GENERAL DIRECTORATE OF MAPPING

(HARİTA GENEL MÜDÜRLÜĞÜ)

TURKEY

NATIONAL REPORT

(2015-2019)

18th General Assembly

International Cartographic Conference

Tokyo – JAPAN, 15-20 July 2019

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INTRODUCTION

This report contains the cartographic activities between 2015-2019 in General Directorate of Mapping (GDM) (Turkey).

1. PRODUCTION ACTIVITIES

According to her law of foundation, GDM is responsible for the production of maps needed for defense and development purposes. Therefore, the production of base scale maps at 1/25.000 and other topographic maps at 1/50.000 and 1/100.000 scale which are generalized from base scale maps, 1/250.000 scale Joint Operations Graphics (JOG) series maps and Transit Flying Charts (TFC) as well as 1404 series 1/500.000 scale maps covering Turkey are under the responsibility of GDM.

Beside these products, GDM is also carrying out the production of small scale thematic maps, atlases and plastic relief maps.

a. 1/25.000 Scale Topographic Map Production

Base scale of Turkey's topographic maps is 1/25.000 and the country is covered with about 5534 sheets. The production of all sheets with conventional and digital method is completed. From the end of 1999 to beginning of 2014 all of the sheets are produced digitally. Since the beginning of 2014, second edition of digital production is started.

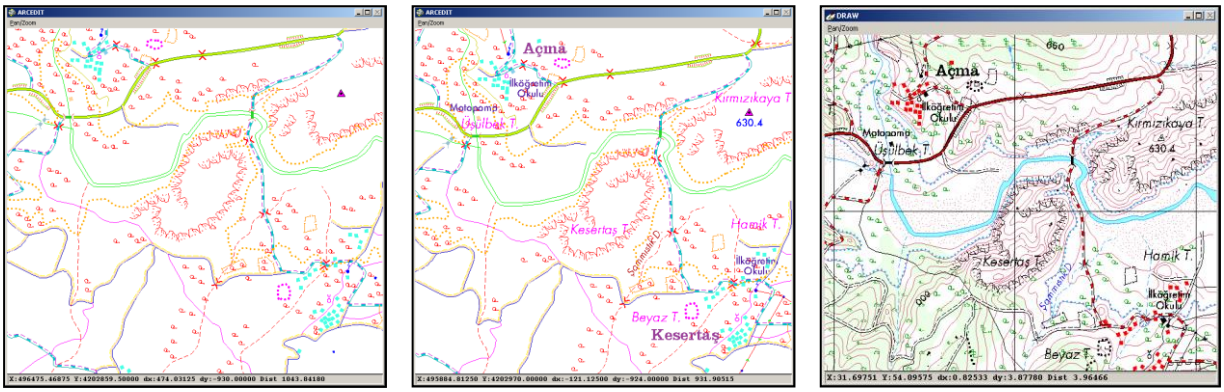
1/25.000 scale digital topographic map production is carried out with Arc/Info (workstation) software to the end of 2015. After this year all production methods and scripts are transfered to ESRI ArcGIS platform. Data is collected in vector format under 9 classes. These classes are shown in Table-1. At the end of the production, two products are obtained, one is vector and the other is a raster product. The vector product is called "1/25.000 scale Cartographic Vector Map" while the raster product is called "1/25.000 scale Cartographic Digital Map". Figure-1 shows different views of 1/25.000 Cartographic Vector Map.

Until the end of 2002 the production was carried out by heads-up digitizing of photogrammetric revision plates. At the beginning of 2003 the system is converted to digital data exchange between Photogrammetry and Cartography departments. Within the frame of this development "Feature Describing and Symbology Specification" is prepared and published in 2002, "Data Dictionary" and "Specification for Annotations" is prepared and published in 2003, "Production Specification" is published in 2006. "Feature Describing and Symbology Specification"" was updated in 2015 and it was divided into two parts by the name of "Cartographic Describing" and "Symbology Specification".

From the beginning of 2003, the base scaled maps have been produced with WGS-84 ellipsoid instead of International-1909 and a digital seamless library have been used for archiving these maps in UTM projection system after a quality control process performed. Maps added to this library are also used for generalization purposes.

Table-1: Themes of 1/25.000 scale Cartographic Vector Map

No	Abbreviation	Themes
1	Bnd	Boundaries
2	Ele	Elevation
3	Hyd	Hydrography
4	Tra	Transportation
5	Phy	Physiography
6	Uti	Utilities
7	Pop	Population
8	Veg	Vegetation
9	Ind	Industry



(a) (b) (c)

Figure-1: Different Views From 1/25.000 Cartographic Vector Map
(a) Vector data, (b) Vector data and annotations, (c) Vector Map

b. 1/50.000 and 1/100.000 Scale Topographic Map Production by Automated Generalization

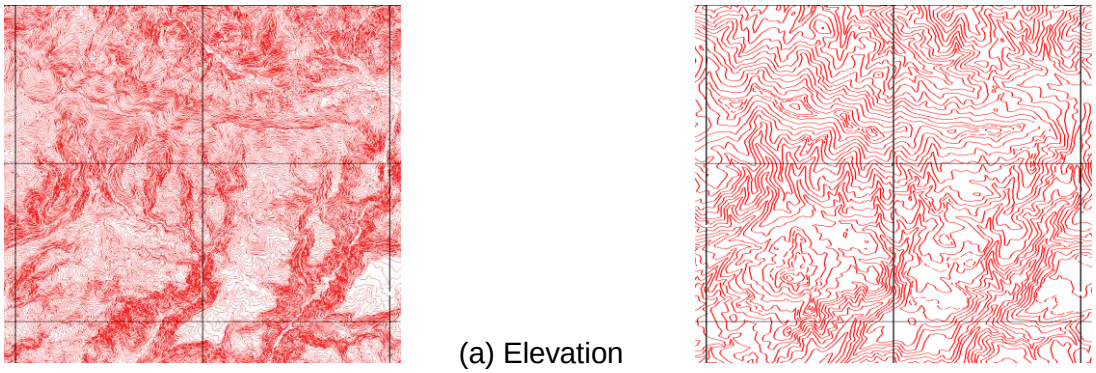
Conventional cartographic productions at these scales were ceased by the end of year 2000. A new project called “Computer Assisted Generalization Project” was initialized in 2002.

The objective of project was to design 1/100.000 and 1/50.000 scale digital topographic map production system. By the end of 2005, 1/100.000 scale map production system, and by the end of 2006 1/50.000 scale map production system had been realized. According to statistics, 75 % of cartographic processes are carried out automatically and the rest are made interactively. Hence, compared with the conventional production time spent was decreased to 50%.
To accomplish this project, following aims were realized.

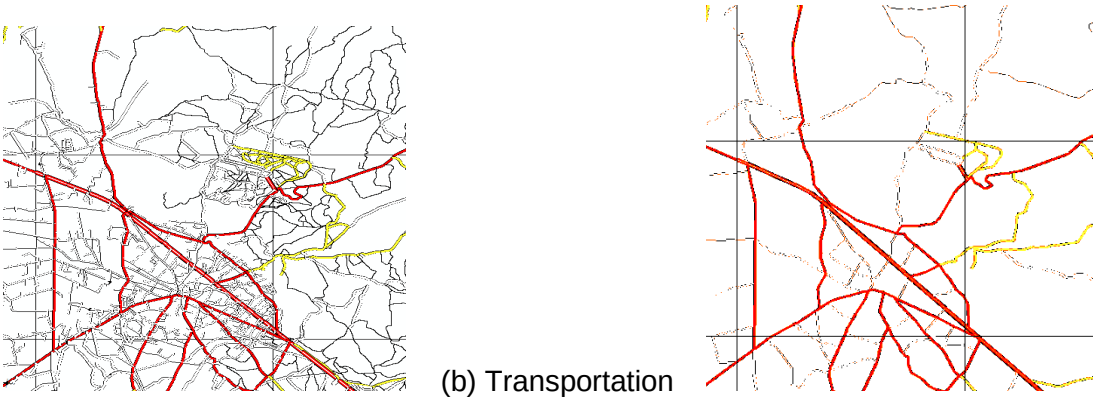
- Obtaining, defining and arranging the needed generalization rules,
- Defining and arranging the feature’s importance and priority list,
- Defining the generalization parameters,
- Obtaining the needed generalization algorithms,
- Investigating the present algorithms and their applicability to our needs, and modify and/or improve them or develop a new one, if needed.
- Defining the processes and their orders, and
- Defining the production lines

As mentioned above, project group created a semi-automatic production line by developing intelligent and sophisticated generalization tools using ArcGIS and its customization

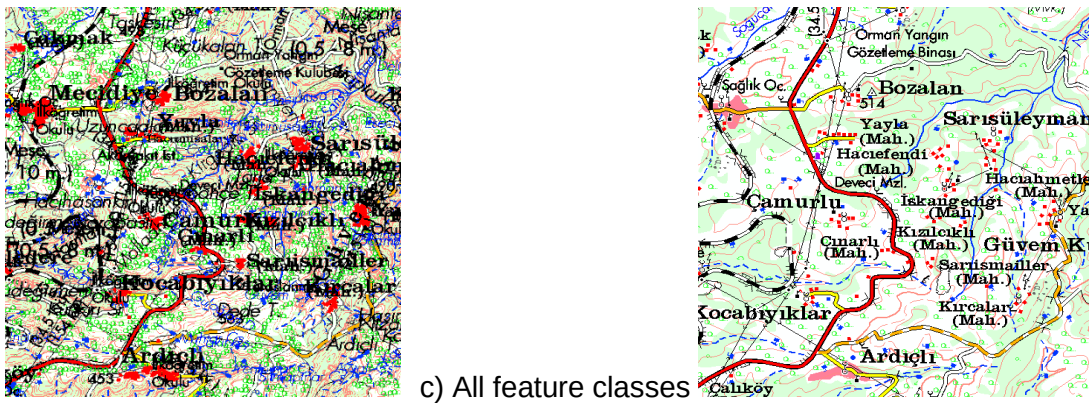
environment (ArcObjects, Visual Basic and C# Programming languages). With this production line, which is still improved by the project group, 1453 (100%) 1/50.000 and 391 (100%) 1/100.000 scaled maps will be produced until the end of 2019. So, we will have first version digital cartographic models of our maps. Generalization samples of different feature classes in 1/100.000 scale maps are given in Figure-2.



(a) Elevation



(b) Transportation



c) All feature classes

Figure-2: Samples of Different Feature Classes Before and After Generalization Process

c. JOG Series and TFC Series Map Production

JOG series (JOG-Ground and JOG-Air) and TFC series maps are produced from updated VMAP Level-1 database which is generated by collecting data from new version of 1/100.000 scale digital map data and sources from other databases. Aeronautical and other information (AIP, DAFIF, DVOF, etc.) are taken from General Directorate of State Airport Authority and Turkish Air Forces respectively.

Production work-flow from VMAP Level-1 database is given in Figure-3. JOG and TFC series maps (Figure-4, Figure-5, Figure-6) are all produced in the same production line. Map data except from aeronautical information are same for these three maps. Some extra annotation and graphic edits are needed for cartographic design of the final products.

ESRI and Adobe platforms are used for the production. Defense Mapping Tools are used and tools are developed by our staffs for the automation of the production process.

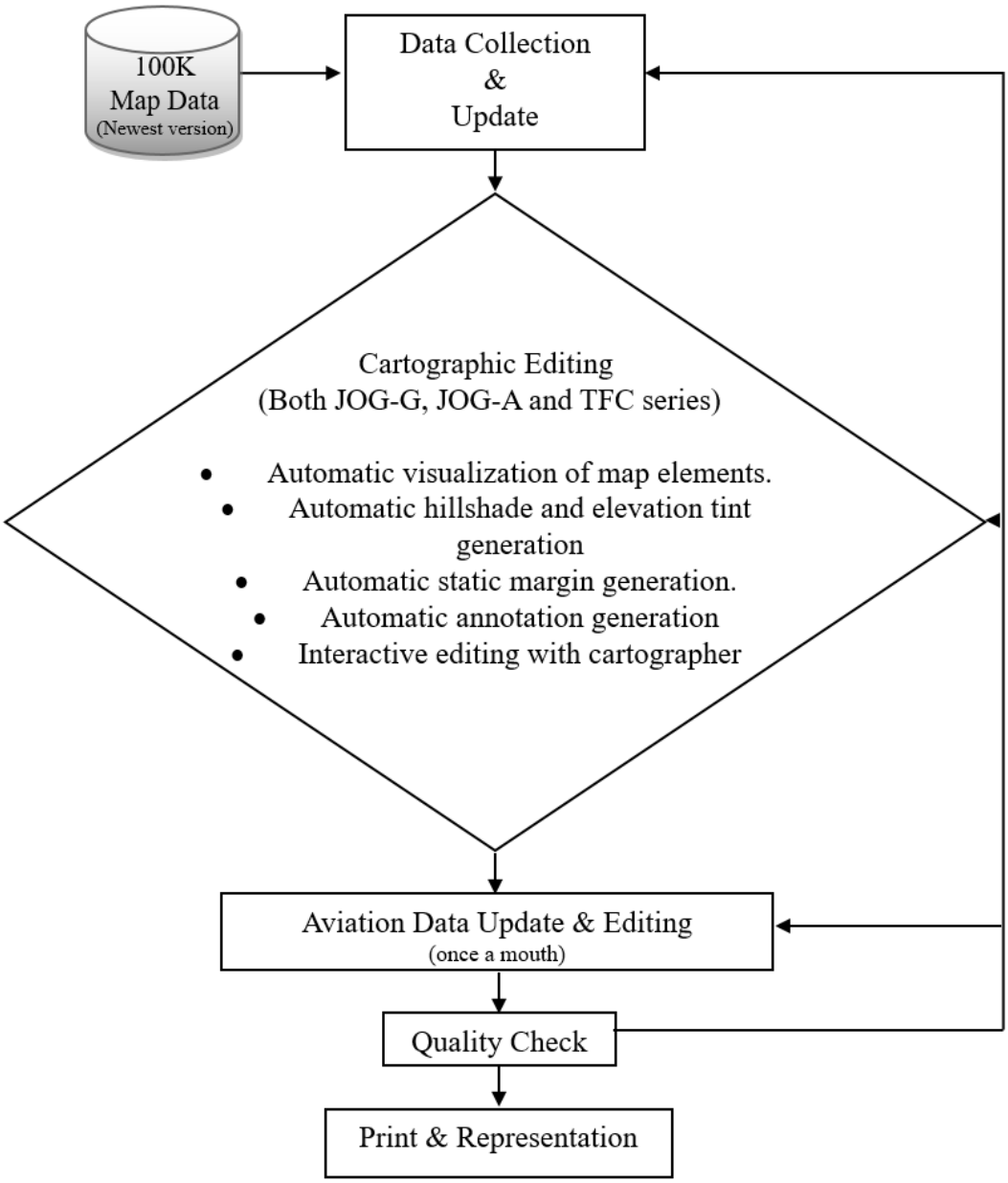


Figure-3: Flow Chart of JOG Series Map Production

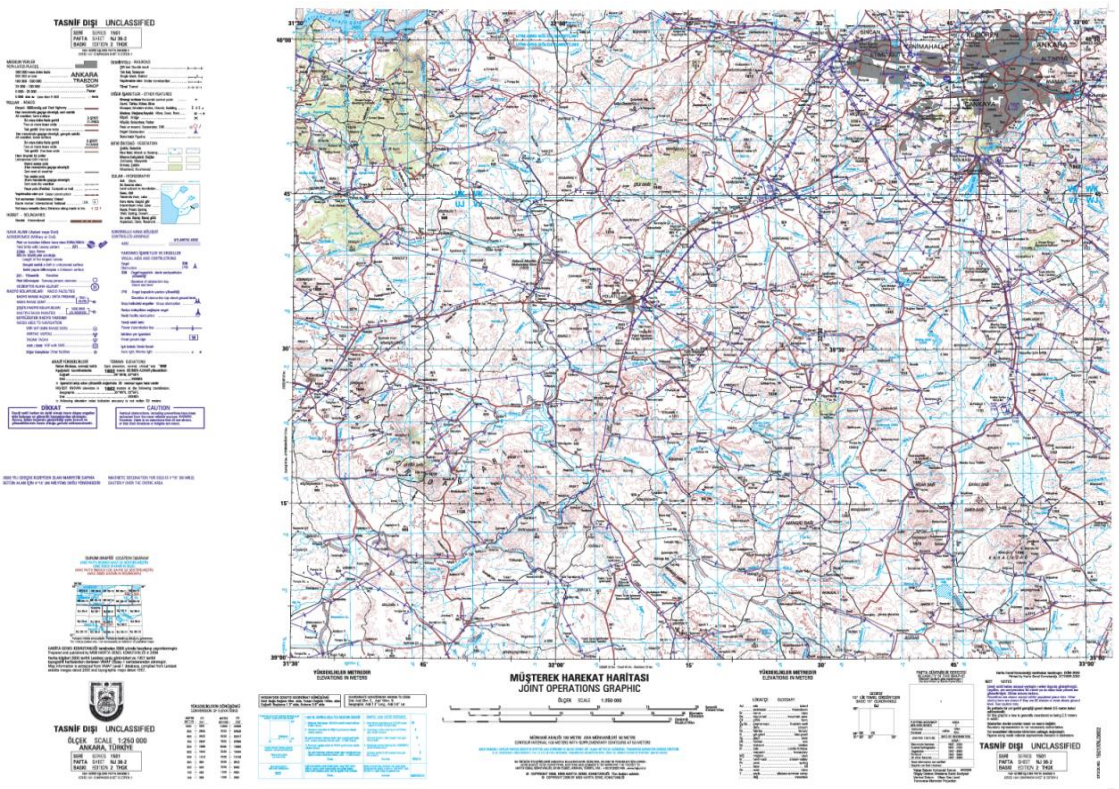


Figure-4: JOG Series Map

Figure-5: Sample of 1/250.000 scaled JOG-Air Chart

Figure-6: Sample of 1/250.000 scaled TFC Chart

d. 1/500.000 Scale Topographic Map Production

GDM is able to produce small scale topographic maps and air charts at 1/250.000 and 1/500.000 scales, as well. 1404 series 1/500.000 scale topographic maps and special aeronautical charts are produced from 1/250.000 scale maps by generalization. The techniques of cartographic visualization are different from the other small scale topographic maps. The final product can be seen in Figure 7.

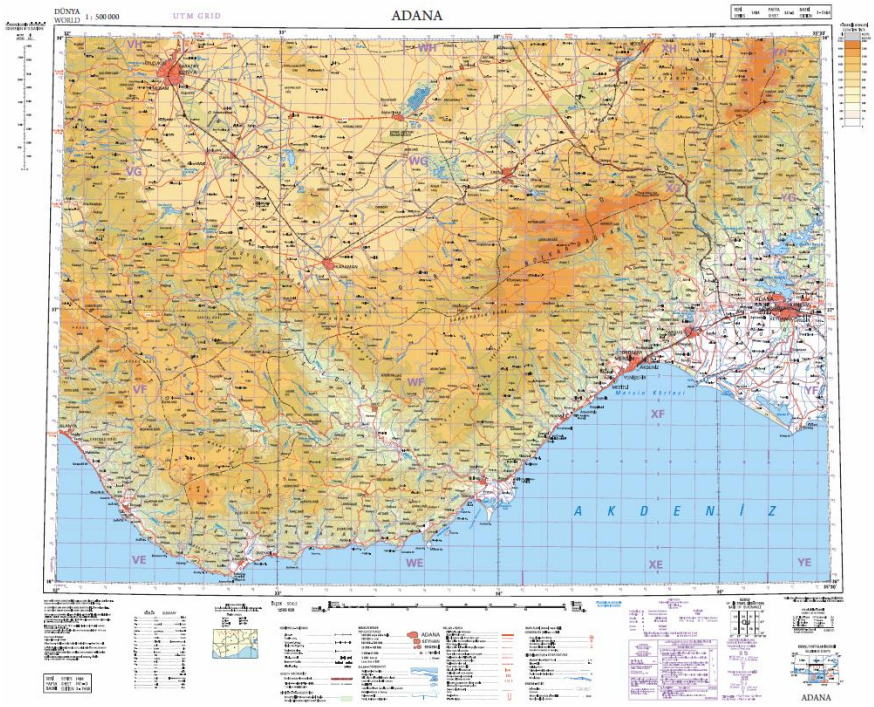


Figure-7: 1/500.000 Scale World Series Map Sample

e. Thematic Map and Atlas Production

Thematic maps and atlases are produced in various scale with a workflow given in Figure 8. Thematic map production is carried out using map services, ubiquitous applications in the frame of customer requirements and cartographic principles, as well. Product samples of the thematic maps can be seen through the official web site of GDM (www.map.gov.tr).

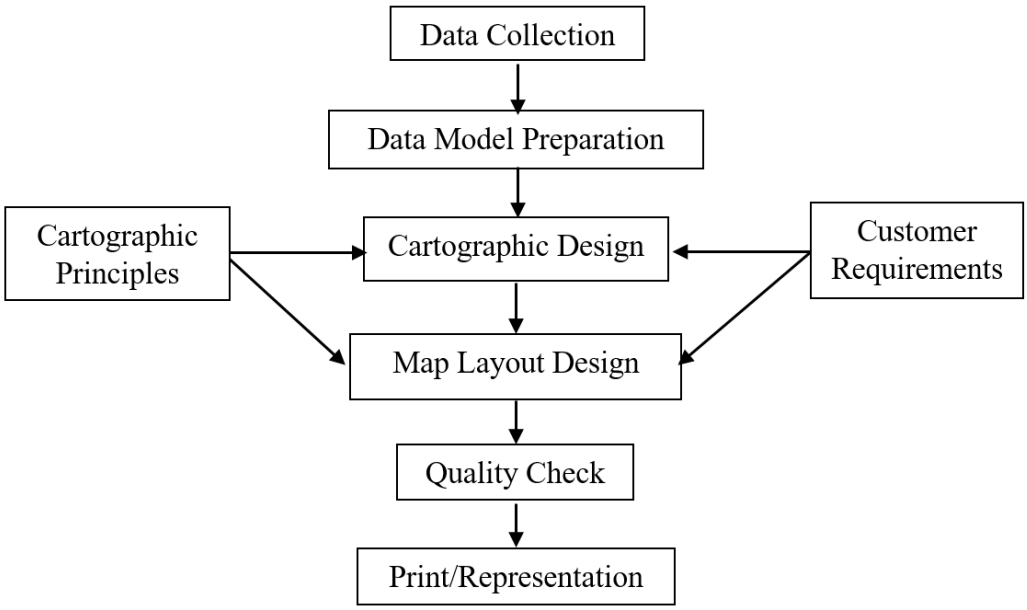


Figure-8: Flow Chart of Thematic Map Production

f. Gazetteer Production

First version of Mid-scale Gazetteer at scale 1:250.000 (Gazetteer-250-v1) containing features rendered on JOG maps at scale 1/250.000 was accomplished in-between 1997-1998 consisting of almost 45.000 names. This Gazetteer-250-v1 is produced according to standards put forward by NATO STANAG 2213.

The second version (Gazetteer-250-v2) is created by means of extracting natural features and populated places from Gazetteer-250-v1 and integrated Populated Places Database of Turkey (PPDB) respectively in July 2006. This gazetteer comprises of approximately 53.000 geographical names. The Gazetteer is being continuously updated by using produced JOGs which covers more than two thirds of Turkey and released from GDM's web site (www.map.gov.tr).

g. Web Map Application "HGM Atlas"

HGK-Atlas updated under the name of HGM-Atlas in 2019. New application is performed with vector tile technology. It works with vector data and it has already 20 different zoom levels from world to street. Users can display maps with different themes which are primary, physical, political, orthophoto and dark themes (Figure 9,10). At the same time HGM-Atlas serves some properties, all themes, search, geocoding and route service, to the other web applications with API services and in this way users can prefer the themes as a base map or use other services for their applications (https://atlas.harita.gov.tr).

Figure-9: Digital Atlas view with political themes

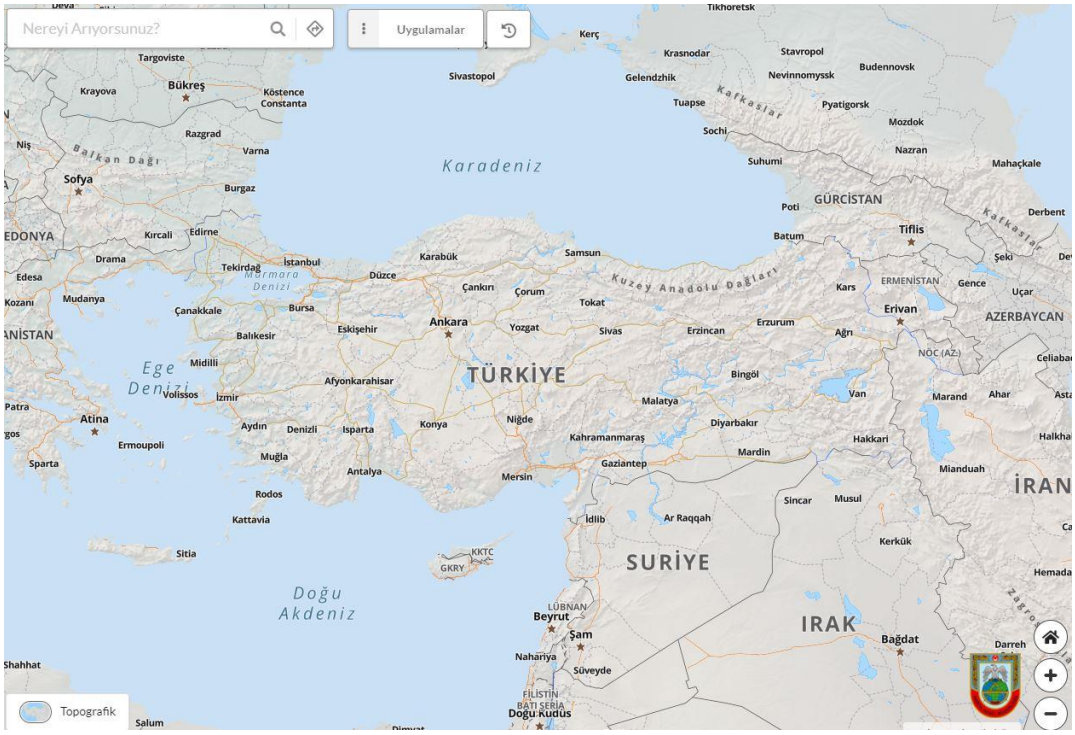


Figure-10: Digital Atlas view with physical themes

2. RELATIONS WITH OTHER ORGANIZATIONS

To contribute to the national/international cooperation and collaboration, to catch up with the latest technological developments and benefit from international expertise and provide the staff with fast and updated information, GDM having been National Mapping Agency (NMA) for Turkey is eager to work closely with national/international organizations and national mapping agencies.

Geographic activities in NATO have been carried out in accordance with the decisions taken by "NATO Geographic Conference (NGC)" and "NATO Standardization Agency (NSA)". GDM participates in the relevant meetings regularly.

Apart from its active participation in geographic events in NATO, GDM is a member of Turkish Board of Experts on Geographical Names. This board is subordinated to the Ministry of Interior General Directorate of Provinces. The board is working on standardization of geographical names and also is responsible to represent Turkey in UN Geographic Names Conference and United Nations Group of Experts on Geographical Names (UNGEGN).

Besides International Cartographic Association (ICA) and the UNGEGN mentioned above, GDM is also a member of EuroGeographics.