MAP TRANSFORMATION SCALE 1:25000 FROM ANALOG TO DIGITAL VECTOR WITH ArcGIS 10.3

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Abstract

Vectorization can involve a series of procedures to achieve an acceptable raster-to-vector conversion. It can be as simple as executing one command to generate the vector features. Depending on the state of the input raster data you are working with, the vectorization process varies. This section is intended to provide an overview of the automatic vectorization experience. For vectorization we chose a trapeze in eight colors, scale 1:25,000. The software we work with is ArcGIS 10.3.

Key words: vectorization, vector, raster, ArcGIS, maps

INTRODUCTION

ArcGIS is a geographic information system (GIS) for working with maps and geographic information. It is used for: creating and using maps; compiling geographic data; analyzing mapped information; sharing and discovering geographic information; using maps and geographic information in a range of applications; and managing geographic information in a database. The system provides an infrastructure for making maps and geographic information available throughout an organization, across a community, and openly on the Web.

MATERIALS AND METHODS

ArcGIS Extension:

1. ArcGIS Spatial Analyst

ArcGIS Spatial Analyst provides a broad range of powerful spatial modeling and analysis tools. You can create, query, map, and analyze cell-based raster data; perform integrated raster/vector analysis; derive new information from existing data; query information across multiple data layers; and fully integrate cell-based raster data with traditional vector data sources. Integrated with the geoprocessing framework, ArcGIS Spatial Analyst offers easy access to numerous functions in ModelBuilder™, a graphic modeling tool.

2. ArcGIS 3D Analyst

ArcGIS 3D Analyst provides powerful and advanced visualization, analysis, and surface generation tools. Using ArcGIS 3D Analyst, you can seamlessly view extremely large sets of data in three dimensions from multiple viewpoints, query a surface, and create a realistic perspective image that drapes raster and vector data over a surface.
3. ArcGIS Geostatistical Analyst
ArcGIS Geostatistical Analyst provides a powerful suite of statistical models and tools for spatial data exploration and optimal surface generation. It allows you to create a statistically valid prediction surface, along with prediction uncertainties, from a limited number of data measurements. From determining whether an environmental safety threshold has been exceeded to locating mineral deposits, ArcGIS Geostatistical Analyst lets you model spatial data in a reliable and intelligent way. ArcGIS Geostatistical Analyst enables you to take advantage of these tools and techniques in an interactive graphical user interface (GUI) and as web services.

4. ArcGIS Network Analyst
ArcGIS Network Analyst provides network-based spatial analysis, such as routing, fleet routing, travel directions, closest facility, service area, and location-allocation. Using a sophisticated network data model, users can easily build networks from their GIS data. ArcGIS Network Analyst enables users to dynamically model realistic network conditions, including one-way streets, turn restrictions, height restrictions, speed limits, and variable travel speeds based on traffic.

5. ArcGIS Schematics
ArcGIS Schematics provides a powerful suite of tools to automate schematic representations of spatial or nonspatial data by taking advantage of core ArcGIS symbology and labeling. It allows you to schematically represent any kind of physical network including utilities (telecommunication, electric, gas) and transportation (railways, aviation, roads) and visualize virtually any logical network including social and economic networks. ArcGIS Schematics lets you rapidly visualize and check your data connectivity, quickly understand network architecture, and shorten the decision cycle by presenting focused views of the data.

6. ArcGIS Tracking Analyst
ArcGIS Tracking Analyst extends the time-aware capabilities of ArcGIS with advanced functions to let you view, analyze, and understand spatial patterns and trends in the context of time. By providing tools for time-dependent symbolization and time-based analysis, Tracking Analyst automates and enables the tracking and discovery of time-related trends and patterns. When combined with Tracking Server or GeoEvent Processor for Server, ArcGIS Tracking Analyst can be used to create a real-time GIS tracking system.
7. ArcGIS Publisher
ArcGIS Publisher gives you the freedom to easily share and distribute your GIS maps, globes, and data with anyone. ArcGIS Publisher converts ArcGIS map and globe documents to Published Map Files (PMFs). PMFs are viewable through ArcGIS for Desktop products including ArcReader™, a free downloadable application from Esri. PMFs contain instructions about the location and symbology of data layers (rendering rules, scale dependencies, etc.) so you can quickly, easily, and securely share dynamic electronic maps locally, over networks, or via the Internet. ArcGIS Publisher also enables you to easily package PMFs together with their data, if desired. Developers can use the ArcGIS Publisher extension’s ArcReaderControl to create and distribute royalty-free, customized ArcReader application 2D or 3D maps.

8. ArcGIS Data Interoperability
ArcGIS Data Interoperability eliminates barriers to data sharing by providing state-of-the-art direct data access; data translation tools; and the ability to build complex spatial extraction, transformation, and loading (ETL) processes. Jointly developed by Esri and Safe Software—an Esri corporate alliance—this extension is built on Safe Software’s industry-standard FME technology. ArcGIS Data Interoperability allows you to use any standard GIS data, regardless of format, within the ArcGIS for Desktop environment for mapping, visualization, and analysis. The Workbench application, included with the extension, enables you to build complex spatial ETL tools for data validation, migration, and distribution.
RESULTS AND DISCUSSIONS

For vectorization we chose a trapeze in eight colors scale 1: 25,000. We work with ArcGIS software is version 10.3 Desktop.

**Create a theme in ArcGIS 10.3**

- To create a theme launch project in ArcGIS with extension .mxd and then click with your mouse on catalog.
- Click with the mouse to create a new theme **Home - 9201\New\Shapefile**
- Add a theme name in the window **name** and then choose the appropriate type (**Feature Type**) of entity theme we want to represent in vector format.

![Figure 9. Creating a new shapefile](image)

![Figure 10. We choose coordinate system -Stereo 1970](image)

- Click the Edit button to select the projection system (**Projected Coordinate Systems/National Grids/Europe/Stereo 1970**) and then we press **Ok**.

- The new theme apper in the Table of contents/Layers.
- The new created theme is saved with the name we want and the extension .dbf, .prj, .shp, .shx

**Editing a theme in ArcGIS 10.3**

- Check the existence of the **Editor toolbar** on the menu toolbar. If this doesn’t exist we click **Customize/Toolbars** and then we thick the **Editor toolbar**.
- Before starting the actual editing we must complete columns of table attributes. We click on the **Table Of Contents/Layers** on the shapefile. Right click on the Atribute table opens a submenu proper attributes table, there are already three default fields: **Fid, Shape, ID.**
If we want to add new fields click on the table options and then we click Table/Table Option/Add Field.

To start the actual editing we position ourselves with the mouse on the desired theme and we click on the Start editing.

After vectorization open the attribute table and fill in the fields created.

After we finished vectorized we close the editing session: Stop editing and Save edits.

CONCLUSIONS
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