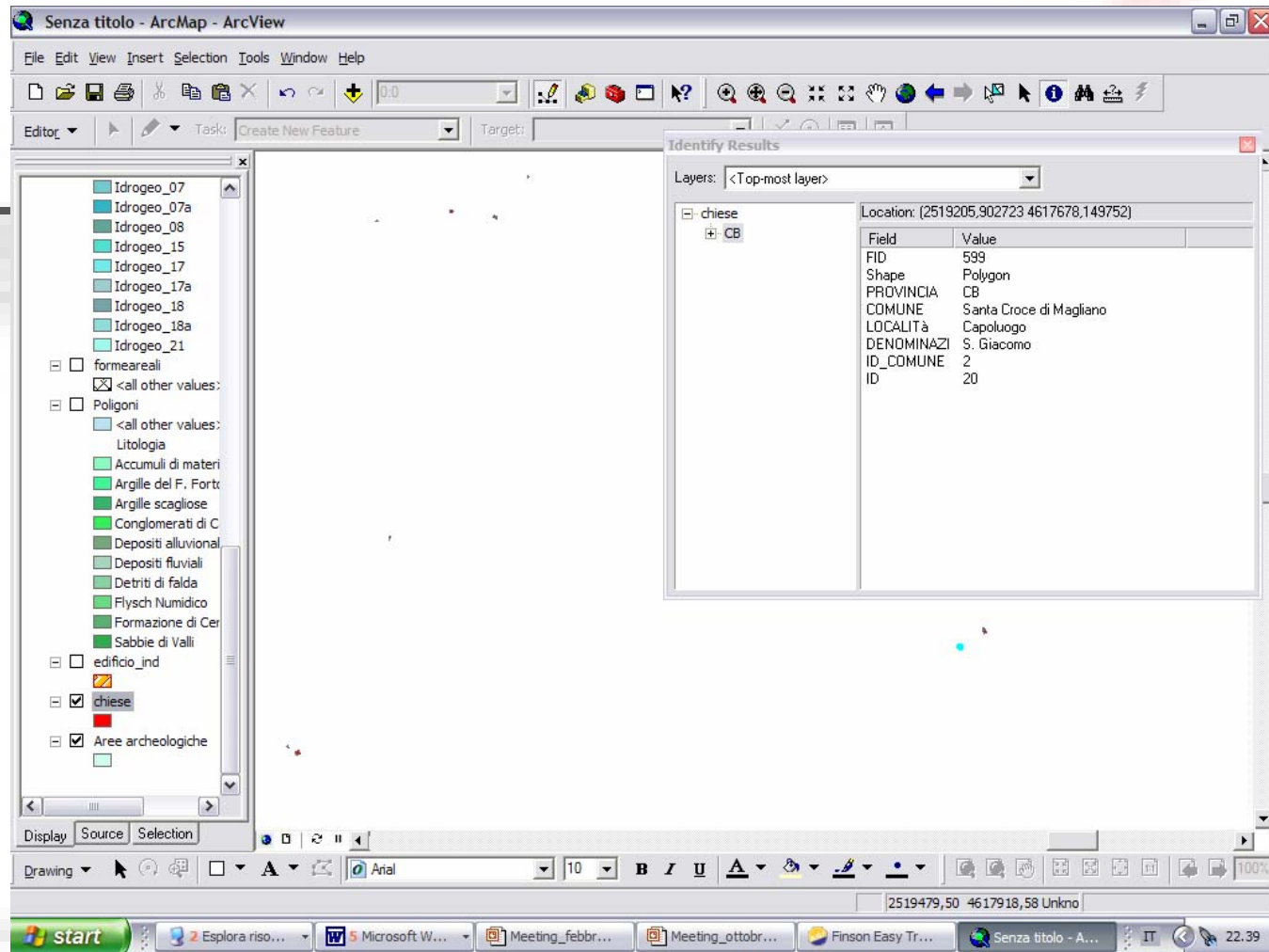


# FOUR MONTHS BEFORE END

The informative layers of base are:

- Land use (completed)
- Geology, geomorphology and hydrogeology (completed)
- Lifelines (completed)
- Infrastructures of public utility (completed)
- **Architectural-historical buildings (completed)**
- Environmental resources (completed)
- Industries and productive firms (completed)
- Works of captation for hydrogeological resource (completed)





# ARCHITECTURAL-HISTORICAL BUILDINGS

The architectural-cultural buildings are represented, in this phase of the study, from the churches

During the creation of the SITRA we (University of Molise and CNR) have censused around 1000 churches on the whole territory of the Molise region. For every of them, in the objectives of the project, CNR have to value the index of seismic vulnerability and, for the churches damaged from 2002 earthquake, also the index of damage.





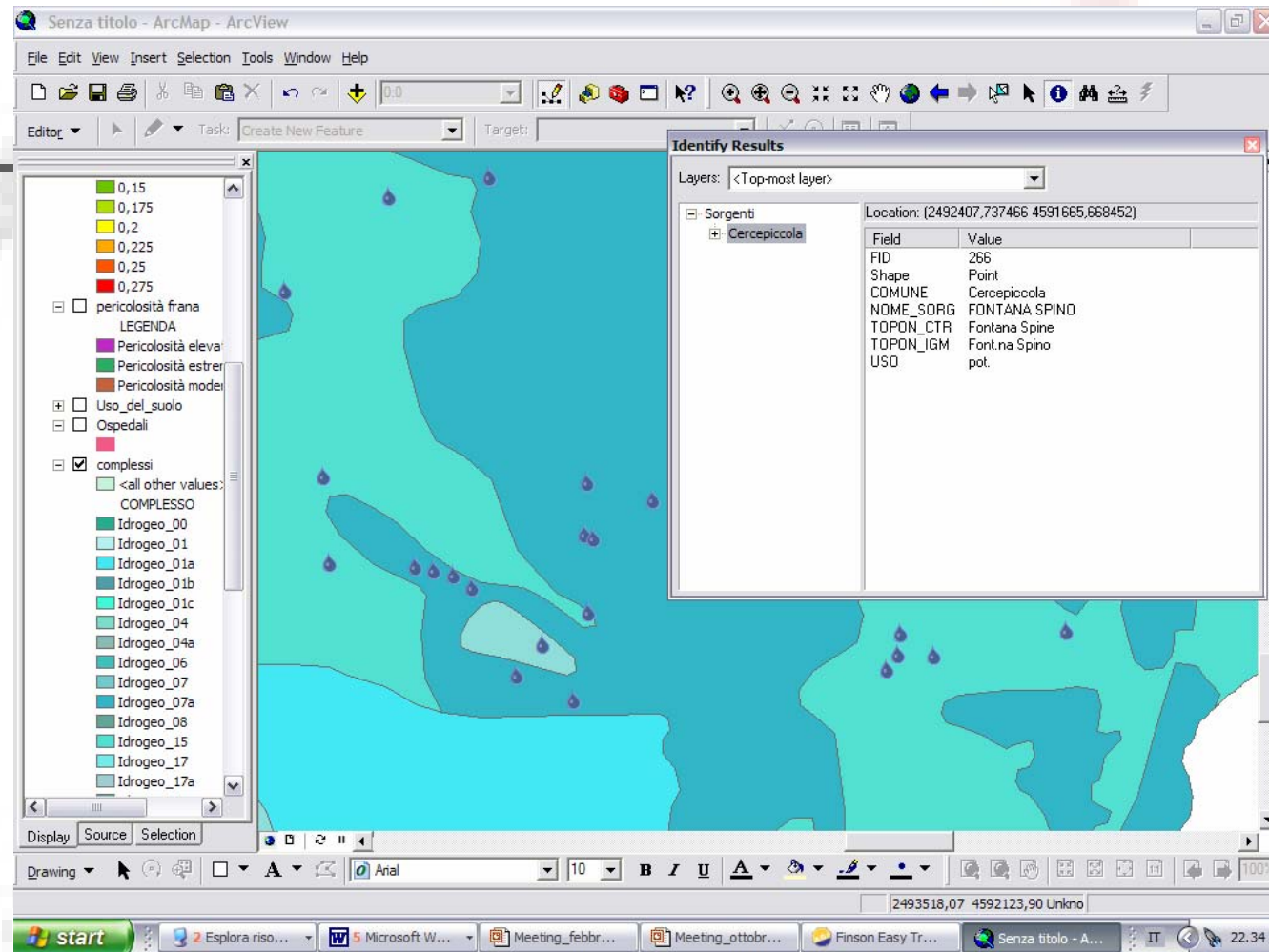
# FOUR MONTHS BEFORE END

---

The informative layers of base are:

- Land use (completed)
- Geology, geomorphology and hydrogeology (completed)
- Lifelines (completed)
- Infrastructures of public utility (completed)
- Architectural-historical buildings (completed)
- **Environmental resources (completed)**
- Industries and productive firms (completed)
- Works of captation for hydrogeological resource (completed)







# ENVIRONMENTAL RESOURCES

---

The risk apparent itself when it is a natural event to produce it or when the catastrophe is determined by the man.

In this optics the natural resources and the water are particularly exposed to the risk of pollution.

A good knowledge of the points of water (wells and sources) is fundamental in the specific analysis of the problem.







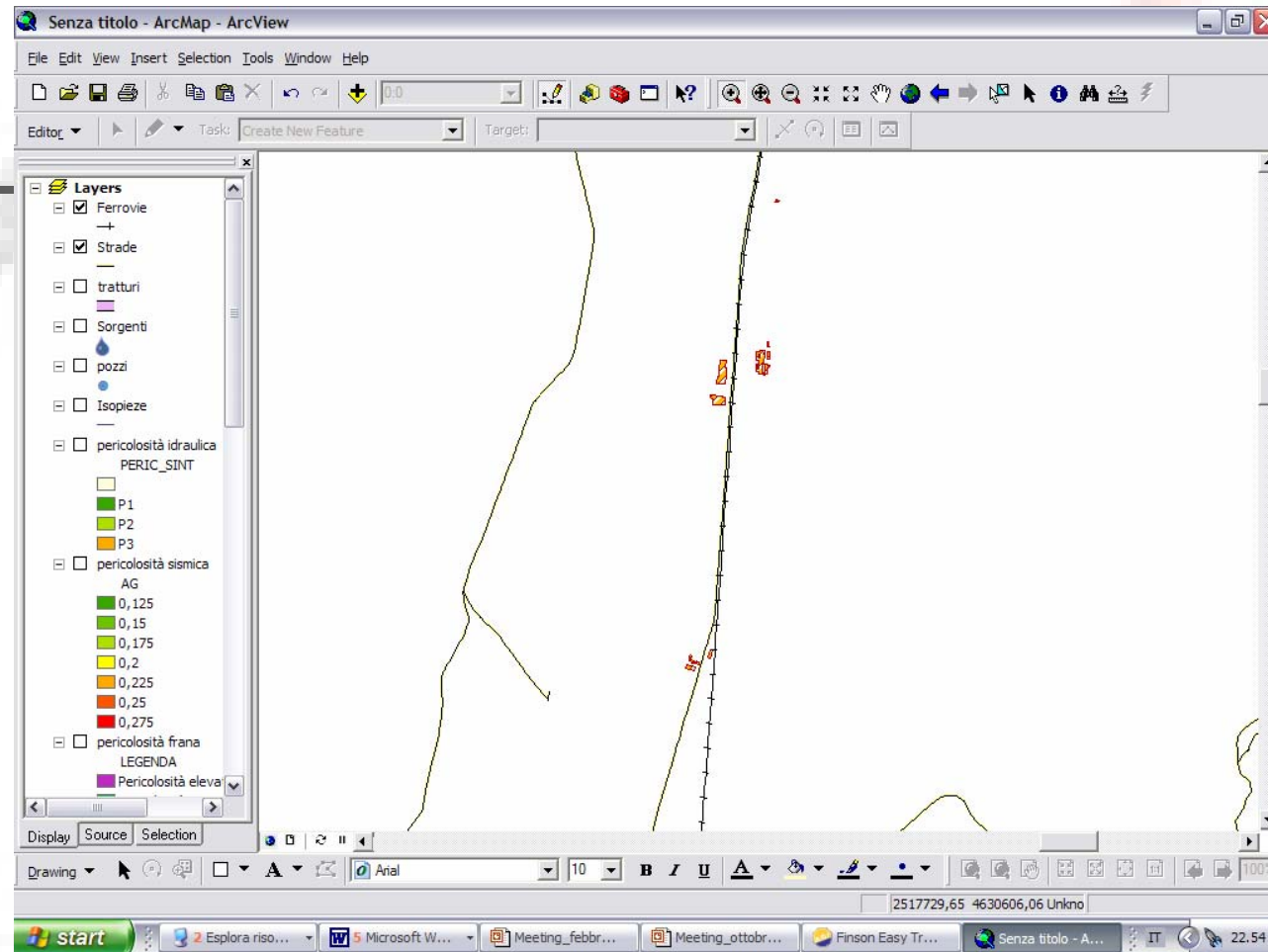
## FOUR MONTHS BEFORE END

---

The informative layers of base are:

- Land use (completed)
- Geology, geomorphology and hydrogeology (completed)
- Lifelines (completed)
- Infrastructures of public utility (completed)
- Architectural-historical buildings (completed)
- Environmental resources (completed)
- **Industries and productive firms (completed)**
- Works of captation for hydrogeological resource (completed)







# INDUSTRIES AND PRODUCTIVE FIRMS

---

The industries and the productive firms are potential pollutants.

In an optics of analysis of the risk of pollution is very important to know the distribution of the potential sources and their relative distribution in comparison to the points of water and to the underground flows.





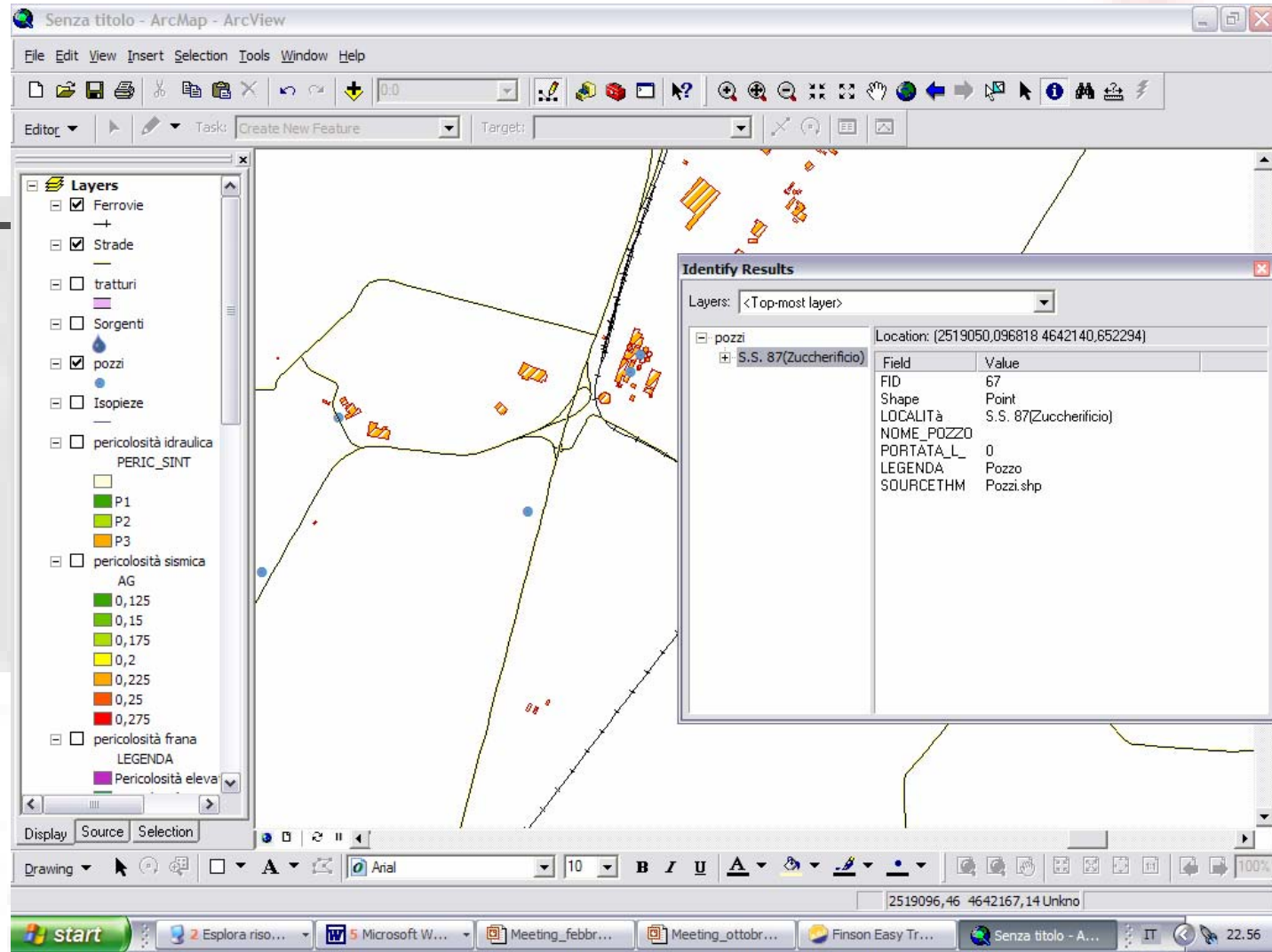
# FOUR MONTHS BEFORE END

---

The informative layers of base are:

- Land use (completed)
- Geology, geomorphology and hydrogeology (completed)
- Lifelines (completed)
- Infrastructures of public utility (completed)
- Architectural-historical buildings (completed)
- Environmental resources (completed)
- Industries and productive firms (completed)
- **Works of captation for hydrogeological resource (completed)**







## FOUR MONTHS BEFORE END

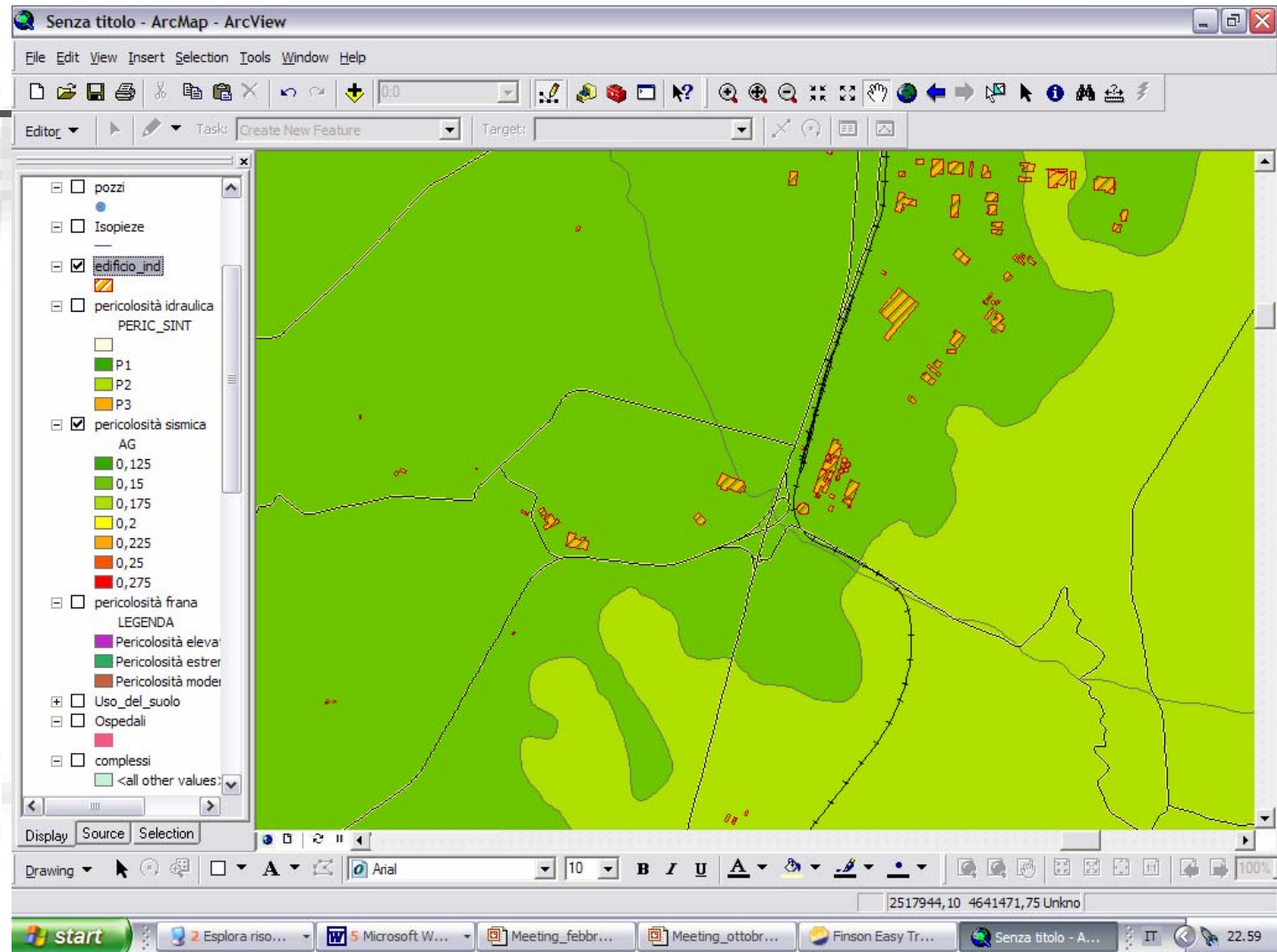
---

The informative layers of work are:

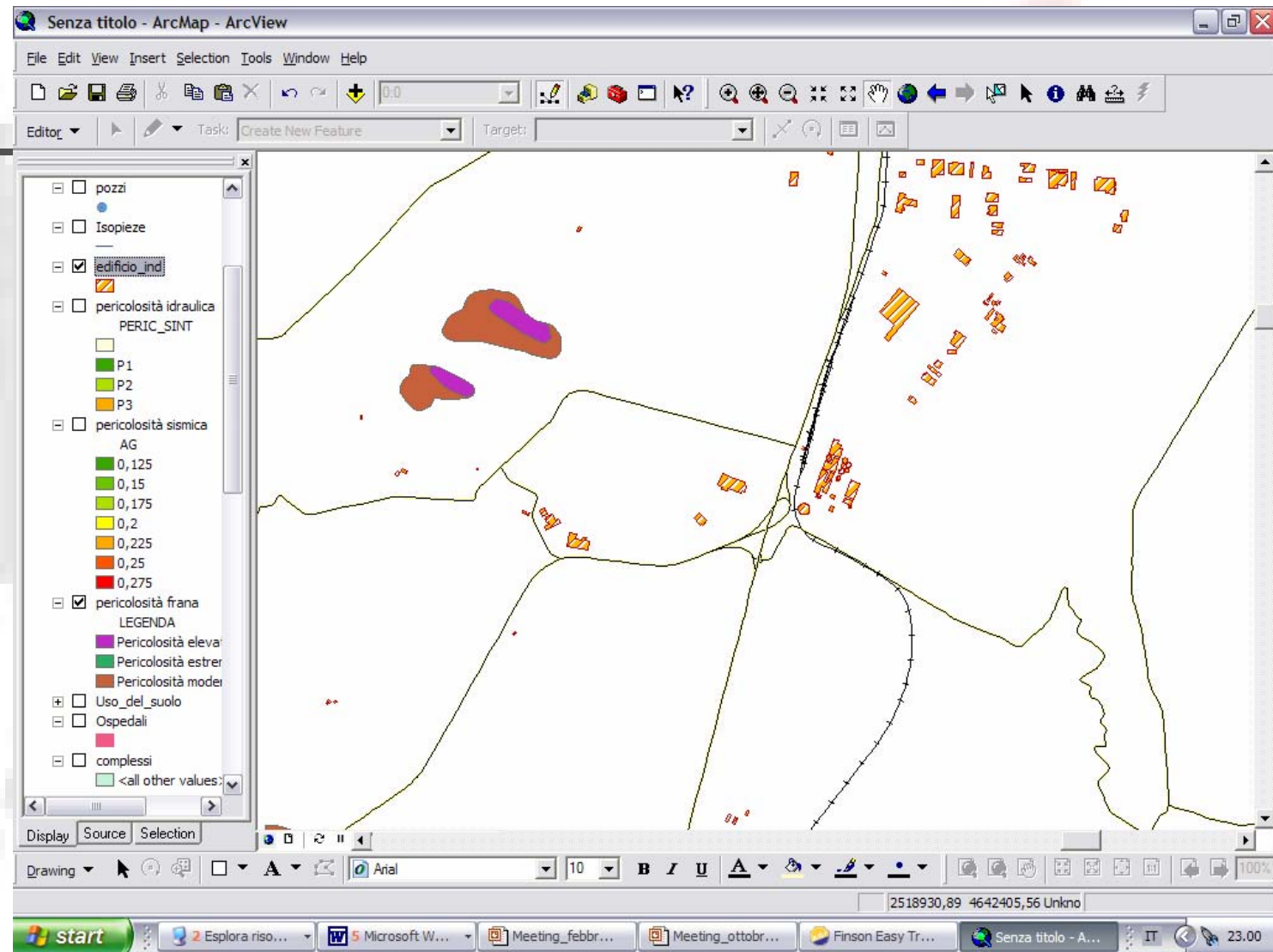
- Map of seismic hazard (completed)
- Map of landslide hazard (completed)
- Map of flood hazard (completed)
- Map of vulnerability of hydrogeological resource (in progress)
- Map of coastal erosion (in progress with ENEA)



# SEISMIC HAZARD

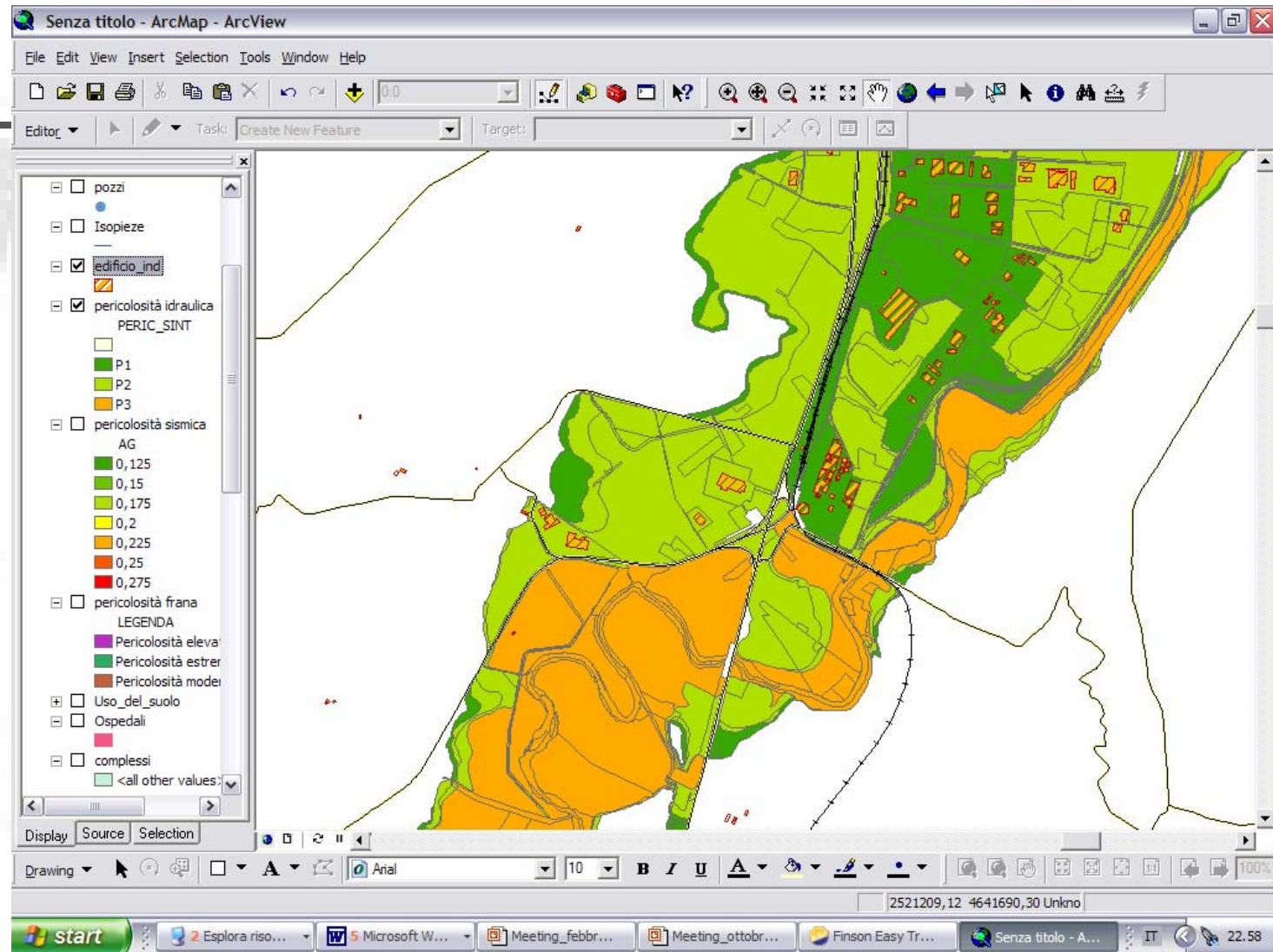


# LANDSLIDE HAZARD



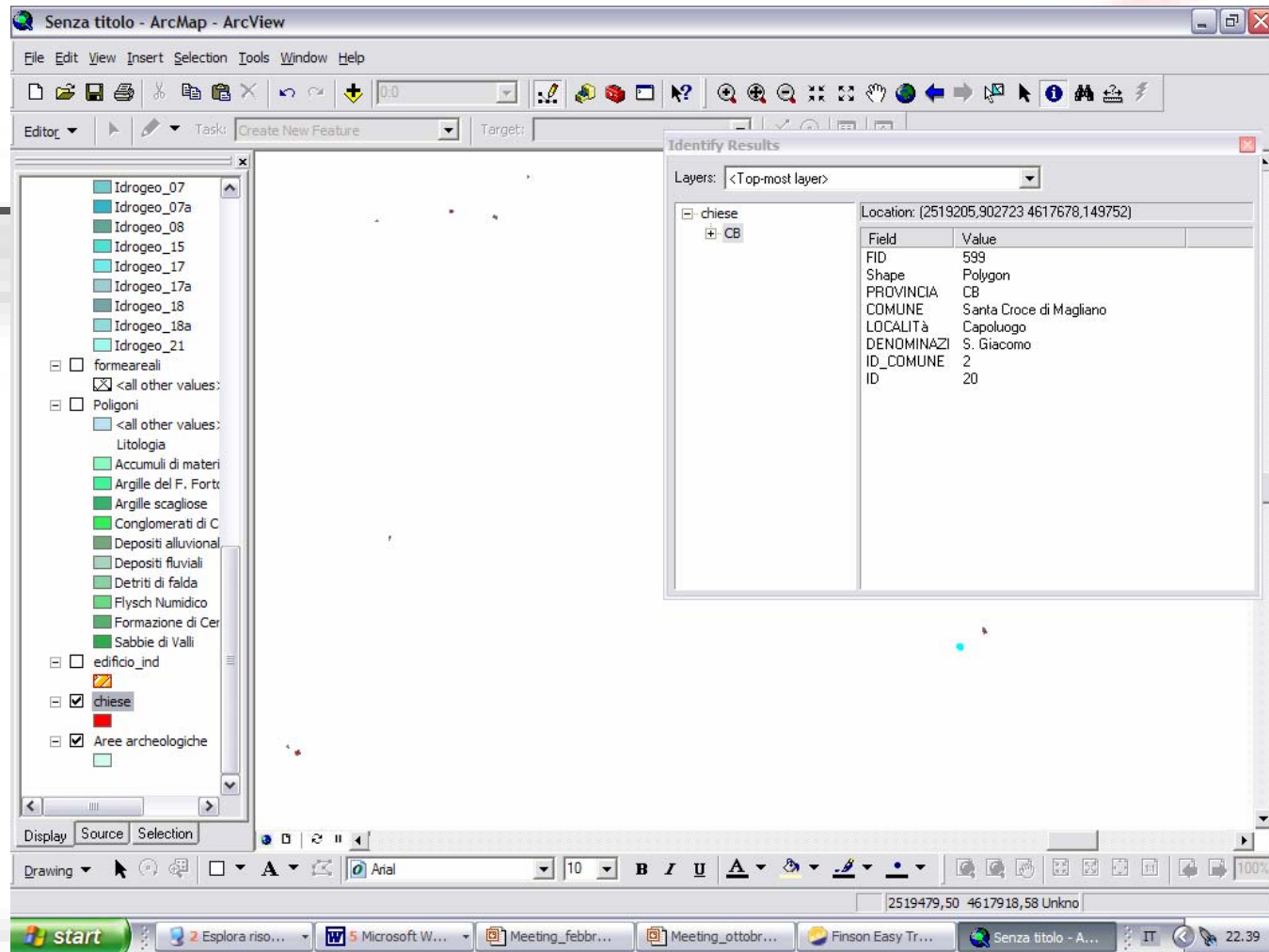


# HAZARD OF FLOOD

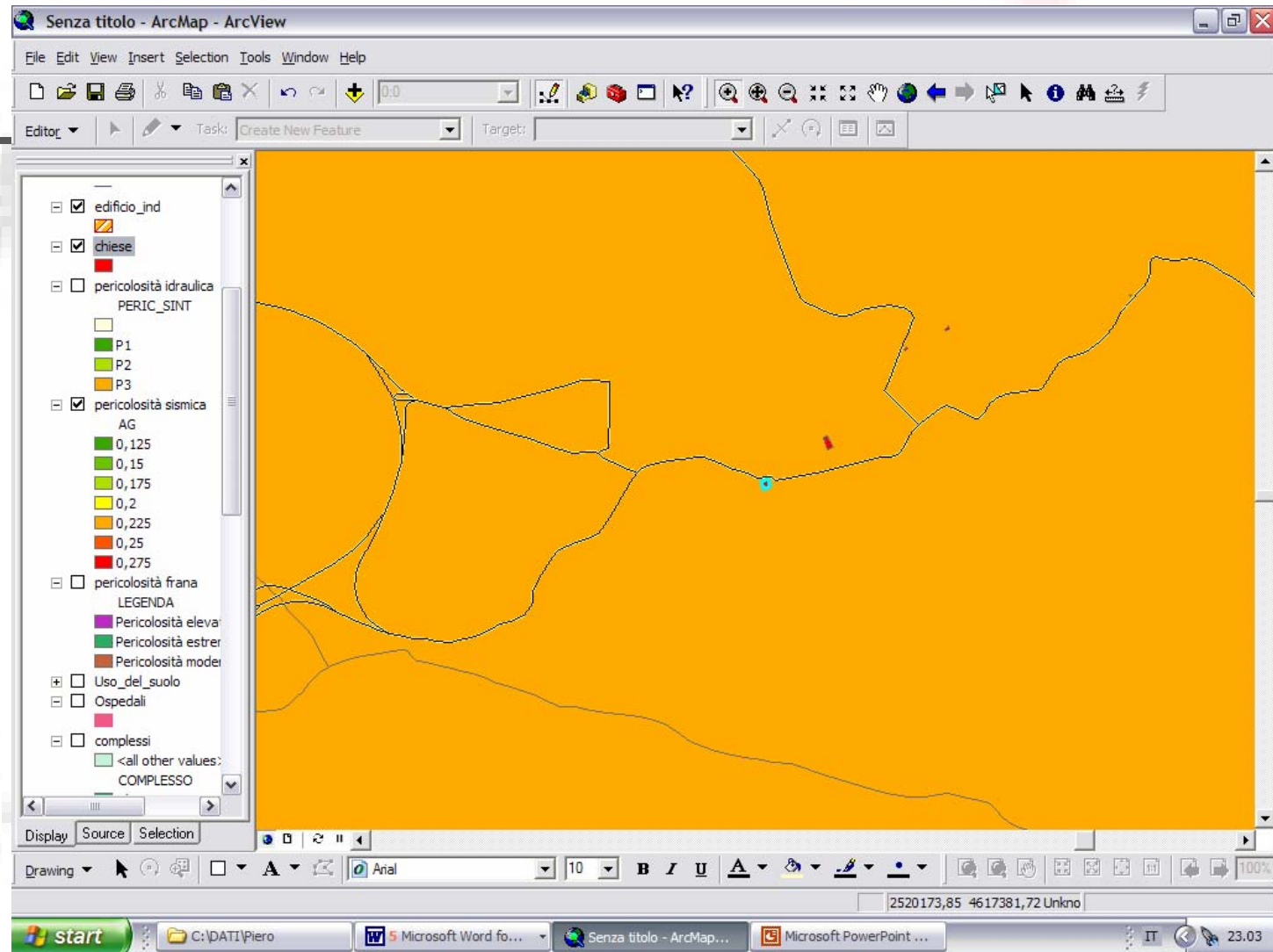


# AN EXAMPLE: ST. GIACOMO CHURCH





# SEISMIC HAZARD



# DAMAGE AND VUNERABILITY

For St. Giacomo Church, in St. Croce di Magliano, was calculated damage and vulnerability (in seismic sense).

The calculations have produced the following two values:

$$ID = 0.53 (53\%)*$$

$$IV = 0.71 (71\%)*$$

From the analysis of damage and vulnerability (following events of known intensity) is possible to improve the model of analysis and, therefore, of the risk.

\* The calculations have been produced by CNR





# HAZARD AND RISK

If hazard is the probability that an event of date intensity happens in the period of hypothesized time (return-time), the risk is the algebraic product between hazard and vulnerability.

$$R = H \times V$$

The measured damage has to be the more possible similar to the risk.

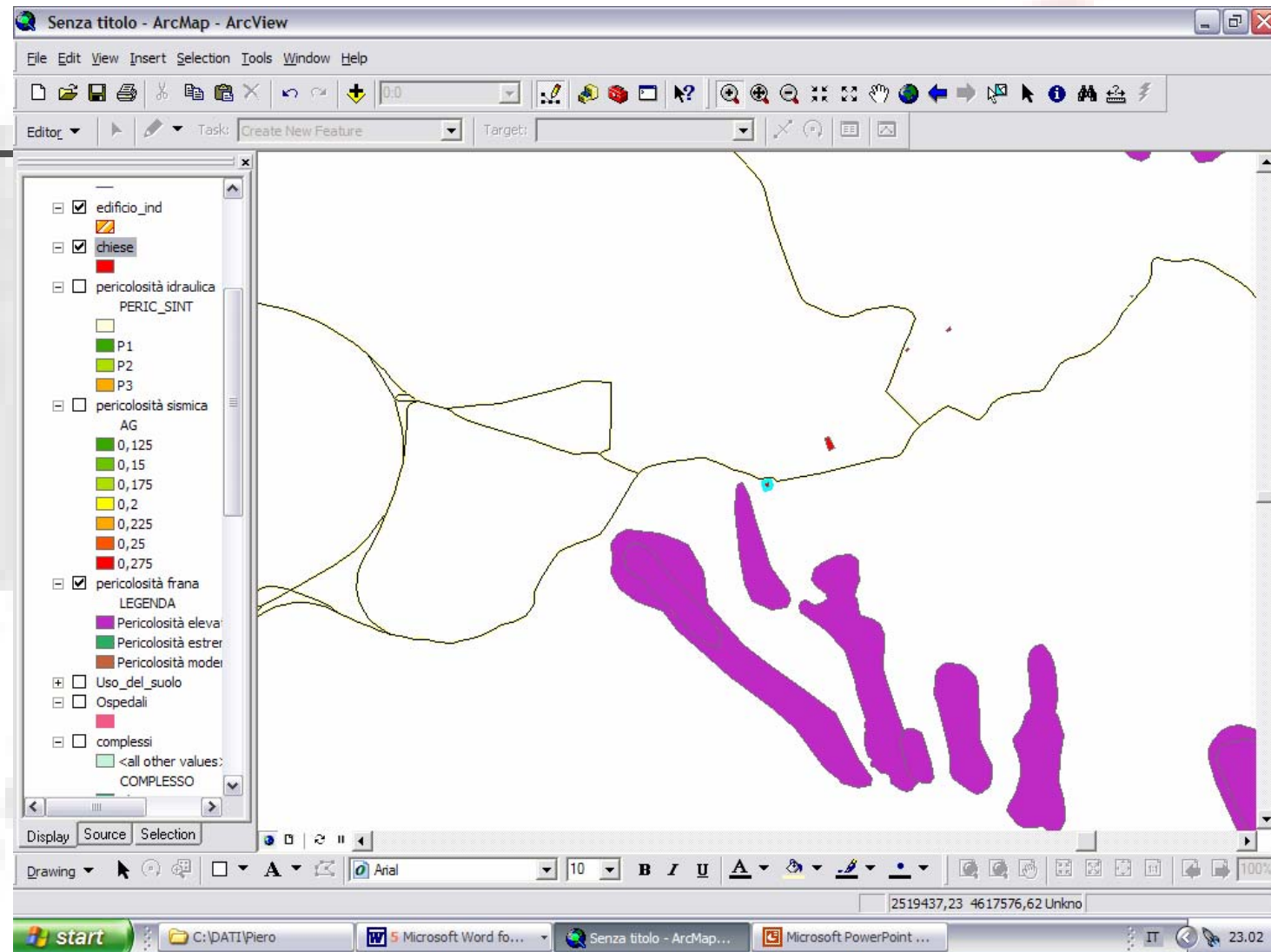
In our example, for an hazard  $H=0.75$ , (return-time=275 ys), the risk is  $R=0.5325$ . The damage index calculated on the church is  $ID=0.53$ , very similar to the value calculated for the risk.

This method allows to calculate the risk for all the elements exposed to the natural event and to plan interventions to set in safety.

Introducing the economic value of the element is possible value the specific risk and, therefore, of the damage.



# LANDSLIDE HAZARD





# DAMAGE AND VUNERABILITY

For St. Giacomo Church, in St. Croce di Magliano, damage and vulnerability are equal to 0 and 0.5 (in landslide sense).







# HAZARD AND RISK

---

For St. Giacomo Church, in St. Croce di Magliano, hazard and risk are equal to 0 (in landslide sense) because the product  $0 \times 1 = 0$ .





# METADATA

---

- Metadata, according to the classical definition, can be defined as 'data on the data' and represent the documentation of the data (a kind of certificate) that furnish useful and immediate information to understand, to compare and to exchange the data that they describe.
- Metadata, in the optics of the interoperability (possibility to contemporarily operate and in way coordinated on the same data sets), represent a very useful tool in how much they allow a rapid management (search, diffusion and acquisition) of the territorial data from authorized subjects.





# METADATA

---

- The utility to realize and to individualize a methodology of job for the metadatum dresses again an enormous importance within CARTODATA sub-project. In fact, treating of procedures usable in European circle, the possibility of information interchange on the data is more main point of the data themselves.
- The metadatum experimented within the CARTODATA sub-project, foresees the description of the elaborate individuals that compose a project. Within the job the standard ISO19115 will follow it regarding the criterions of creation of the metadata for the datasets.





# METADATA

---

- In CARTODATA sub-project we will use the software ArcView GIS 9.1 of the ESRI Inc.® also to allow rapid way the creation of the metadatum according to an only standard with the instructions that the same software proposes in the different languages.
- The possibility to execute automatically adjourn the metadatum from the software (in the limits of the information automatically adjournable) from the software it represents a further aspect that has made to slant toward the release 9.1 of ArcView GIS.



# AN EXAMPLE OF METADATA

noe

Polynomial possibilities  
does not solve naturally



## Strade

**Formato dei dati:** Shapefile

**Sistema di coordinate:** UTM - ED50

**Localizzazione:** file://\RegioneMolise\SITRA\Viabilità\Strade.shp

### ISO ed ESRI Metadata:

- [Informazioni Metadata](#)
- [Informazioni sull'identificazione delle risorse](#)
- [Informazioni Rappresentazioni Spaziali](#)
- [Informazione sul sistema di riferimento](#)
- [Data Quality Information](#)
- [Informazioni sulla distribuzione](#)

### Informazioni Metadata

**Linguaggio Metadata:** Italiano  
**Impostazioni caratteri Metadata:** utf8 - 8 bit UCS Transfer Format  
**Ultimo aggiornamento:** 20070222

**Contatti Metadata:**  
**Nome dell'individuo:** Pierfederico De Pari  
**Nome dell'organizzazione:** Geoservizi s.r.l.  
**Posizione del contatto:** Amministratore  
**Ruolo del contatto:** creatore del metadata

**Obiettivo dei dati descritti dal metadata:** dataset  
**Nome dell'obiettivo:** dataset

**Nome utilizzato dal metadata standard:** ISO 19115 Geographic Information - Metadata  
**Versione del metadata standard:** 1.0

[Torna all'inizio](#)

## Informazioni sull'identificazione delle risorse:

### Citazione:

**Titolo:** Strade

### Date di riferimento:

**Date:** 2003

**Tipo di date:** creation

**Formato presentazione:** mappa digitale

### Parti responsabili per la risorsa:

**Nome dell'individuo:** Pierfederico De Pari

**Nome dell'organizzazione:** Geoservizi s.r.l.

**Posizione del contatto:** Amministratore

**Ruolo del contatto:** creatore del metadata

**Temi o categorie delle risorse:** trasporti

### Abstract:

Rete stradale con indicazione del tipo di strada, nome e lunghezza

**Linguaggio Dataset:** Italiano

### Vincoli delle risorse:

#### Vincoli legali:

**Vincoli di accesso:** Diritti di proprietà intellettuale

**Vincoli d'uso:** Diritti di proprietà intellettuale

**Tipo di rappresentazione spaziale:** vettoriale



OpenStreetMap  
© OpenStreetMap contributors  
CC-BY-SA

**Ambiente di processamento:** Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2

**Limite rettangolare della risorsa:**

**Longitudine ovest:** 14,00

**Longitudine est:** 15,10

**Latitudine nord:** 42,05

**Latitudine sud:** 41.20

**Altre informazioni esterne:**

**Estensione geografica:**

**Limite rettangolare:**

**Tipo di estensione:** Estensione completa in coordinate

**Estensione che contiene la risorsa:** Si

**Longitudine Ovest:** 2435857.5

**Longitudine est:** 2531442.5

**Latitudine nord:** 4657182.750616

**Latitudine sud:** 4581273.5

Estensione completa per l'ambito  
des ressources naturelles



---

## Rappresentazione Spaziale - Vettore:

**Livello della topologia per questo dataset:** solo geometria  
**Oggetti geometrici:**  
**Nome:** Strade  
**Tipo di oggetto:** complesso  
**Contatore di oggetti:** 576

[Torna all'inizio](#)

---

## Informazione sul Sistema di Riferimento:

**Identificatore del sistema di riferiemnto:**  
**Valore:** GAUSS-BOAGA (Monte Mario)

[Torna all'inizio](#)

---

## Informazioni sulla Qualità del Dato:

**Scopo delle informazioni di qualità:**  
**Livello di dati:** dataset

**Lignaggio:**  
**Dichiarazione di lignaggio:**

Dati provenienti dalla C.T.R. e integrati con le informazioni mancanti

---

## Informazioni sulla distribuzione:

### Distributori:

**Formato disponibile:**  
**Nome del formato:** Shapefile

**Opzioni di trasferimento:**  
**Ampiezza di trasferimento:** 2,272 MB

### Fonte Online:

**Località Online (URL):** file://\\RegioneMolise\SITRA\Viabilità\Strade.shp  
**Protocollo di connessione:** Rete Locale  
**Descrizione:** Dataset in locale



## Uso del suolo

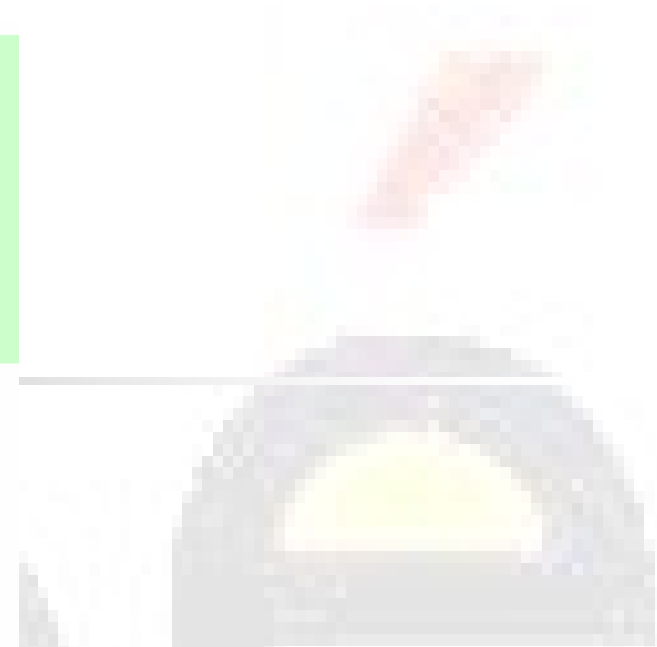
**Formato dei dati:** Shapefile

**Sistema di coordinate:** UTM - ED50

**Localizzazione:** file://\RegioneMolise\SITRA\Viabilità\Uso del suolo.shp

### ISO ed ESRI Metadata:

- [Informazioni Metadata](#)
- [Informazioni sull'identificazione delle risorse](#)
- [Informazioni Rappresentazioni Spaziali](#)
- [Informazione sul sistema di riferimento](#)
- [Data Quality Information](#)
- [Informazioni sulla distribuzione](#)



### Informazioni Metadata

**Linguaggio Metadata:** Italiano

**Impostazioni caratteri Metadata:** utf8 - 8 bit UCS Transfer Format

**Ultimo aggiornamento:** 20070222

#### Contatti Metadata:

**Nome dell'individuo:** Pierfederico De Pari

**Nome dell'organizzazione:** Geoservizi s.r.l.

**Posizione del contatto:** Amministratore

**Ruolo del contatto:** creatore del metadata

**Obiettivo dei dati descritti dal metadata:** dataset

**Nome dell'obiettivo:** dataset

**Nome utilizzato dal metadata standard:** ISO 19115 Geographic Information - Metadata

**Versione del metadata standard:** 1.0

[Torna all'inizio](#)

## Informazioni sull'identificazione delle risorse:

### Citazione:

**Titolo:** Uso del suolo

### Date di riferimento:

**Date:** 2003

**Tipo di date:** creazione

**Formato presentazione:** mappa digitale

### Parti responsabili per la risorsa:

**Nome dell'individuo:** Pierfederico De Pari

**Nome dell'organizzazione:** Geoservizi s.r.l.

**Posizione del contatto:** Amministratore

**Ruolo del contatto:** creatore del metadata

**Temi o categorie delle risorse:** Territorio

### Abstract:

Usuolo agro-forestale con perimetrazione delle aree boschive naturali e artificiali, delle aree adibite a colture specializzate - vigneti, oliveti e frutteti - e di quelle adibite ad usi esten-sivi; tessuto urbano continuo e discontinuo

Federazione provinciale  
dei Comuni del  
Sudtirolo

**Linguaggio Dataset:** Italiano

**Vincoli delle risorse:**

**Vincoli legali:**

**Vincoli di accesso:** Diritti di proprietà intellettuale

**Vincoli d'uso:** Diritti di proprietà intellettuale

**Tipo di rappresentazione spaziale:** vettoriale

**Ambiente di processamento:** Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2

**Limite rettangolare della risorsa:**

**Longitudine Ovest:** 14,00

**Longitudine est:** 15,10

**Latitudine nord:** 42,05

**Latitudine sud:** 41,20

**Altre informazioni esterne:**

**Estensione geografica:**

**Limite rettangolare:**

**Tipo di estensione:** Estensione completa in coordinate

**Estensione che contiene la risorsa:** Si

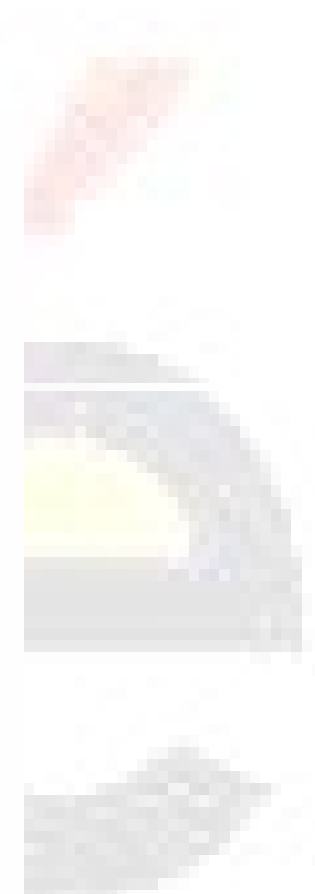
**Longitudine ovest:** 2431970.5

**Longitudine est:** 2533554.5

**Latitudine nord:** 4657590.0

**Latitudine sud:** 4579059.5

[Torna all'inizio](#)



dataset - risorse - servizi

---

## Rappresentazione Spaziale - Vettore:

**Livello della topologia per questo dataset:** solo geometria  
**Oggetti geometrici:**  
**Nome:** Uso del suolo  
**Tipo di oggetto:** complesso  
**Contatore di oggetti:** 50911

[Torna all'inizio](#)

---

## Informazione sul Sistema di Riferimento:

**Identificatore del sistema di riferiemnto:**  
**Valore:** GAUSS-BOAGA (Monte Mario)

[Torna all'inizio](#)

---

## Informazioni sulla Qualità del Dato:

**Scopo delle informazioni di qualità:**  
**Livello di dati:** dataset

**Lignaggio:**  
**Dichiarazione di lignaggio:**

Dati provenienti dalla C.T.R. e integrati con le informazioni mancanti

[Torna all'inizio](#)

---



### Informazioni sulla distribuzione:

#### Distributori:

##### Formato disponibile:

Nome del formato: Shapefile

##### Opzioni di trasferimento:

Ampiezza di trasferimento: 13,272 MB

##### Fonte Online:

Località Online (URL): file://\RegioneMolise\SITRA\Viabilità\Uso del suolo.shp

Protocollo di connessione: Rete Locale

Descrizione: Dataset in locale

[Torna all'inizio](#)

THANK FOR YOUR ATTENTION



University of Molise