DESIGNING A REGIONAL ATLAS IN GREECE
THE ELECTRONIC REGIONAL ATLAS OF EPIRUS

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Abstract

The needs of the regional planning and education for organized, concentrated and readily available information in Greece require an integrated solution. The lack of a complete and systematic cartographic documentation of the land and the socio-economic spatial parameters of Greece, creates a great scientific and development gap as the last relevant Atlas goes back to 1963 and it is considered as old, at least as far as the data used are concerned. The recent publication of a new Atlas in this field, does not cover the gap mainly because the cartographic approach followed is rather limited and weak.

As a consequence, such cartographic challenge is a major concern for specialists especially from the domain of the university. The present project is attempting to cover the needs we mentioned before via the design of an electronic regional atlas of a unique Greek region (Epirus). The design includes the standards, the thematic contents and the structure and functionality. The structure of a regional atlas, considering that it may evolve into a national atlas, should be an application that would be flexible and user-friendly. The main parts of the Atlas are the web service which is the main application and the mapping service which creates the maps.

The structure of the thematic content of the Atlas will be referring to three major sections of describing the region:
a. analysis of the geographical composition
b. an analysis of geographical features of the mountainous area
c. presentation of complex processes of spatial organization.

The Regional Atlas of Epirus is to fill the gaps that occur due to the lack of concentrated and organized information its mapping. The Atlas will be a model for further attempts in Greece, as will be the first attempt to design an electronic interactive tool which will gather all the data and characteristics at regional level. The electronic version of Atlas enables continuous updating with new data while the availability through the Internet, enables quick and easy access to scientists involved in regional development and also the ordinary citizen, student or adult.

1. Introduction

The pursuit of economic development under social, cultural and environmental restrictions and guidelines appears now that it can be realized, assessed and achieved only in the regions scale. That is a fact that is verified by the European Union as the socio-economic analysis and development planning are based on the regions scale (NUTS II: Nomenclature of territorial units for statistics – NUTS Statistical Regions of Europe), to economic integration and balancing regional disparities across Europe.

The processing of geographic data for the purpose of researching the regional particularities, which are limited in geographical and administrative terms, nowadays can only be achieved and assessed in the scale of regions.

The final maps are the product of the data collection and processing. The map (in all forms) is the necessary and fundamental infrastructure which represents graphically and in many scales the land and socioeconomic situation of a region (Myridis et al, 2007) That representation has to be uniform and according to specific standards. A Geographic Atlas is a systematic, codified and analytic map series.

The cartographic infrastructure that exists in Greece and particularly as long as geographical Atlases are concerned is incomplete. It's main characteristics are the great variety of scales, coordinate systems, dates of publication, editors etc. Furthermore there have been cases of economic waste, delays and general confusion during the process of the creation of atlases in the past. In Greece, today, the only organized Atlas is the National Economic and Social Atlas which is a National Center of Social Research creation. It was created in the 1963 and in tree languages (Greek, French and English). Another attempt by the same institute in 2000 cannot be considered complete yet and is definitely not regional (Myridis, 1989a).

The goal of this project, which is a cooperative effort of the Aristotle University of Thessaloniki and the Hellenic Cartographic Society, is to design an electronic regional atlas and define the standards and the thematic content, so that all the Atlas information is concentrated, organized and readily available to all. The Atlas is considered to be used by the Scientists involved in regional development and the ordinary citizen, student or adult. In the following sections a detailed design, operation and thematic content of the regional Atlas is presented.

2. The structure of a regional Atlas

The electronic atlas that will be described is a live atlas. It works like a living organism which interacts with its environment. There are three steps for its preparation and a cycle which keeps it updated. The three steps are: a) preparation of the main atlas system b) creation of the basic data c) creation of the first themes. After the completion of the first steps the atlas can be enriched with many other themes with a procedure that we will describe later.

The structure of a regional atlas, considering that it may evolve into a national atlas, should be an application that would be flexible and user-friendly. The parts of the system in a case like this are the sources that provide the data to be presented, the final users and the system of the Atlas application that is the hardware, the software and the administration (Myridis et al, 2001). The Atlas combines the data provided and presents them in an appropriate way through a web application or a cd application or even in a printed version (I.C.A. Workshop, 1996). The core of the Atlas application as we present it below is the system server. That server could be a simple personal computer that hosts the web service and the mapping service.

Starting from the mapping service it consists of three parts. The first is the cartographic data that should be in a common format so that the interchange through the whole system can be easier. Basic cartographic elements such as the road network or the administrative boundaries are the base for the final maps and all other data should be according to them. Having a common base other data from different sources could be easily added later. The next step is to provide the shapes, we described above, with descriptive information. That means we have to create tables in a database system, like SQL server, retrieved by public services, with statistical data and join them with the shapefiles data (White, 1988). The final goal is to create databases with statistical indexes which combined with the shapes will create the final maps. The creation of the maps can be achieved with mapping software like UNM MapServer which is a tool to create interactive maps on the web. The final result is an image that has the size of our choice and shows the cartographic data using properties (like line color, line width, hatches, labels and styles in general) that we selected and stored in a mapfile. Whenever a map should be drawn a computer signal is sent to the MapServer service, the MapServer creates the image using the mapfile and the image is sent back to the user.

An Atlas though, is not only a group of maps. It should contain text, photographs, attribute tables, diagrams, audio or even animation (Lorenz, 2000). In order to combine all the above and the map image created via MapServer there must be an application that will be able to visualize all the data provided. A web application that can be customized to be able to work offline (dvd distribution) is needed (Rhines and Swift, 1999). The idea is that there will be a table of thematic contents with the titles of the Atlas themes. Every title is a link that provides the application with instructions regarding what to show and how to show the data the theme author wants. Furthermore the final user will be able to switch on/off layers and navigate though the map.

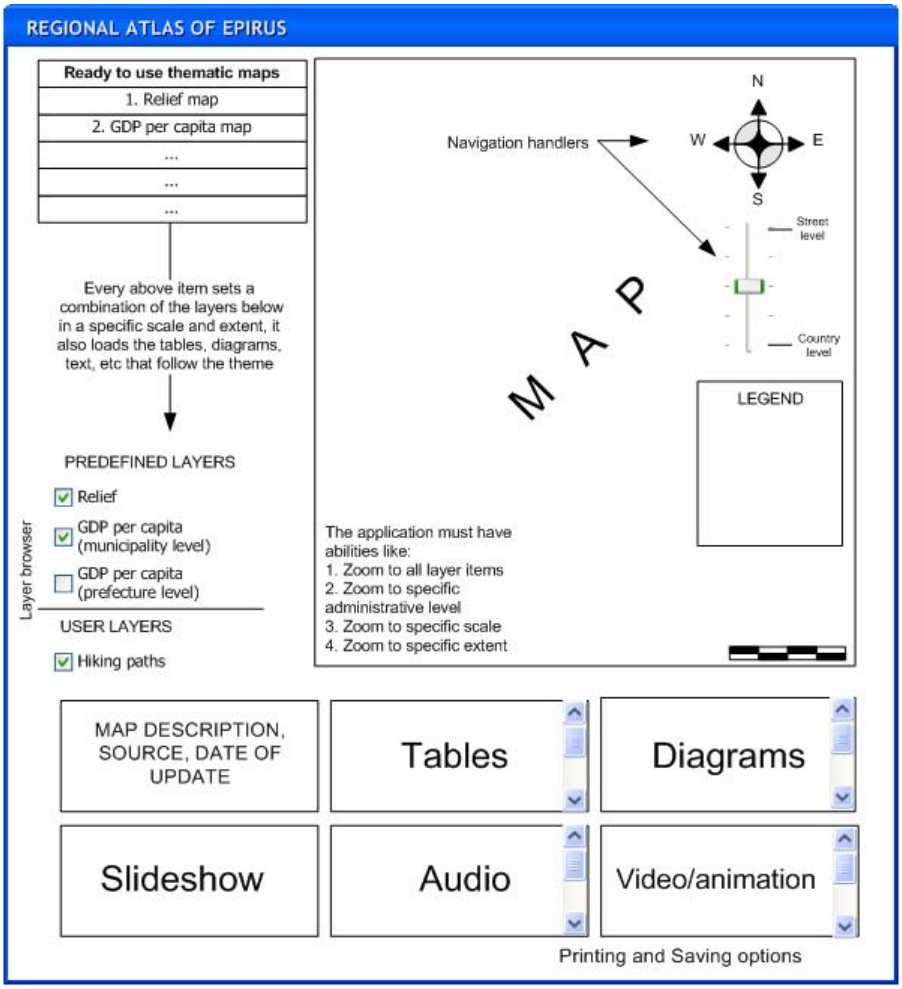

Figure 1. The application design and contents

That feature is useful for people who will use the Atlas as a tool and may want to do more than just looking at the prepared map and create maps of their own.

The image above shows how all the features described before could be implemented. The application form consists of a themes table of contents, a layer browser, a map tool, a list of relative documents, a list of tables containing the variables that were used in the map or other relative statistics, a list of diagrams that may follow the tables, a list of pictures, a list of sounds and a list of videos/animations. The user will be able to make queries to the database and navigate in the map by panning and zooming in/out. New technologies like Flash, Openlayers and other multimedia will be used to enhance interactivity. Printing and saving options will help people transfer the data from the Atlas, as it will be used for puproses of research and planning.

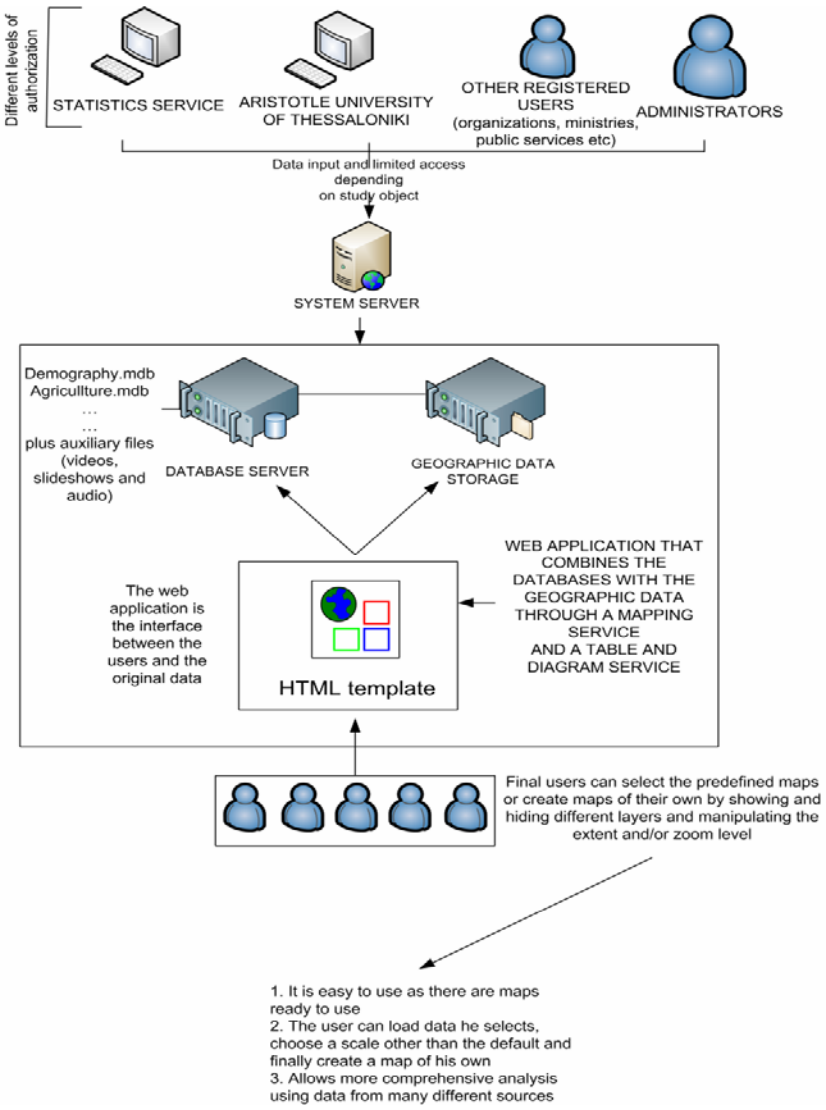

Figure 2. The Regional Atlas structure

As far as the functionality of the Atlas is concerned, there should be different levels of authorization to the system. This will protect the system from errors and keep it organized. The publication of the themes from registered and acknowledged users such as public services will provide the Atlas with validity and accent it into a tool for anyone interested (students, planners or administrative services). The users will have no access to the data, the registered users will have limited access and the administrators will have full access. The existence of a section for free users is an issue to discuss. Users will be able to propose and create themes that will be examined by a research agency or comment on the existing ones, achieving participatory mapping.

A very important part of the system is the author. The author is the person or group of people that will build a theme. Anyone who wants to contribute to the Atlas must provide the data to the administrators to upload the theme. The documents and tables must have the appropriate references and they must also provide the cartographic data if necessary with the styles they want to use. Some checking must be done before the upload to the Atlas application. This procedure will protect the Atlas from being abused and will combine the frequent updating with validity. The goal of the whole system, creating a live Atlas as an electronic encyclopedia is achieved effectively through this system.

3. Regional Atlas of Epirus

As we mentioned before, the purpose of this work is the creation of a Regional Atlas applicable to a particular geographical area of Greece, Epirus. The region of Epirus is currently the most mountainous and less developed, at both national and European level. The Atlas will have two forms. There will be a printed and a electronic form so that the update of the data will be possible. The electronic version of the atlas will be managed by local authorities, who will update the data. Initial data will be used from the population census of 2001 of NSSG and then the Atlas will be constantly enriched with new data from new surveys of NSSG, so it will have a dynamic form (Tsoulos, 2000).

The Regional Atlas of Epirus is required to meet educational and administrative needs. It will be used to support social and economic development programs of the region on one hand and teaching, education and research needs, on the other. Thus, the Atlas should include a wide range of data to be reported and reflect the conditions in the area, using maps, diagrams and text for better results. The data in the atlas will be listed at the municipal and the departmental level because this is the basic unit of government in Greece and will be bilingual (Greek and English).

4. Thematic contents of the Atlas

The Atlas will cover needs of surveying the local conditions, as they are used in the regional planning and it covers the physical, economic and man-made environment. The structure of the thematic content of the Atlas will be referring to three major sections of describing the region:

a. analysis of the geographical composition
b. an analysis of geographical features of the mountainous area
c. presentation of complex processes of spatial organization.

The thematic contents of the atlas are described in further extent in the chart below (Myridis, 1989b).

1. Natural Environment

- Bas-relief
- Land characteristics
- Climatic characteristics
- Geological characteristics
- Hydrography
- Flora
- Fauna
- Protected areas

2. Demographic characteristics

- Population development
- Age-related structure of population
- Population composition
- Population density
- Immigration
- Natural population movement

3. Socio-economic characteristics

- Educative level of population
- Characteristics of households
- Familial situation
- Financially active population
- Employment
- Unemployment

4. Economic activity

- Primary sector
  - Agriculture
  - Stockbreeding
  - Fishery
  - Mining
- Secondary sector
  - Constructions
  - Manufacture – small industries
  - Industries
- Tertiary sector
  - Tourism
  - Trade
  - Services

5. Cultural characteristics

- Cultural resources
- Cultural institutions
- Cultural events

6. Infrastructures

- Technical infrastructure
  - Road network
  - Sea transport
  - Air transport
  - Rail network
  - Water Network
  - Sewerage network
  - Environmental Infrastructure
  - Energy Infrastructure
  - Telecommunications Networks
- Social infrastructures
  - Education
  - Welfare
  - Health services

7. Regional and urban characteristics

- Built-up network
- Land uses
- Urban characteristics
- Building reserve

The figures below are sample maps of the thematic contents.

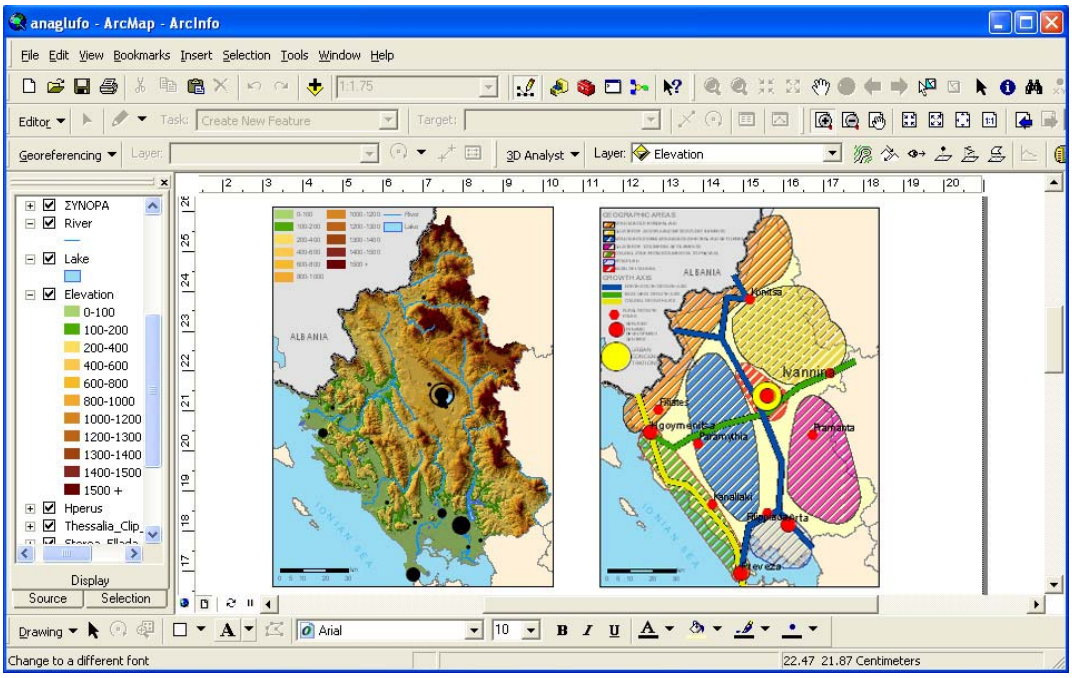

Figure 3. Bas-relief - Spatial development model

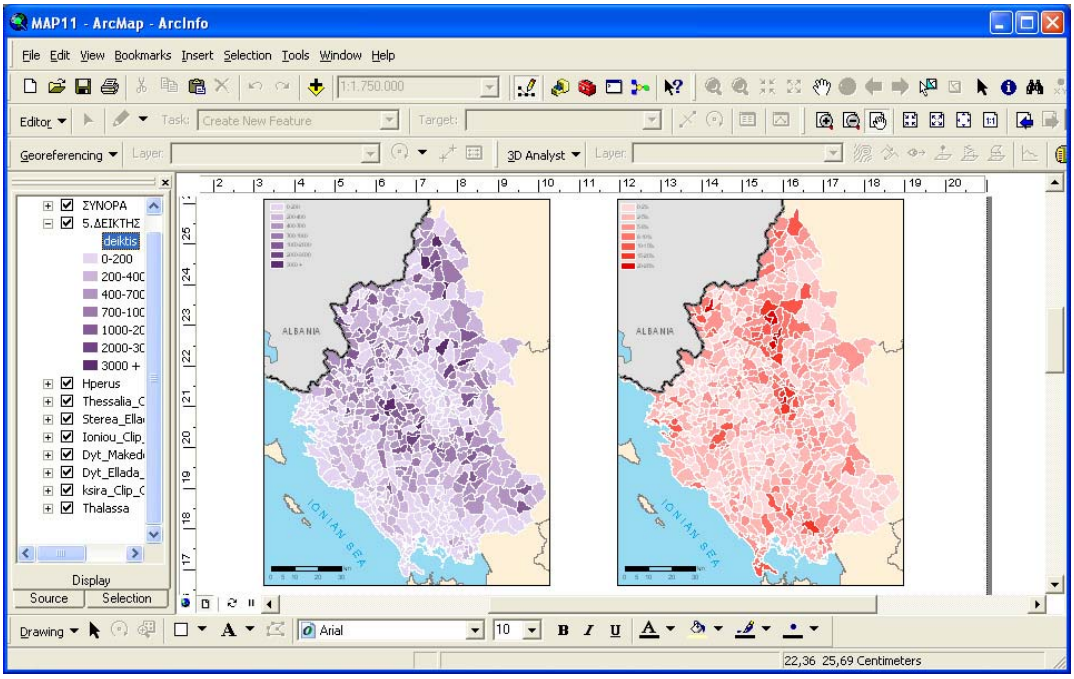

Figure 4. Aging index - Percentage of highly educated population

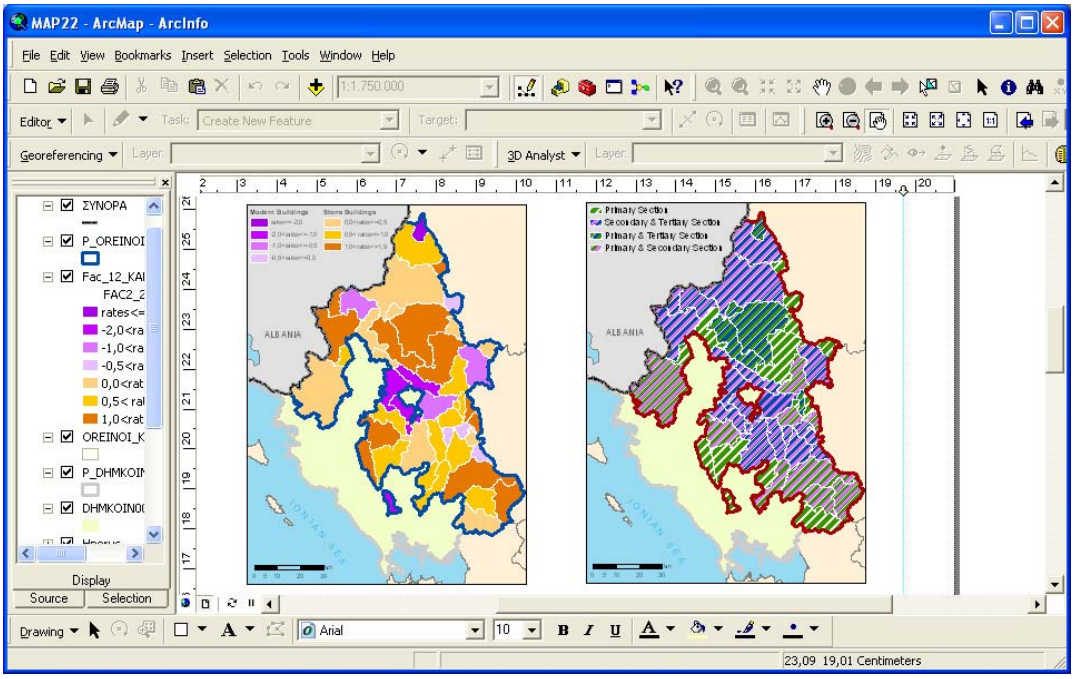

Figure 5. Buildings of stone and modern buildings - The three sectors of production

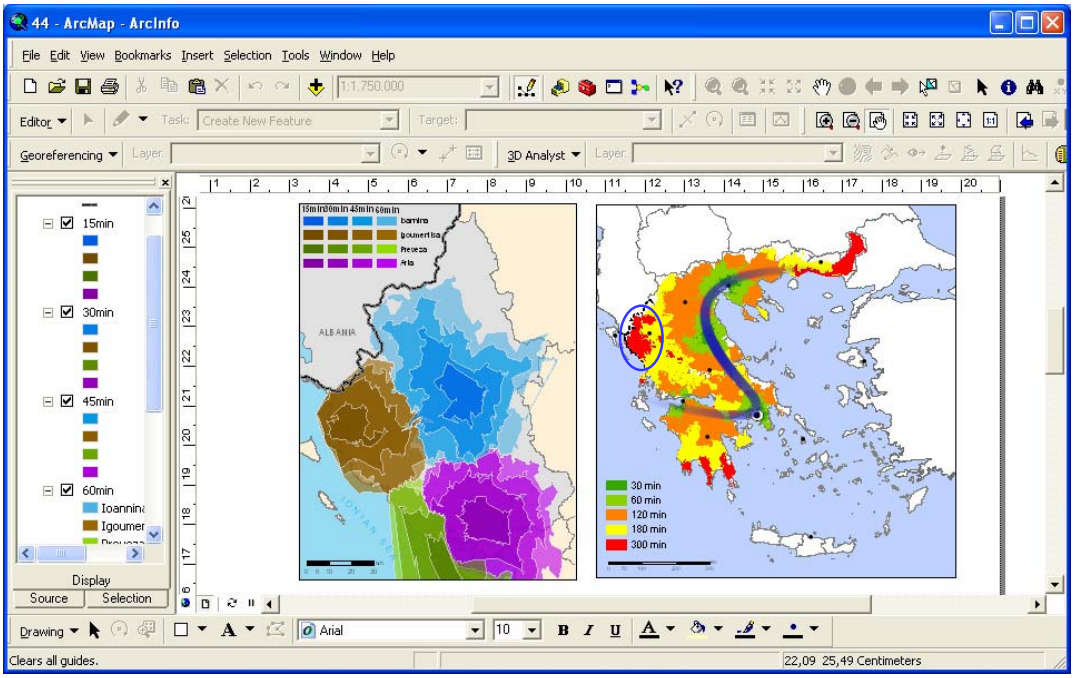

Figure 6. Time travel from capitals of prefectures – Time travel from the Greek growth axis (S)

5. Technical features

For the construction of the maps the Transverse Mercator Projection is used with the geodetic reference system by the Greek Geodetic Reference System of 1987. The rest of the properties are: central meridian the 24th meridian, Latitude of Origin the Ecuador, Scale Factor equals to mo = 0,9996 and False Easting c = 500.000. The maps were constructed on a uniform scale 1:1.500.000, appropriate for Regional Cartography in Greece.

6. Conclusions

The Regional Atlas of Epirus is to fill the gaps that occur due to the lack of concentrated and organized information its mapping and Geographic atlases particularly at regional level. Thus, the Atlas will be a model for further attempts in Greece, as will be the first attempt to design an electronic interactive tool which will gather all the data and characteristics at regional level. Indeed, the application in a particular geographical area of Greece, Epirus, which is the most mountainous and less developed region, at both national and European level will assist in the more organized and integrated development planning. The electronic version of Atlas enables continuous updating with new data while the availability through the Internet, enables quick and easy access to scientists involved in regional development and also the ordinary citizen, student or adult.

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