

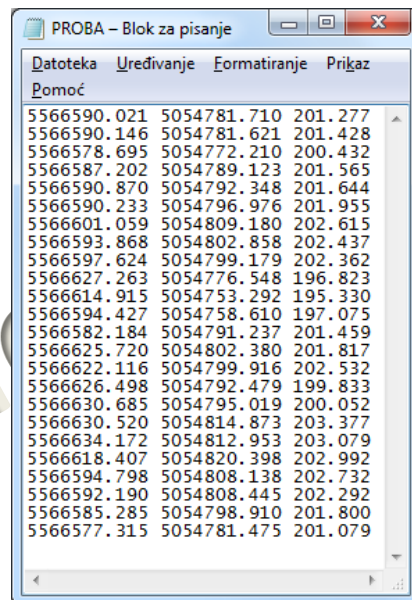
Vizualizacija prostornih podataka

Armando Slaviček

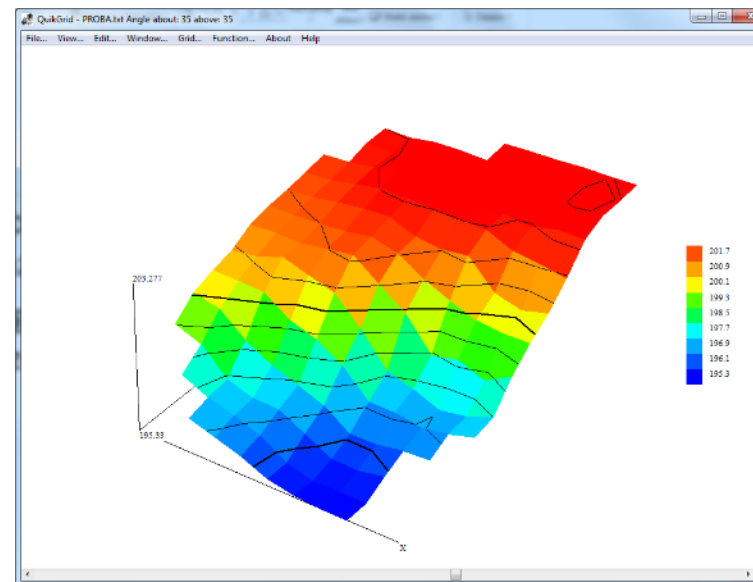
Digitalni model reljefa

Trodimenzionalne oblike zemljine površine nazivamo **reljefom**.

Digitalni model reljefa je numerički definiran nizom točaka s tri koordinate (y,x,z).



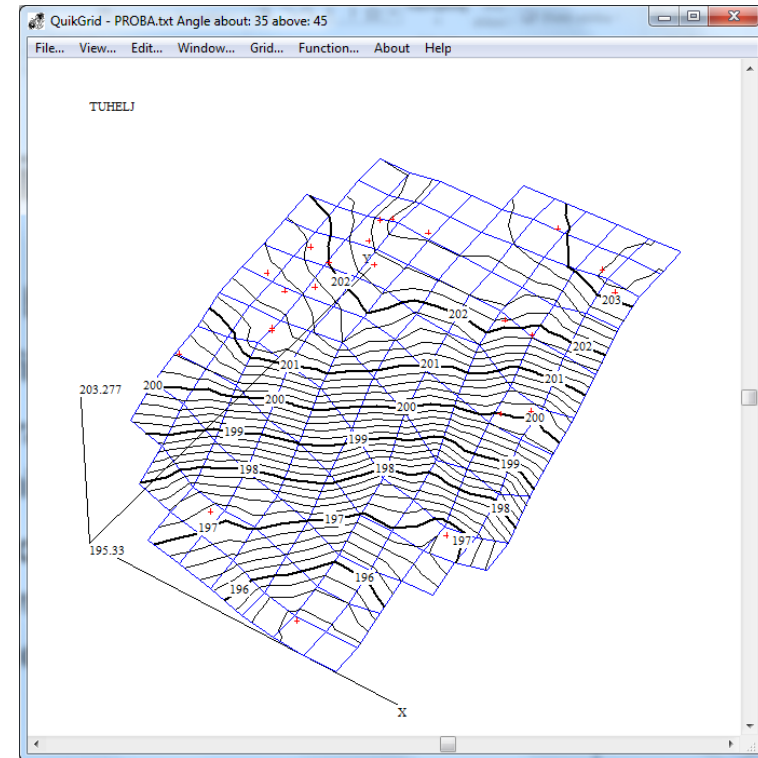
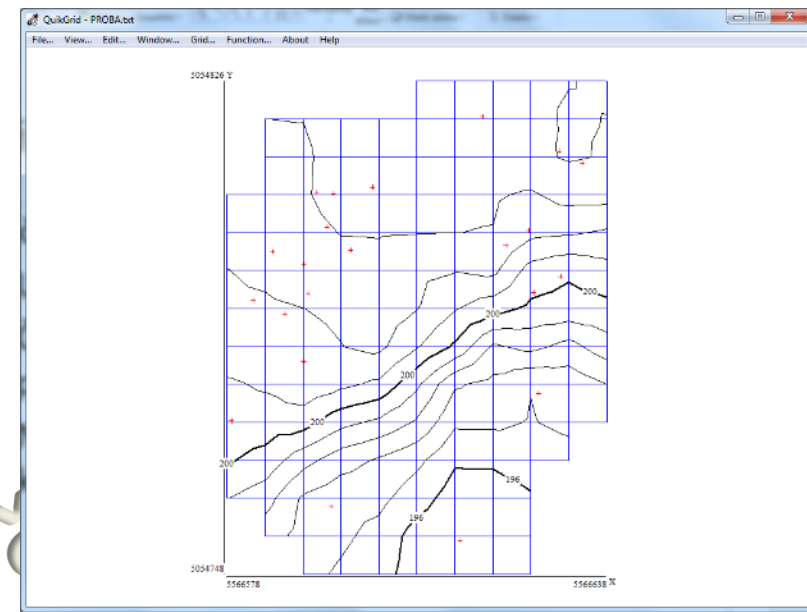
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Digitalni Model Reljefa

Točke mogu biti:

- Uduž profila
- Čvorovi pravilne mreže kvadrata, pravokutnika... (engl. Grid)
- Nepravilno razmještene na cijeloj površini za koju izrađujemo DMR



Digitalni Model Reljefa (engl. DEM – Digital Elevation Model)

Digitalni model reljefa možemo izraditi:

- Fotogrametrijskom izmjerom
- Satelitskim snimanjem
- Direktnom izmjerom na terenu
- Digitalizacijom postojećih snimki



Digitalni Model Reljefa

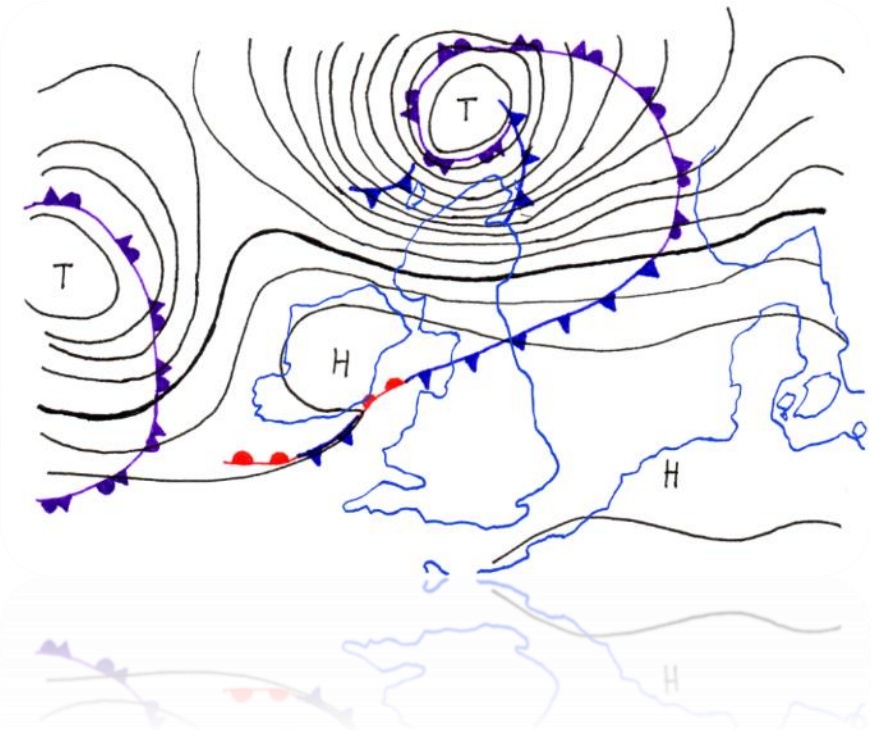
(engl. DEM – Digital Elevation Model)

Na temelju digitalnog modela reljefa mogu se programski izraditi:

- Razni trodimenzionalni prikazi
- Zemljovidi s izohipsama i izobatama

Treća koordinata uglavnom predstavlja nadmorsku visinu, no može predstavljati i temperaturu zraka, zemaljski magnetizam, pritisak zraka,...

Temeljem tih podataka mogu se izraditi različiti tematski zemljovidi gdje se trećom dimenzijom mogu prikazati izolinije koje predstavljaju **izodiname** (u geofizici, krivulje koje na zemljopisnoj karti spajaju mjesta jednake jakosti Zemljina magn. polja), **izoterme** (izolinija temperature (crta iste temperature), **izobare** (linije koje na kartama povezuju mjesta istog tlaka zraka).

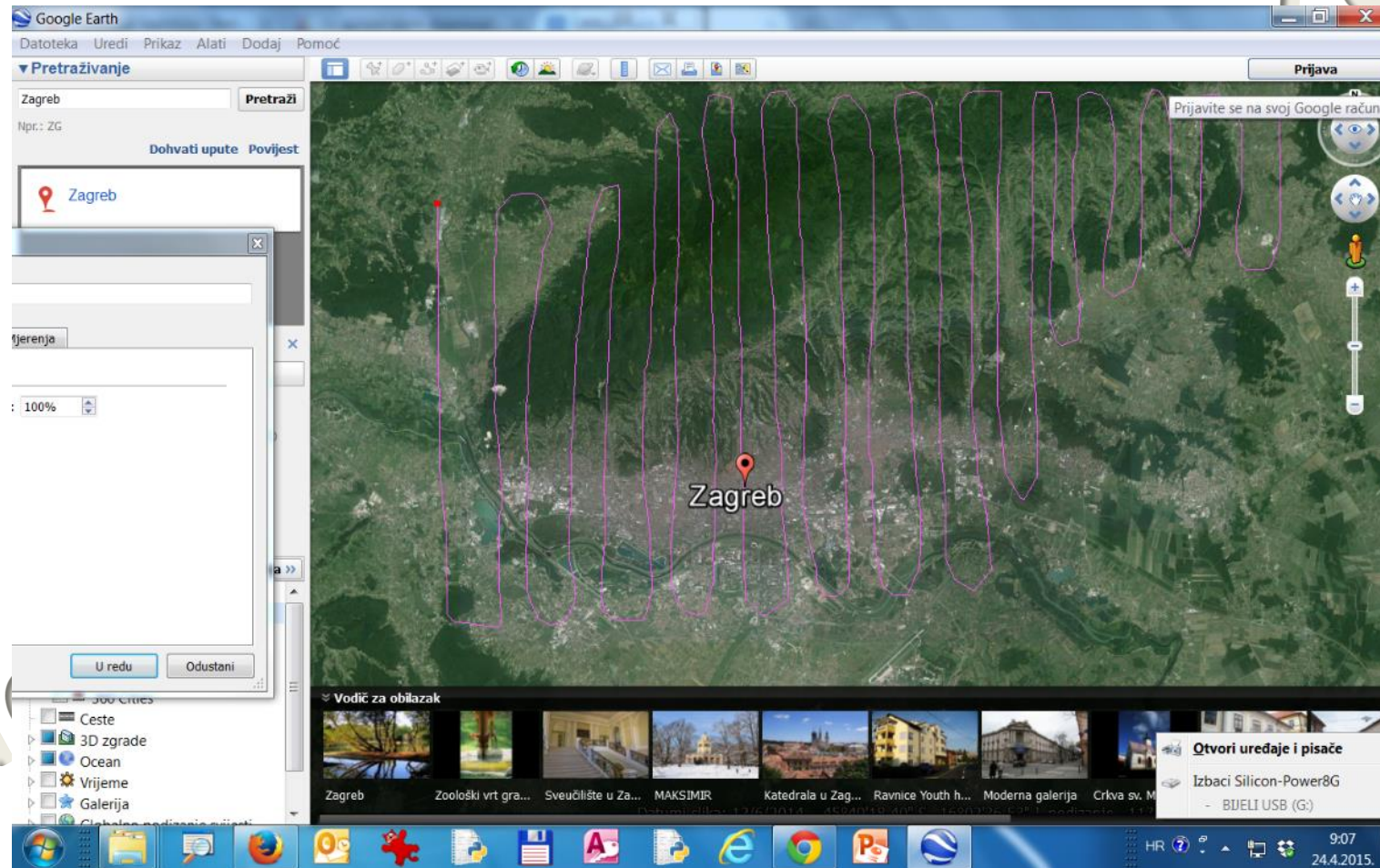


Google Earth

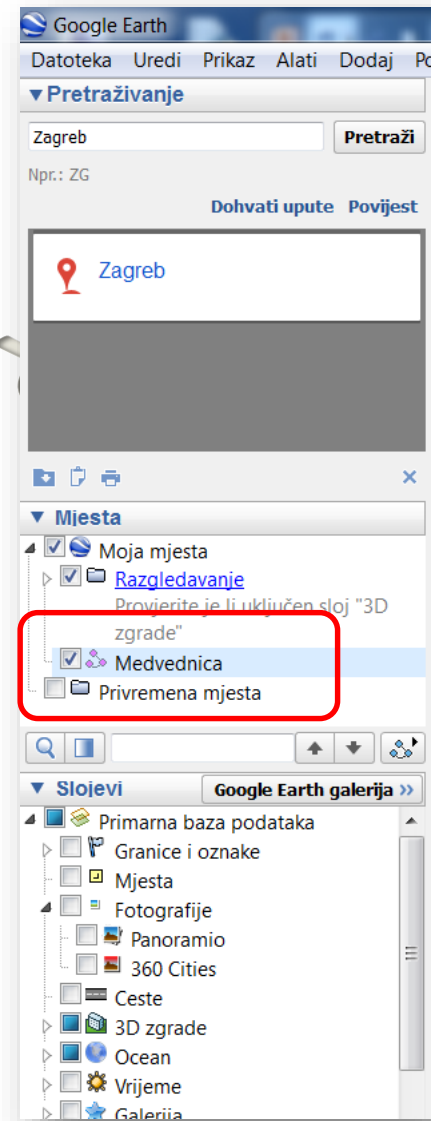
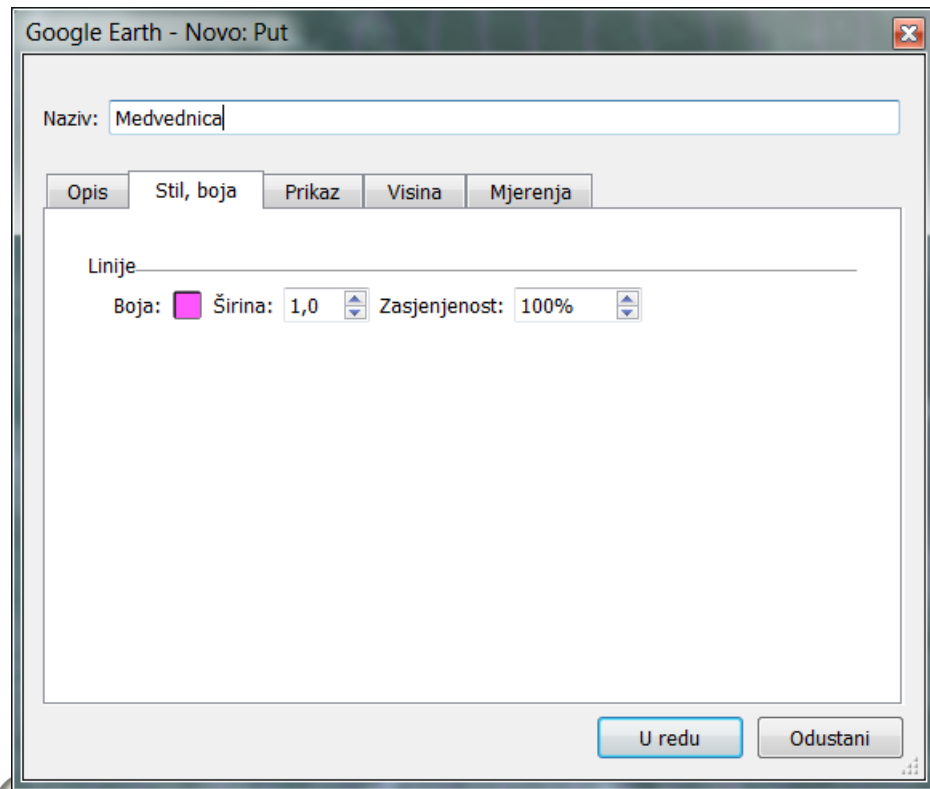
Geodetska tehnička škola, Zagreb

Google Earth

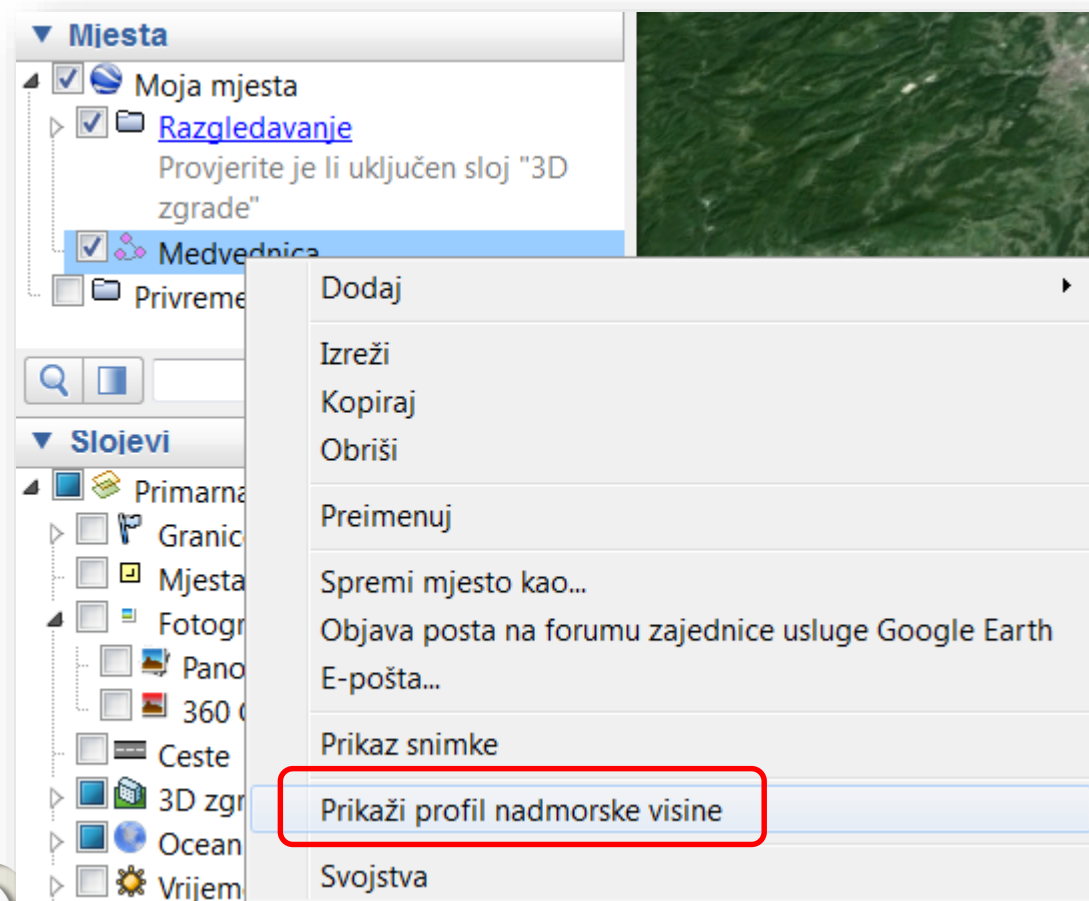
Zagreb



Geod



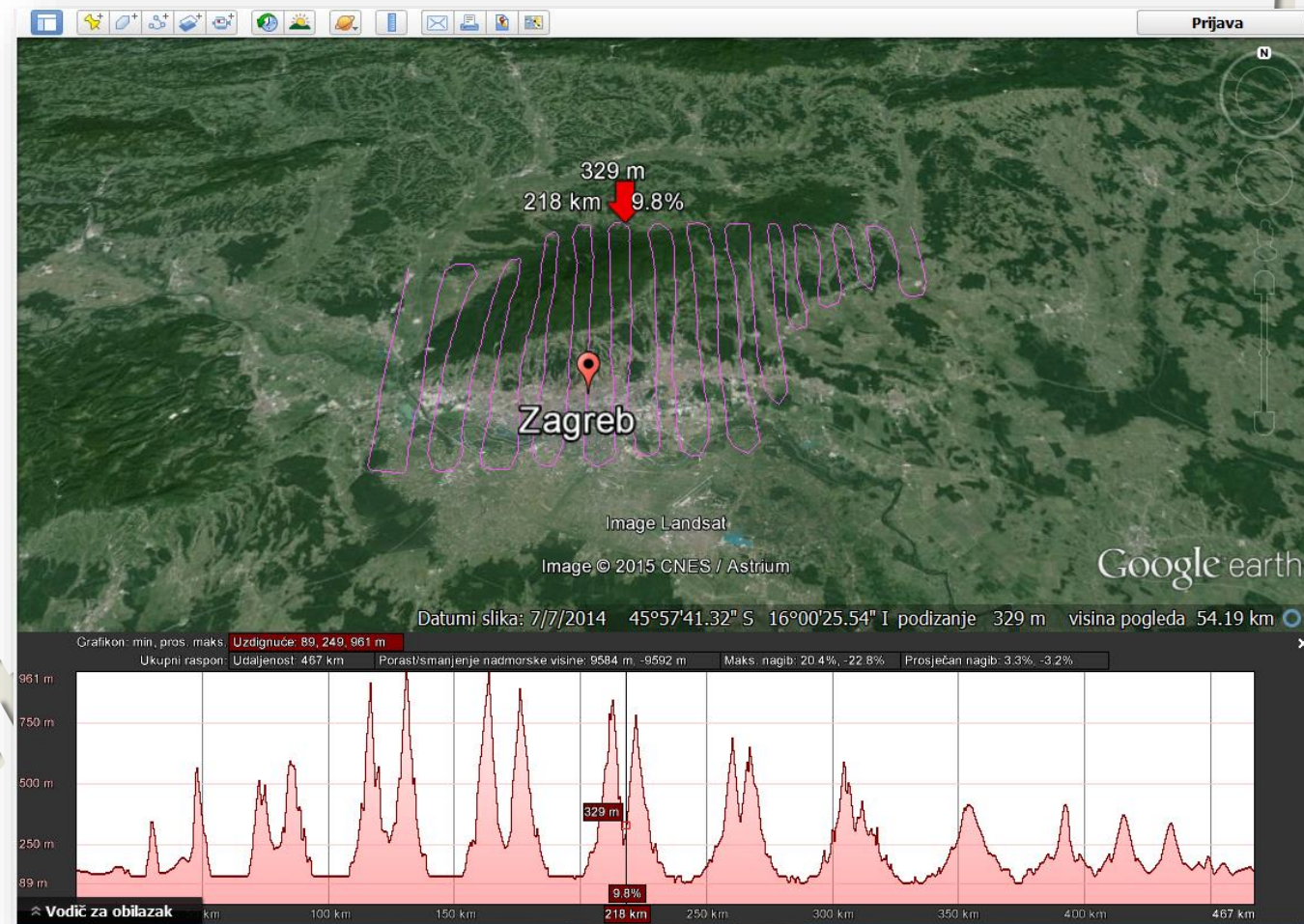
Prikaži profil nadmorske visine



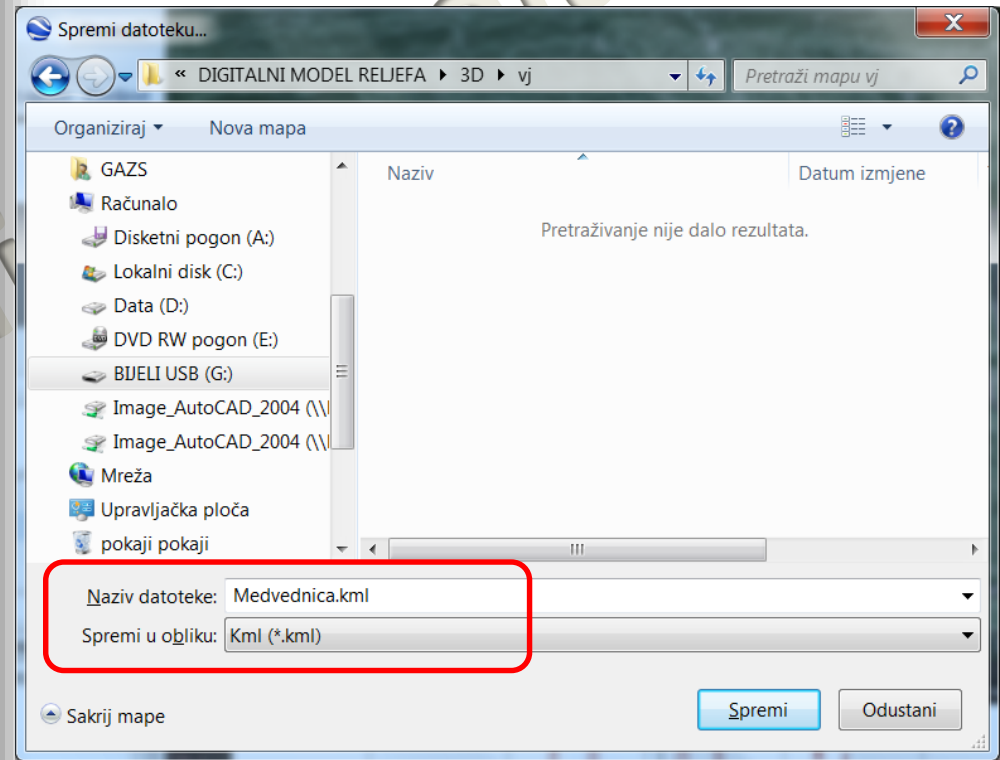
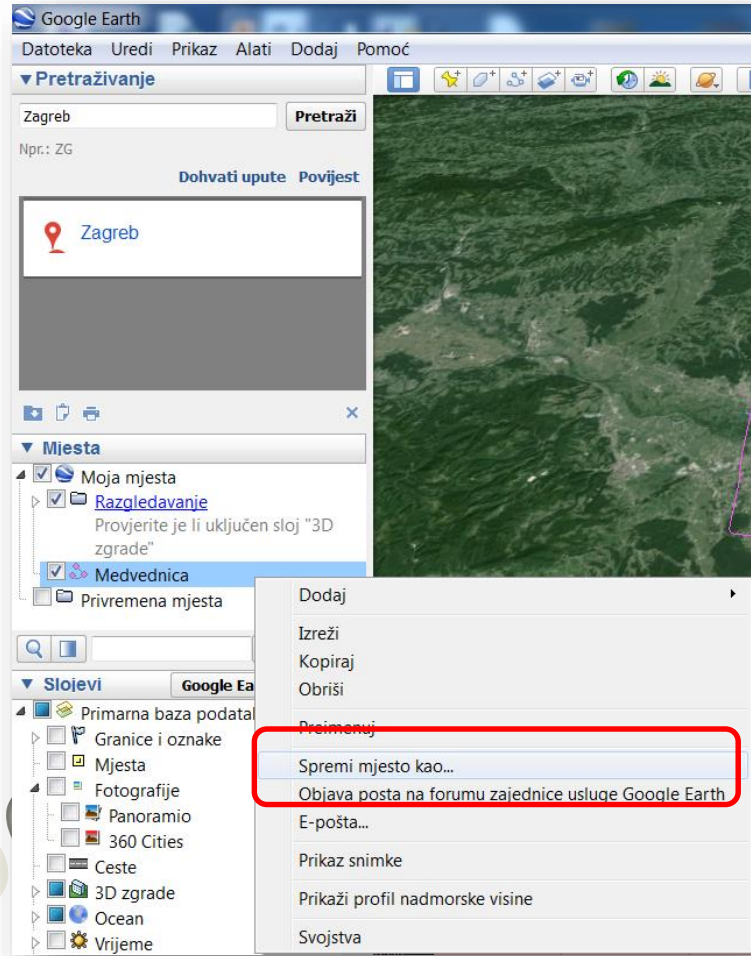
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Profil nadmorske visine

Zagreb

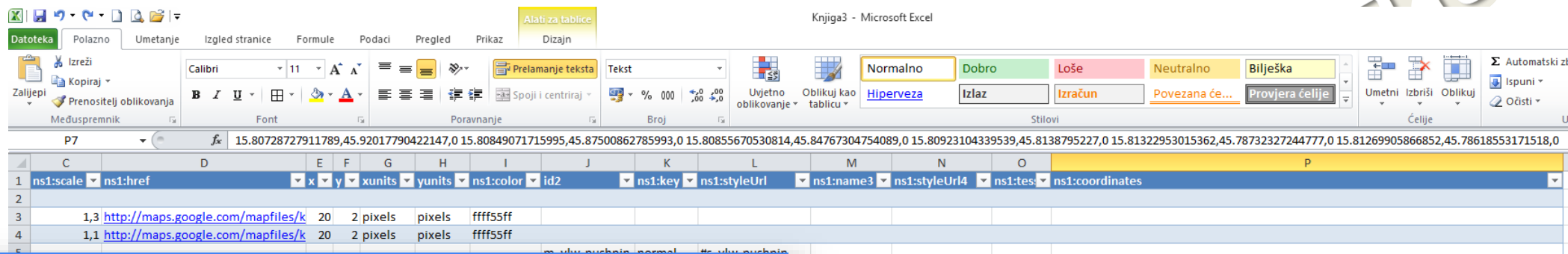


Geodeti



Datoteke .kml i .kmz

reb



Earth Pomoć

Advanced features > KML

O KML-u

KML ili *Keyhole Markup Language* jezik je zasnovan na XML-u i format datoteke za oblikovanje i pohranjivanje zemljopisnih značajki kao što su točke, linije, slike, poligoni i modeli za prikaz u programu Google Earth, [Google karte](#) i drugim programima. KML možete koristiti za dijeljenje mjesta i informacija s drugim korisnicima tih programa. Primjer KML datoteka možete pronaći u KML galeriji i [web mjestu Google Earth zajednice](#) gdje se mogu pronaći opisi zanimljivih značajki i mjesta.

Google Earth obrađuje KML datoteku na sličan način na koji web preglednici obrađuju HTML i XML datoteke. Kao i HTML, KML ima strukturu zasnovanu na oznakama s nazivima i atributima koji se koriste za određene svrhe prikaza. Dakle, Google Earth ima ulogu preglednika KML datoteka. [Saznajte više](#).

Program [Google karte](#) može prikazati samo neke značajke KML datoteka. Više informacija potražite u [ovoj temi pomoći za Google karte](#).

Napomena - **KMZ datoteka** je komprimirana inačica KML datoteke. Program Google Earth može otvoriti KML i KMZ datoteke ako te datoteke imaju odgovarajući nastavak u nazivu (.kml ili .kmz).

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.kml datoteka

Zagreb

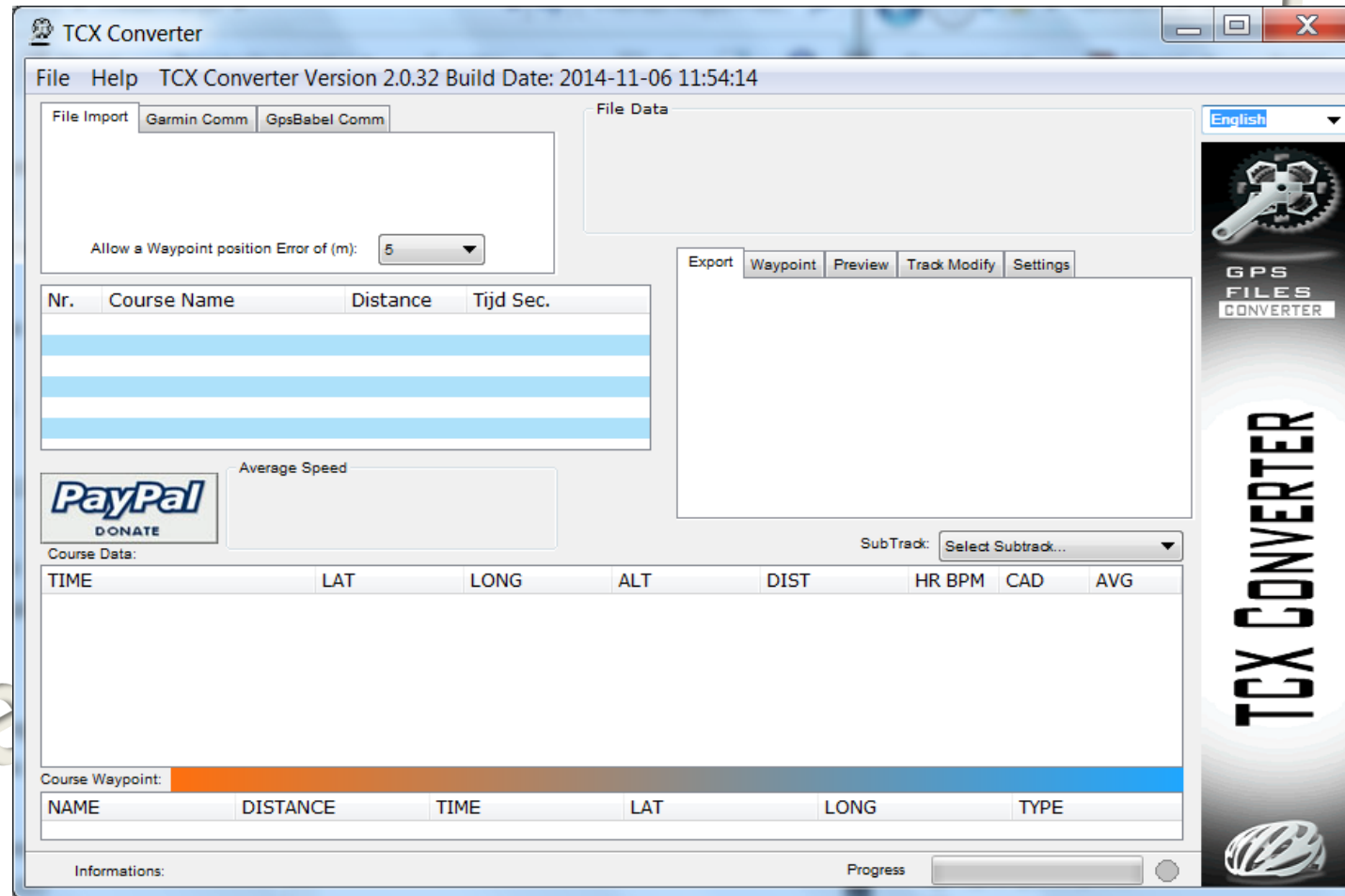
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kamenolom2.kml - Blok za pisanje
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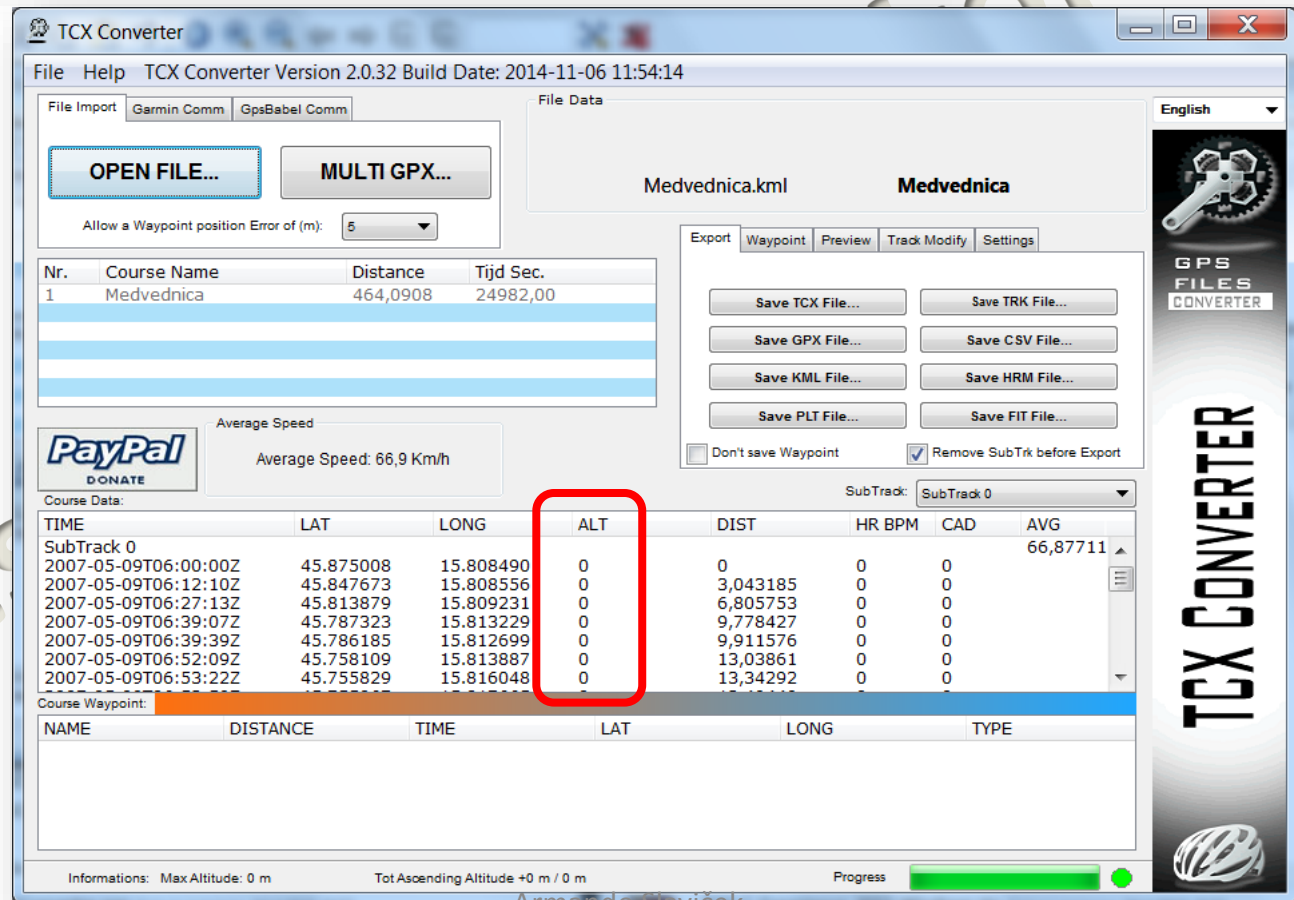
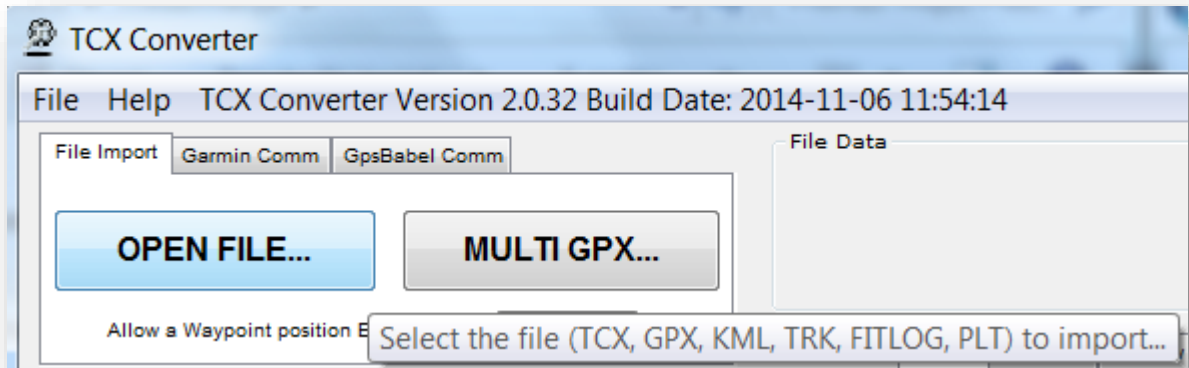
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Geodeti

TCX Converter

TCX Converter





Geodet

ola, Zagreb

Track Modify – Update Altitude

The screenshot shows the TCX Converter software interface. The 'Track Modify' tab is active, and the 'Update Altitude' button is highlighted with a red box and a red arrow. The interface includes a menu bar (File, Help), a toolbar with 'OPEN FILE...' and 'MULTI GPX...' buttons, and a table of course data. The 'Update Altitude' button is located in the 'Track Modify' section, along with other options like 'Rem Duplicate Pts.', 'Invert Track', 'Fix Bad TCX', 'Joint trk/wpt', 'Mod trk name', 'Limit Trackpoints', and 'Mod time Gap'. The 'Course Data' table shows the following data:

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SubTrack 0							66,87711
2007-05-09T06:00:00Z	45.875008	15.808490	0	0	0	0	
2007-05-09T06:12:10Z	45.847673	15.808556	0	3,043185	0	0	
2007-05-09T06:27:13Z	45.813879	15.809231	0	6,805753	0	0	
2007-05-09T06:39:07Z	45.787323	15.813229	0	9,778427	0	0	
2007-05-09T06:39:39Z	45.786185	15.812699	0	9,911576	0	0	
2007-05-09T06:52:09Z	45.758109	15.813887	0	13,03861	0	0	
2007-05-09T06:53:22Z	45.755829	15.816048	0	13,34292	0	0	

The 'Course Waypoint' table is also visible, with columns for NAME, DISTANCE, TIME, LAT, LONG, and TYPE.

TCX Converter

File Help TCX Converter Version 2.0.32 Build Date: 2014-11-06 11:54:14

File Import: **Garmin Comm** GpsBabel Comm

OPEN FILE... **MULTI GPX...**

Allow a Waypoint position Error of (m): 5

File Data: Medvednica.kml **Medvednica**

English

Nr.	Course Name	Distance	Tijd Sec.
1	Medvednica	464,0908	24982,00

Average Speed: 66,9 Km/h

PayPal DONATE

Export Waypoint Preview Track Modify Settings

Update Altitude Rem Duplicate Pts. Invert Track

Fix Bad TCX Joint trk/wpt Mod trk name

Limit Trackpoints Mod time Gap

Change Avg speed (Km/h): 0,00 Apply

Change Avg speed by % increment: 10,00 Increment Decrement

SubTrack: SubTrack 0

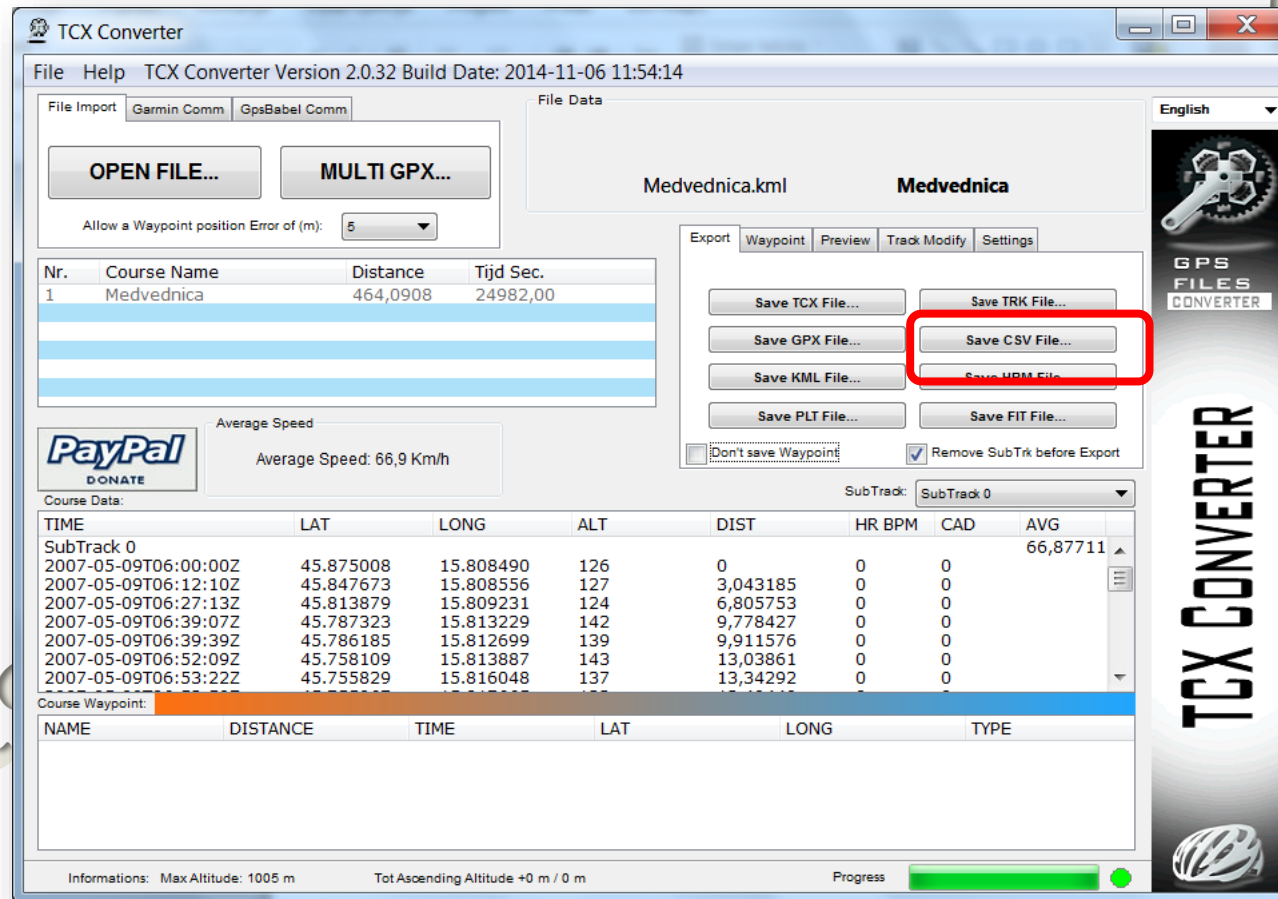
TIME	LAT	LONG	ALT	DIST	HR BPM	CAD	AVG
SubTrack 0							66,87711
2007-05-09T06:00:00Z	45.875008	15.808490	126	0	0	0	
2007-05-09T06:12:10Z	45.847673	15.808556	127	3,043185	0	0	
2007-05-09T06:27:13Z	45.813879	15.809231	124	6,805753	0	0	
2007-05-09T06:39:07Z	45.787323	15.813229	142	9,778427	0	0	
2007-05-09T06:39:39Z	45.786185	15.812699	139	9,911576	0	0	
2007-05-09T06:52:09Z	45.758109	15.813887	143	13,03861	0	0	
2007-05-09T06:53:22Z	45.755829	15.816048	137	13,34292	0	0	

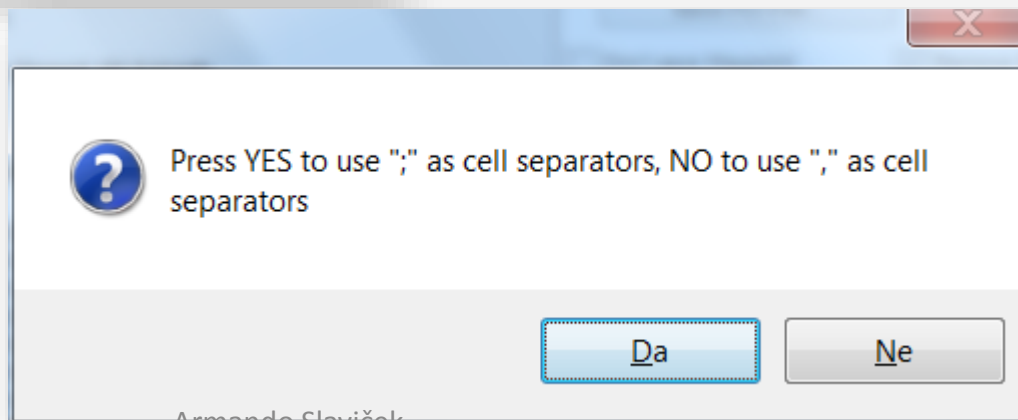
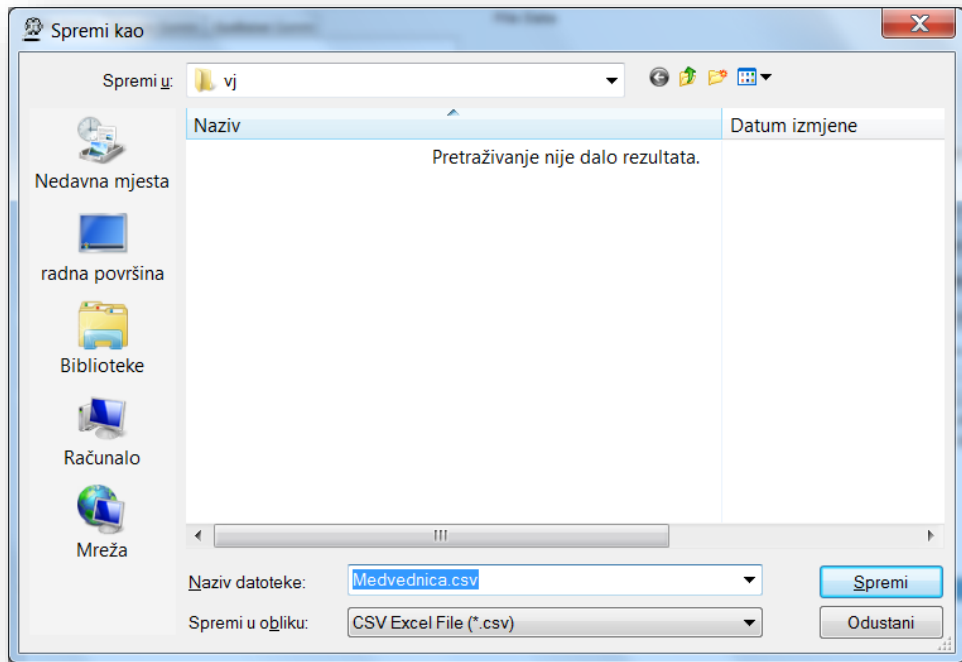
Course Waypoint:

NAME	DISTANCE	TIME	LAT	LONG	TYPE
------	----------	------	-----	------	------

Informations: Max Altitude: 1005 m Tot Ascending Altitude +0 m / 0 m Progress

Export – Save CSV File...






```
Medvednica.csv – Blok za pisanje
Datoteka Uređivanje Formatiranje Prikaz Pomoć
UNIX TIME;TIME;LAT;LONG;ALT;DIST;HR;CAD;TEMP;POWER
1178690400;2007-05-09T06:00:00Z;45,875008;15,808490;126;0;0;0;No Data;No Data
1178691130;2007-05-09T06:12:10Z;45,847673;15,808556;127;3,043185;0;0;No Data;No Data
1178692033;2007-05-09T06:27:13Z;45,813879;15,809231;124;6,805753;0;0;No Data;No Data
1178692747;2007-05-09T06:39:07Z;45,787323;15,813229;142;9,778427;0;0;No Data;No Data
1178692779;2007-05-09T06:39:39Z;45,786185;15,812699;139;9,911576;0;0;No Data;No Data
1178693529;2007-05-09T06:52:09Z;45,758109;15,813887;143;13,03861;0;0;No Data;No Data
1178693602;2007-05-09T06:53:22Z;45,755829;15,816048;137;13,34292;0;0;No Data;No Data
1178693639;2007-05-09T06:53:59Z;45,755067;15,817665;133;13,49449;0;0;No Data;No Data
1178694109;2007-05-09T07:01:49Z;45,752823;15,842694;129;15,4547;0;0;No Data;No Data
1178694159;2007-05-09T07:02:39Z;45,754336;15,844300;128;15,66435;0;0;No Data;No Data
1178694626;2007-05-09T07:10:26Z;45,771770;15,842527;119;17,61018;0;0;No Data;No Data
1178694649;2007-05-09T07:10:49Z;45,772530;15,843070;119;17,70481;0;0;No Data;No Data
```

Geodetska, Zagreb

```
Medvednica-zarez.csv – Blok za pisanje
Datoteka Uređivanje Formatiranje Prikaz Pomoć
UNIX TIME,TIME,LAT,LONG,ALT,DIST,HR,CAD,TEMP,POWER
1178690400,2007-05-09T06:00:00Z,45.875008,15.808490,126,0,0,0,No Data,No Data
1178691130,2007-05-09T06:12:10Z,45.847673,15.808556,127,3,043185,0,0,No Data,No Data
1178692033,2007-05-09T06:27:13Z,45.813879,15.809231,124,6,805753,0,0,No Data,No Data
1178692747,2007-05-09T06:39:07Z,45.787323,15.813229,142,9,778427,0,0,No Data,No Data
1178692779,2007-05-09T06:39:39Z,45.786185,15.812699,139,9,911576,0,0,No Data,No Data
1178693529,2007-05-09T06:52:09Z,45.758109,15.813887,143,13,03861,0,0,No Data,No Data
1178693602,2007-05-09T06:53:22Z,45.755829,15.816048,137,13,34292,0,0,No Data,No Data
1178693639,2007-05-09T06:53:59Z,45.755067,15.817665,133,13,49449,0,0,No Data,No Data
1178694109,2007-05-09T07:01:49Z,45.752823,15.842694,129,15,4547,0,0,No Data,No Data
1178694159,2007-05-09T07:02:39Z,45.754336,15.844300,128,15,66435,0,0,No Data,No Data
1178694626,2007-05-09T07:10:26Z,45.771770,15.842527,119,17,61018,0,0,No Data,No Data
1178694649,2007-05-09T07:10:49Z,45.772530,15.843070,119,17,70481,0,0,No Data,No Data
```

Geodetska

Medvednica.csv - Microsoft Excel

Datoteka Polazno Umetanje Izgled stranice Formule Podaci Pregled Prikaz Esri Maps

A1 UNIX TIME

1	UNIX TIME	TIME	LAT	LONG	ALT	DIST	HR	CAD	TEMP	POWER
2	1178690400	2007-05-0	45,87501	15,80849	126	0	0	0	No Data	No Data
3	1178691130	2007-05-0	45,84767	15,80856	127	3,043185	0	0	No Data	No Data
4	1178692033	2007-05-0	45,81388	15,80923	124	6,805753	0	0	No Data	No Data
5	1178692747	2007-05-0	45,78732	15,81323	142	9,778427	0	0	No Data	No Data
6	1178692779	2007-05-0	45,78619	15,8127	139	9,911576	0	0	No Data	No Data
7	1178693529	2007-05-0	45,75811	15,81389	143	13,03861	0	0	No Data	No Data
8	1178693602	2007-05-0	45,75583	15,81605	137	13,34292	0	0	No Data	No Data
9	1178693639	2007-05-0	45,75507	15,81767	133	13,49449	0	0	No Data	No Data
10	1178694109	2007-05-0	45,75282	15,84269	129	15,4547	0	0	No Data	No Data
11	1178694169	2007-05-0	45,75434	15,8443	128	15,66435	0	0	No Data	No Data
12	1178694626	2007-05-0	45,77177	15,84253	119	17,61018	0	0	No Data	No Data
13	1178694649	2007-05-0	45,77253	15,84307	119	17,70481	0	0	No Data	No Data
14	1178695299	2007-05-0	45,79684	15,84247	119	20,41113	0	0	No Data	No Data
15	1178695321	2007-05-0	45,7976	15,84302	120	20,50577	0	0	No Data	No Data
16	1178695386	2007-05-0	45,79988	15,8441	121	20,77327	0	0	No Data	No Data
17	1178695447	2007-05-0	45,80215	15,84464	119	21,0305	0	0	No Data	No Data
18	1178696067	2007-05-0	45,82531	15,84274	172	23,61265	0	0	No Data	No Data
19	1178696087	2007-05-0	45,82607	15,84282	195	23,69709	0	0	No Data	No Data
20	1178696492	2007-05-0	45,84116	15,84073	366	25,38502	0	0	No Data	No Data
21	1178696524	2007-05-0	45,8423	15,84122	347	25,51742	0	0	No Data	No Data
22	1178696931	2007-05-0	45,85752	15,84054	205	27,21329	0	0	No Data	No Data
23	1178696982	2007-05-0	45,85944	15,84042	190	27,42679	0	0	No Data	No Data
24	1178697430	2007-05-0	45,87618	15,84015	127	29,29123	0	0	No Data	No Data
25	1178698048	2007-05-0	45,89933	15,84012	133	31,8682	0	0	No Data	No Data

Medvednica

Armando Slaviček

Microsoft Excel - Medved...

E7

1	LONG	LAT	ALT
2	15,80849	45,87501	126
3	15,808556	45,84767	127
4	15,809231	45,81388	124
5	15,813229	45,78732	142
6	15,812699	45,78619	139
7	15,813887	45,75811	143
8	15,816048	45,75583	137
9	15,817665	45,75507	133
10	15,842694	45,75282	129
11	15,8443	45,75434	128
12	15,842527	45,77177	119
13	15,84307	45,77253	119
14	15,842474	45,79684	119
15	15,843018	45,7976	120
16	15,844103	45,79988	121
17	15,844642	45,80215	119
18	15,842744	45,82531	172
19	15,842817	45,82607	195
20	15,840731	45,84116	366
21	15,841218	45,8423	347
22	15,840536	45,85752	205
23	15,84042	45,85944	190
24	15,840149	45,87618	127
25	15,840117	45,89933	133
26	15,840665	45,90047	133
27	15,841759	45,91753	153
28	15,849986	45,92358	181

Medvednica

Microsoft Excel - Medved...

A1

1	A	B	C
2	15,80849	45,87501	126
3	15,808556	45,84767	127
4	15,809231	45,81388	124
5	15,813229	45,78732	142
6	15,812699	45,78619	139
7	15,813887	45,75811	143
8	15,816048	45,75583	137
9	15,817665	45,75507	133
10	15,842694	45,75282	129
11	15,8443	45,75434	128
12	15,842527	45,77177	119
13	15,84307	45,77253	119
14	15,842474	45,79684	119
15	15,843018	45,7976	120
16	15,844103	45,79988	121
17	15,844642	45,80215	119
18	15,842744	45,82531	172
19	15,842817	45,82607	195
20	15,840731	45,84116	366
21	15,841218	45,8423	347
22	15,840536	45,85752	205
23	15,84042	45,85944	190
24	15,840149	45,87618	127
25	15,840117	45,89933	133
26	15,840665	45,90047	133
27	15,841759	45,91753	153
28	15,849986	45,92358	181

Medvednica

Prosjek: 62,561166 Brojanje: 3

Medvednica- ocisceno1.txt - Blok z...

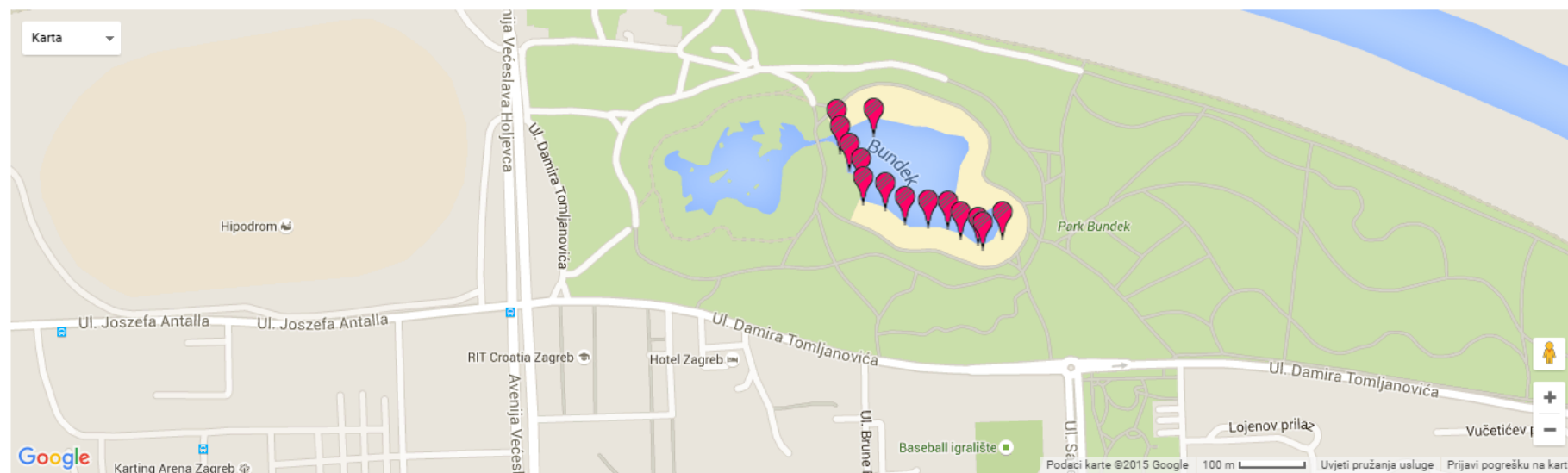
Datoteka	Uredivanje	Formatiranje	Prikaz	Pomoć
15,80849	45,875008	126		
15,808556	45,847673	127		
15,809231	45,813879	124		
15,813229	45,787323	142		
15,812699	45,786185	139		
15,813887	45,758109	143		
15,816048	45,755829	137		
15,817665	45,755067	133		
15,842694	45,752823	129		
15,8443	45,754336	128		
15,842527	45,77177	119		
15,84307	45,77253	119		
15,842474	45,796835	119		
15,843018	45,797595	120		
15,844103	45,799875	121		
15,844642	45,802154	119		
15,842744	45,82531	172		
15,842817	45,826066	195		
15,840731	45,841157	366		
15,841218	45,842296	347		
15,840536	45,857521	205		
15,84042	45,859437	190		
15,840149	45,876183	127		
15,840117	45,89933	133		
15,840665	45,900467	133		
15,841759	45,917527	153		
15,849986	45,923577	181		
15,852181	45,923573	180		
15,854374	45,923948	170		
15,856565	45,924324	178		
15,862601	45,92393	190		
15,864799	45,923165	188		
15,866451	45,922399	175		
15,871403	45,915183	171		
15,871954	45,913666	163		
15,873055	45,911389	162		
15,867576	45,901551	158		
15,867579	45,899277	155		
15,86758	45,898898	155		

Google Maps Find Altitude

Google Maps Find Altitude

Last Updated 23th November 2013

Search For Location : Search Drop Marker?



Karta

Hipodrom

Ul. Jozsefa Antalla

Ul. Jozsefa Antalla

RIT Croatia Zagreb

Hotel Zagreb

Ul. Damira Tomljanovića

Ul. Damira Tomljanovića

Ul. Damira Tomljanovića

Lojenov prilaz

Vučetićev

Google

Kartina Arena Zagreb

Podaci karte ©2015 Google 100 m Uvjeti pružanja usluge Prijavi pogrešku na karti

Last point clicked : 112.547 m / 369.249 feet

Clear Map

[Map Height : Small - Medium - Large]

Output latitude, longitude? Output in meters? Output in feet?

number	latitude	longitude	meters	feet
0	46.74738913515841	15.413818359375	366.829	1203.507
1	45.785768154216605	15.98646730184555	110.742	363.328
2	45.78575716549741	15.985770933330059	112.049	367.614
3	45.785547678011184	15.985835306346416	111.051	364.340
4	45.78532322625948	15.98600696772337	111.183	364.772

<http://www.daftlogic.com/sandbox-google-maps-find-altitude.htm>

Find „Missing” Elevations with GPS Visualizer

GPS Visualizer

MAKE A MAP

- Google Maps
- Google Earth
- JPG/PNG/SVG

MAKE A PROFILE

- CONVERT A FILE
- Draw on a map
- Calculators

Geocode addresses

- Look up elevations
- Atlas: Share a map
- GPSbabel

Examples

- Help/FAQ
- About GPSV

facebook

Svidě

World
GIS
Mapping
data

Purchase
broad
mapping
coverage
for full
countries
and
continents



AdChoices | Elevation | Google Map | GPS Coordinates | GPS Track

Find "Missing" Elevations with GPS Visualizer

The problem: Sometimes you have geographic data that consists only of latitudes and longitudes, but you want to know the altitudes as well — because, for example, you want to colorize points by height above sea level, or [draw a profile](#) of a track. Here are some common reasons why you might have "flat" or incomplete data:

- Your GPS device does not log altitude, or you had poor satellite reception when you recorded the track.
- Your GPS device *does* log altitude, but it's not very accurate.
- You drew a track using the drawing tools in Google Earth or a similar application, like GPS Visualizer's [Sandbox](#).
- You have a KML file that came from Google Maps or Google Earth's "driving directions" feature.
- You created a route in Google Maps and have the URL of that route.
- You have an NMEA log file that contains only "GPRMC" sentences, not "GPGGA."

Solution #1: DEM database

GPS Visualizer's [map](#), [profile](#), and [conversion](#) programs now have the ability to instantly add elevation data — from a DEM (digital elevation model) database — to any type of GPS file. If you just want to draw a profile, or convert a single data file to plain elevation, you can use the simple form right here:

Upload a file: <input type="button" value="Odaberi datoteku"/> Nije odabrana niti jedna datoteka.	<input type="button" value="Convert & add elevation"/>	or	<input type="button" value="Draw elevation profile"/>
Or provide a URL: <input type="text"/>	Output: <input type="text" value="GPX file"/>		Units: <input type="text" value="Metric"/>

Or, look in GPS Visualizer's various input forms for the menu called "Add DEM elevation data," and choose one of the elevation databases (described in the table below). Complete copies of the SRTM3 and USGS NED databases, as well as a large number of SRTM1 and ASTER tiles, are stored on GPS Visualizer's server — that's more than 200GB of raw data.

Note that the elevation-adding feature will *erase* any existing altitude data (for example, from a GPS) that might already be in your file. Often, this is desirable; profiles made with DEM data are usually "smoother" looking than GPS, and typically contain fewer gaps or suspicious readings. (Speaking of gaps, there are a few in NASA's SRTM data, and that's unavoidable. If GPS Visualizer runs into one of these, it will *not* overwrite those elevations in your input data.)



QUIKGRID

popis izbornih predmeta 1... x Geoinformacijski sustavi - ... x Create contour lines from ... x QuikGrid x +

www.galiander.ca/quikgrid/ Traži

Najposjećenije Početak AZOO Stručni skupovi CARNet Bandwidth M... Customize Links Geoinformacijski susta... Predložena web-mjesta Sljedeća bwm.carnet.hr8080

QUIKGRID

3-D rendering of a surface represented by scattered data points

[QuikGrid is free software released under the GNU General Public License. Version 5.4 is the most recent release. Full details are available here.](#)

Microsoft is phasing out support for the Windows help facility (WinHLP) that QuikGrid uses. Under Windows VISTA and Windows 7 you may receive a message similar to the following when you attempt to access "Help":

"The Help for this program was created in Windows Help format, which depends on a feature that isn't included in this version of Windows. However, you can download a program that will allow you to view Help created in the Windows Help format."

Further information is available from Microsoft [here](#).

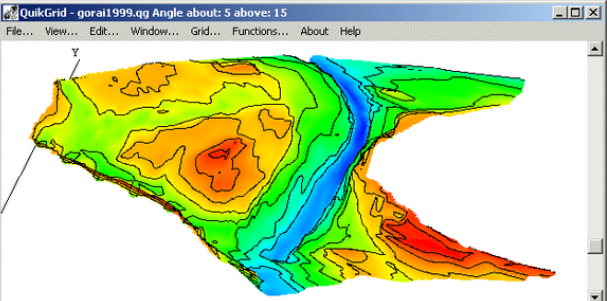
For those who do not wish to download the Windows help facility, the help file is now available as an [online html document here](#). You may obtain a copy for installation on your computer by [downloading a .zip file here](#).

Send email to: retired at galiander.ca
(Replace "at" with @ and remove spaces when entering my email address).

I am happy to provide what support I can. However, I am no longer an active user of any Microsoft Operating system, except Windows XP, which I access occasionally when required. I have no easy access to Windows Vista or Windows 7. (I have been using Linux almost exclusively for many years now). I have no plans to produce a major new release of QuikGrid.

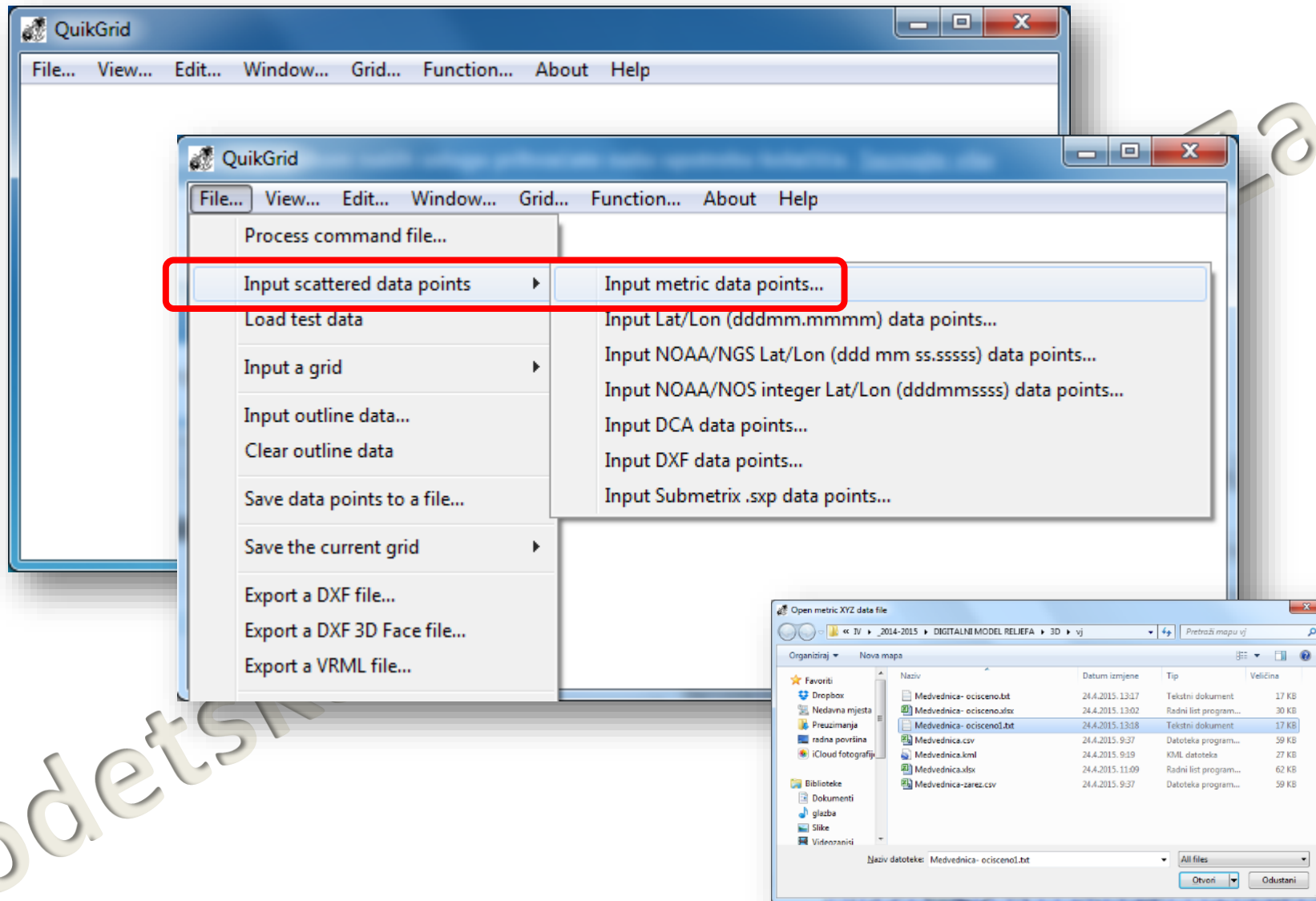
GENERAL DESCRIPTION

QUIKGRID is a program which will read in a set of scattered data points (x, y, z) which represents a surface. The program will generate a grid from this data and then display the surface as a contour map, or as a 3d representation. The [left mouse button](#) may be used to zoom in and pan about the display. The [right mouse button](#) may be used to display information about the generated grid coordinates and data points.



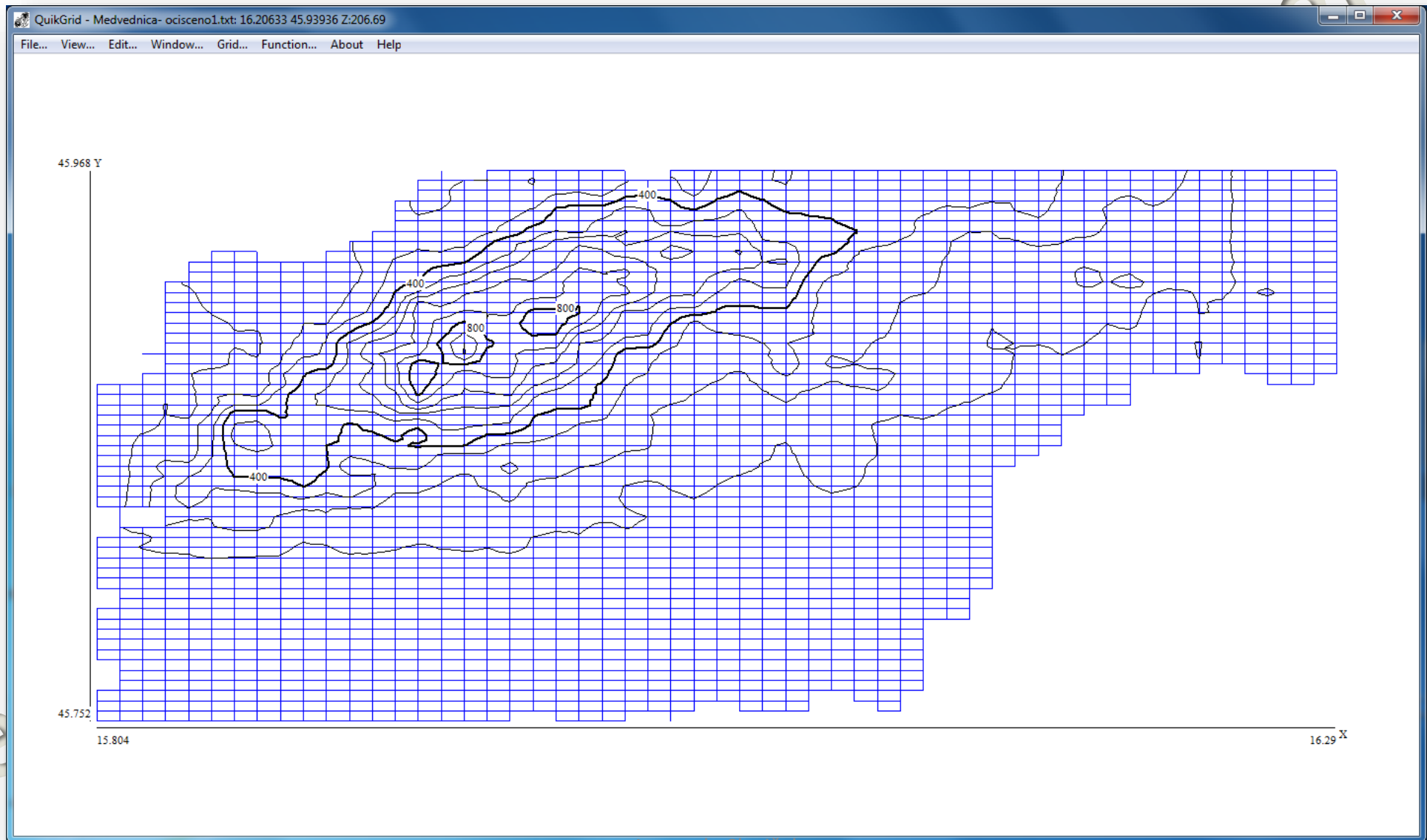
Armando Slaviček

QUIKGRID

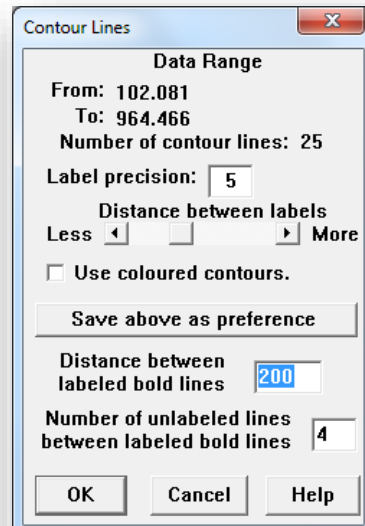
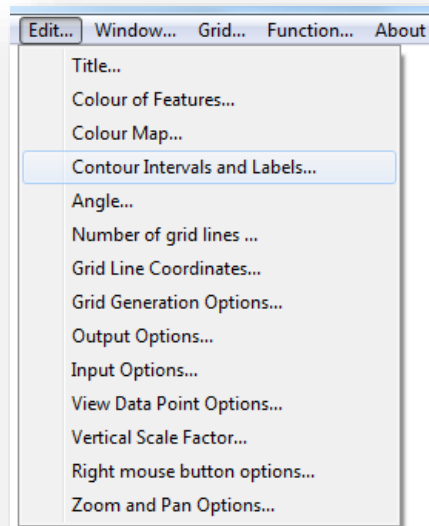


Geodetski

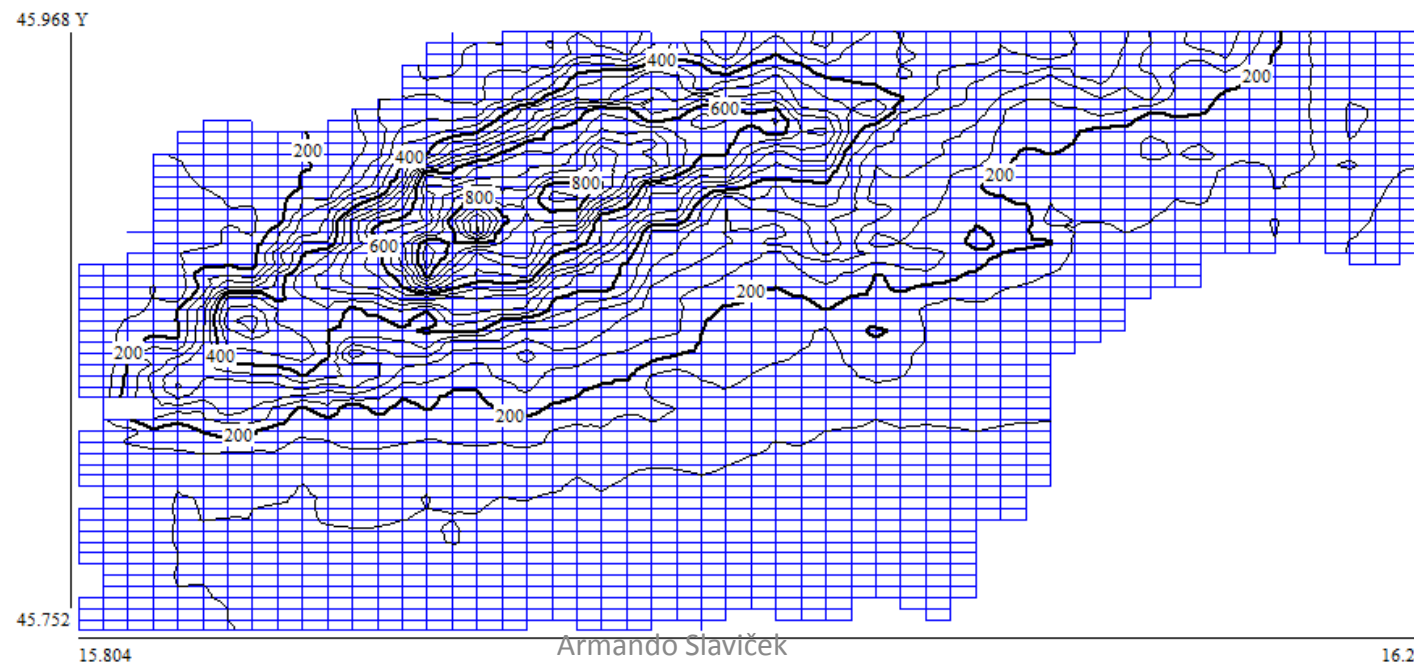
Freeb



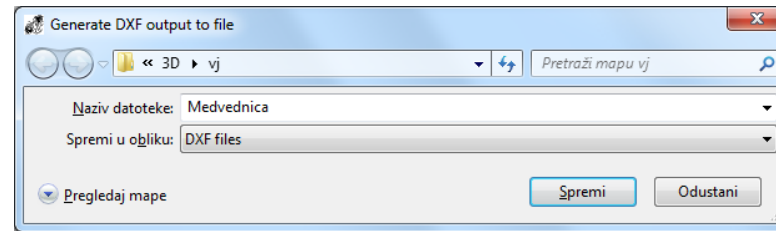
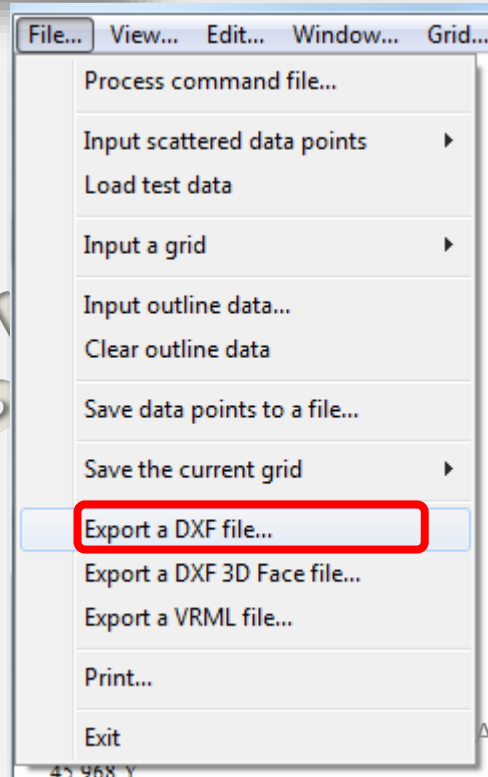
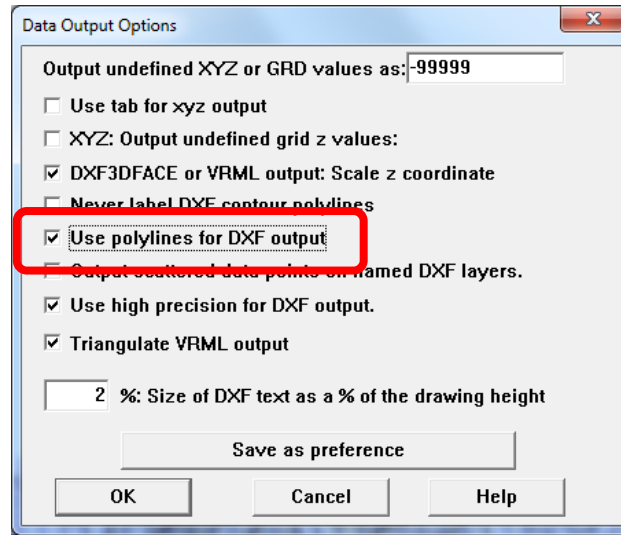
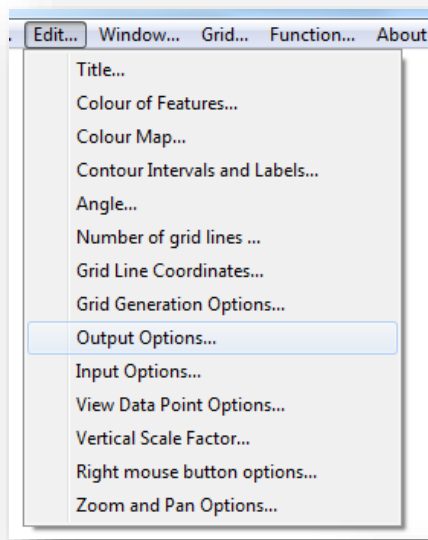
GE



škola, Zagreb

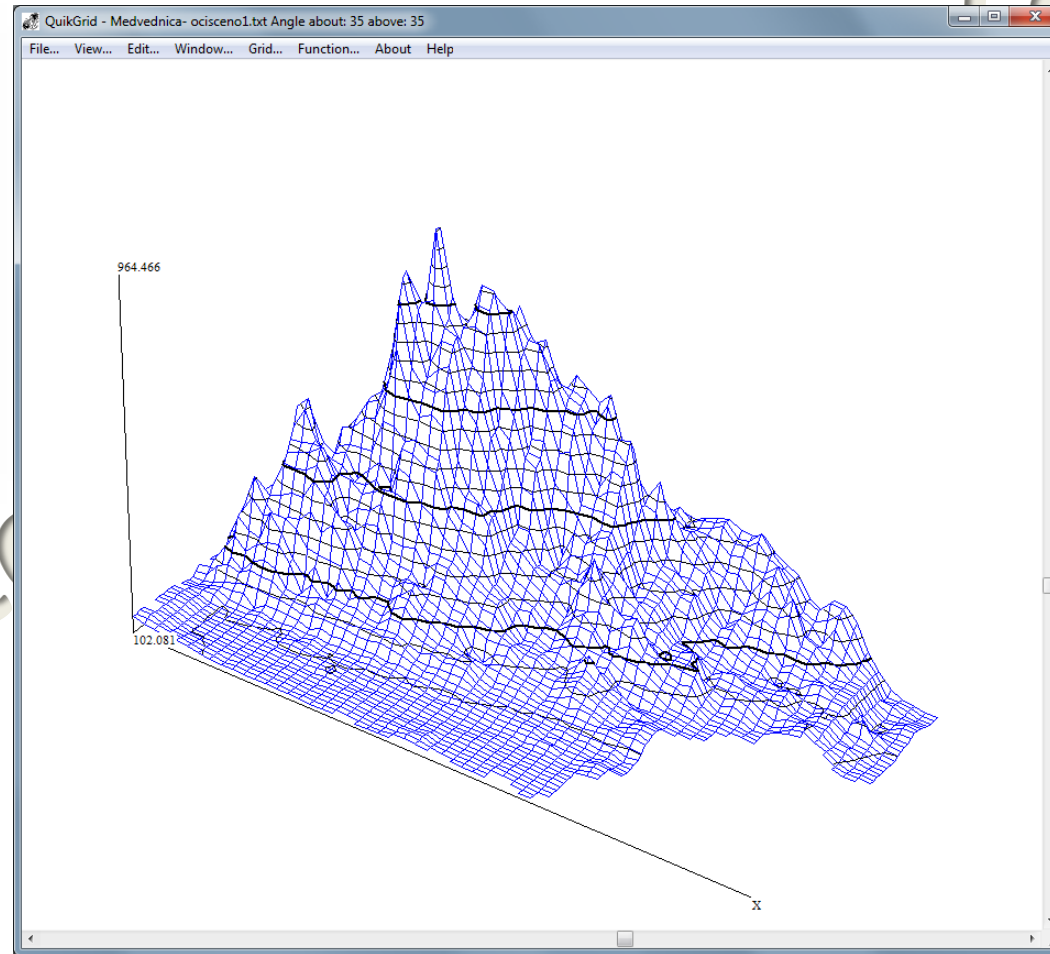
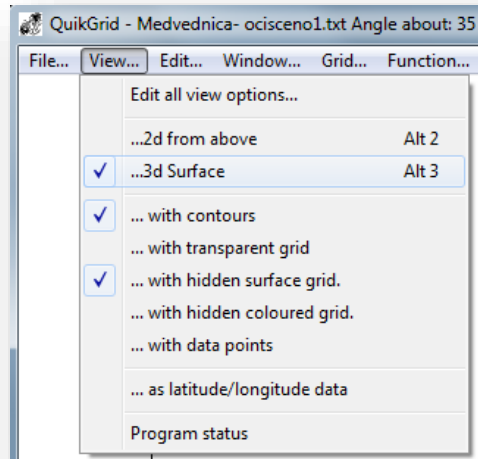


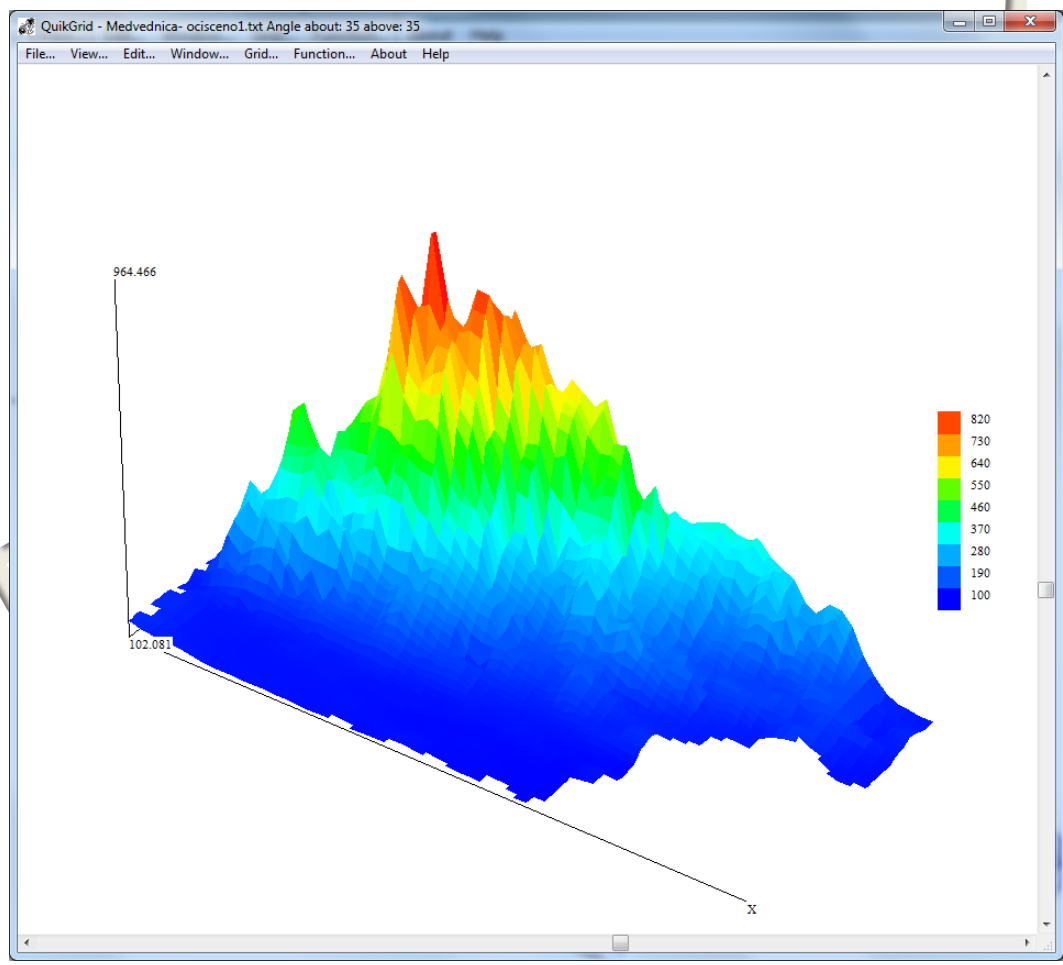
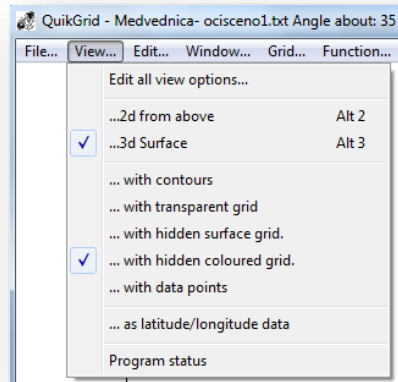
Geodes



Geodetski

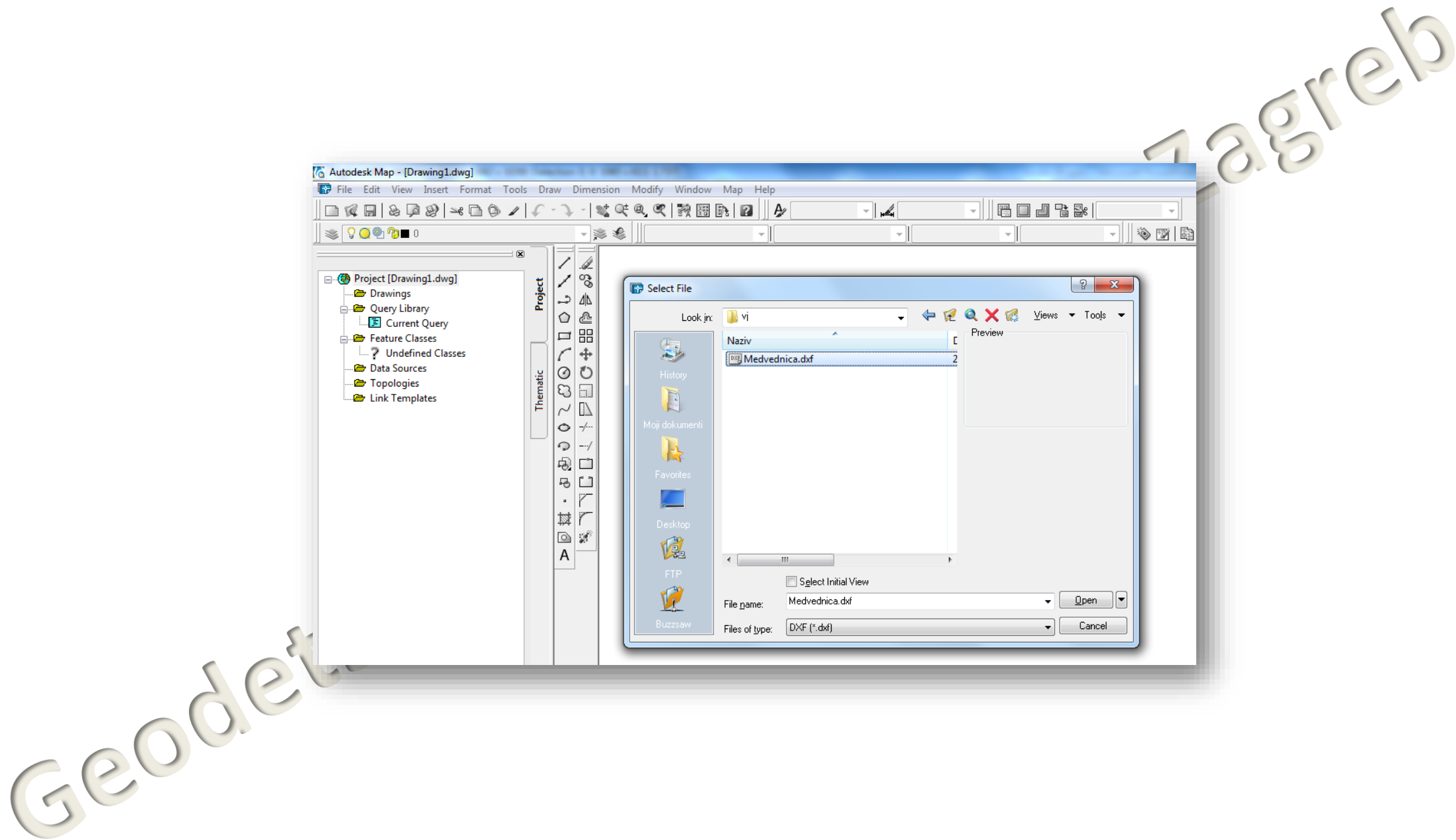
Armando Slaviček, Zagreb

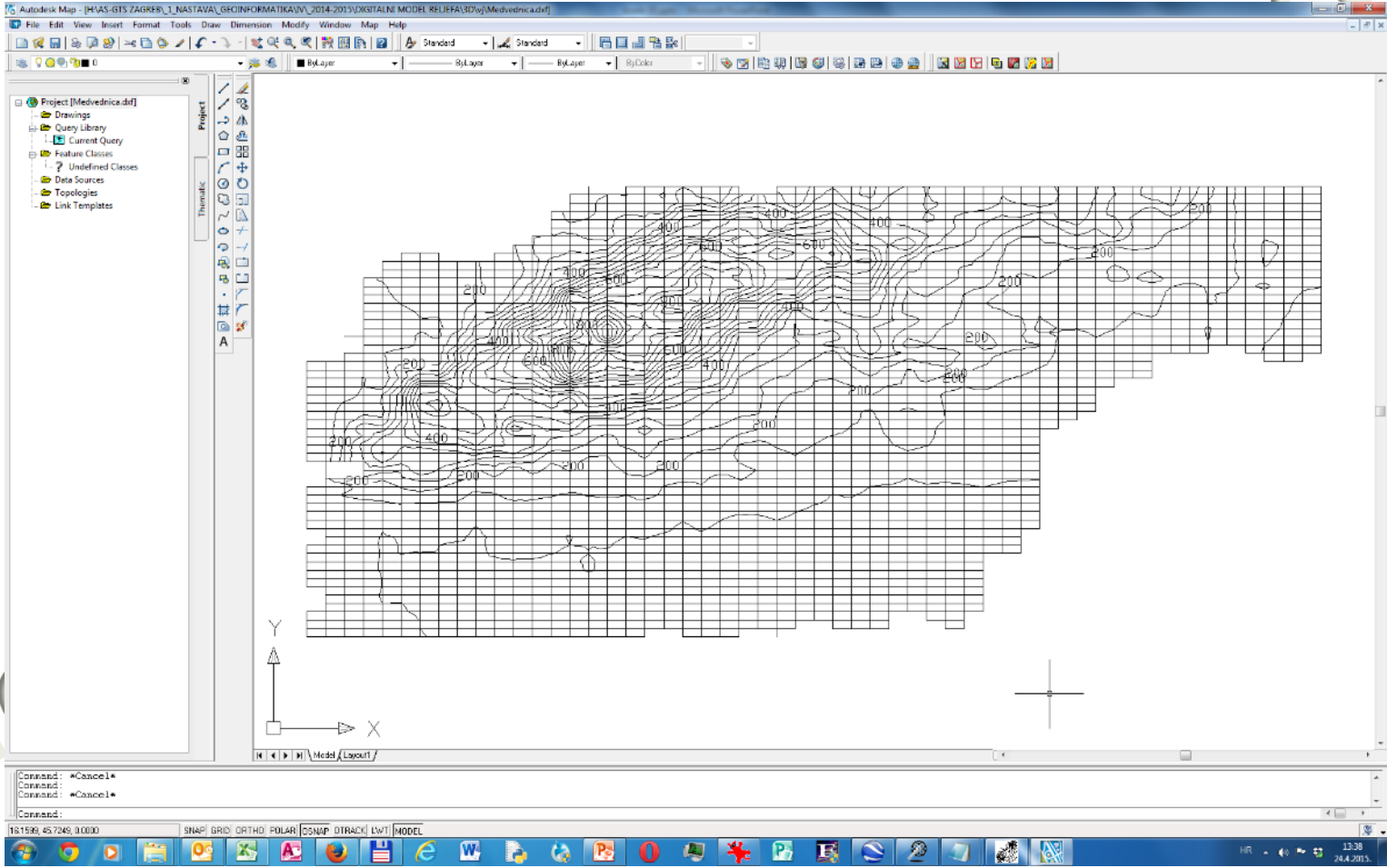


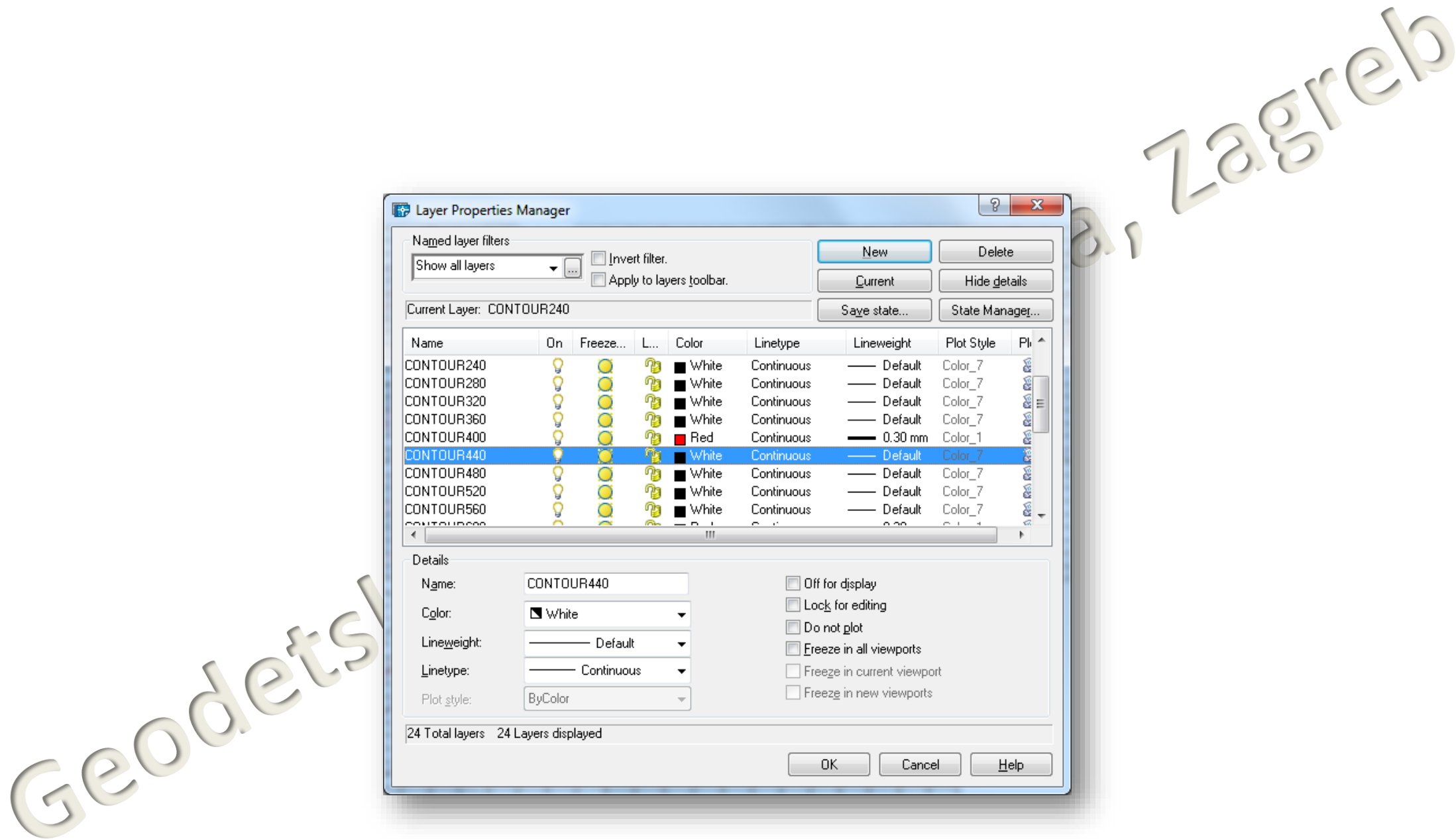


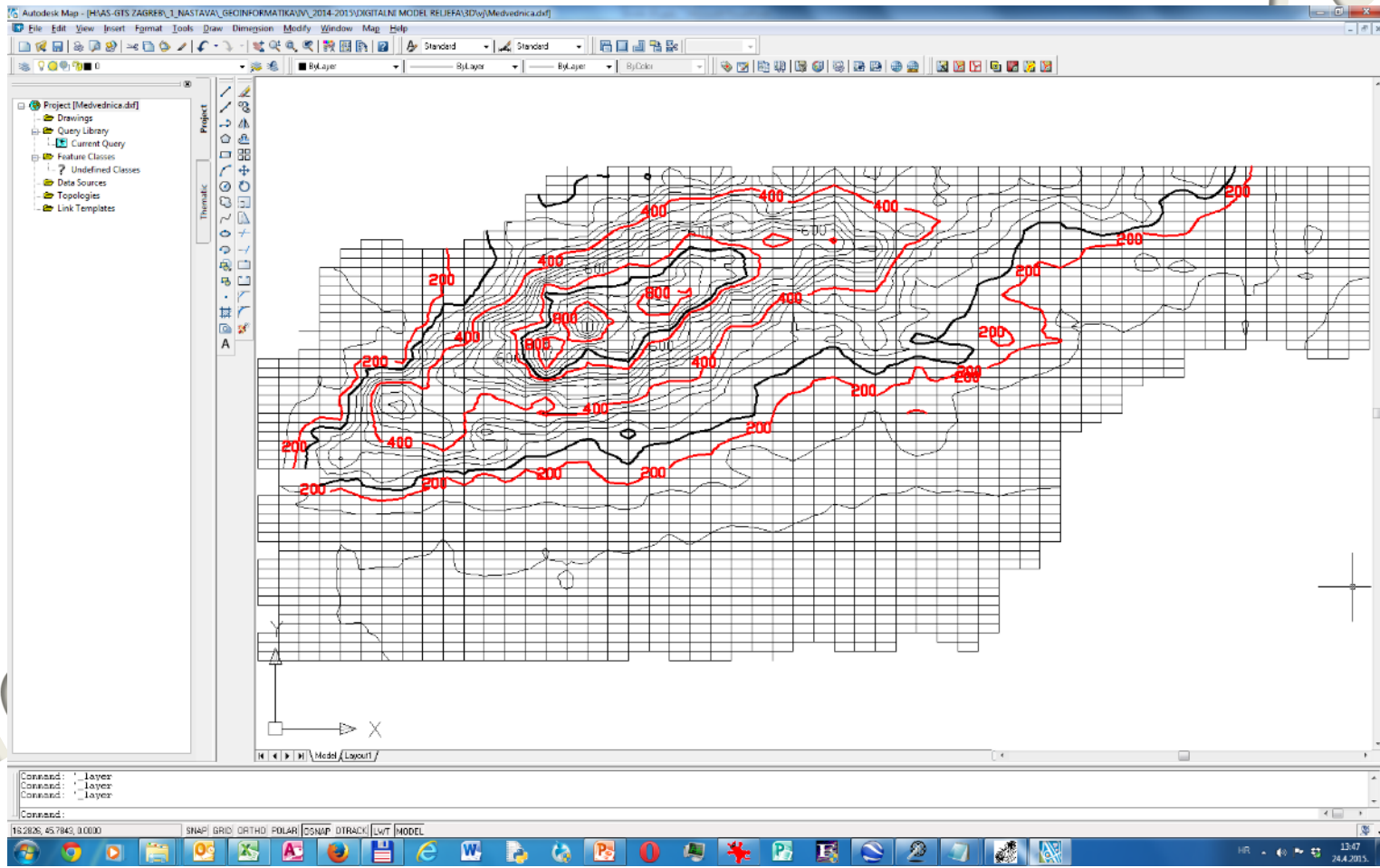
Geodetska tehnička škola, Zagreb

.dxf

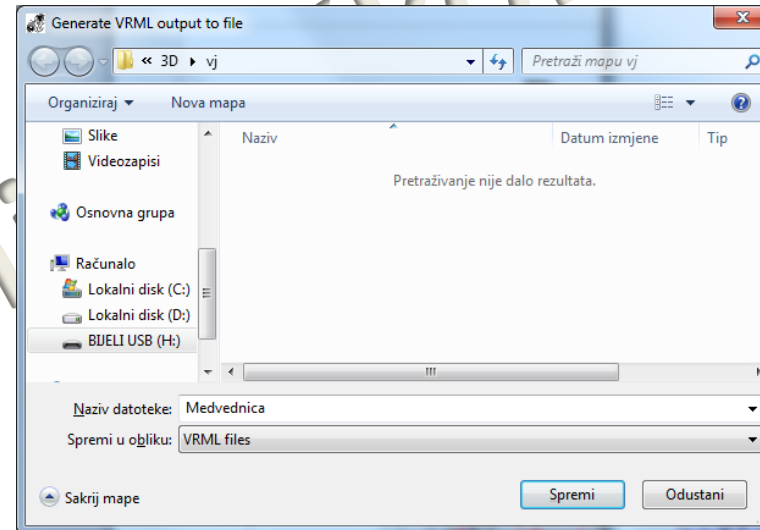
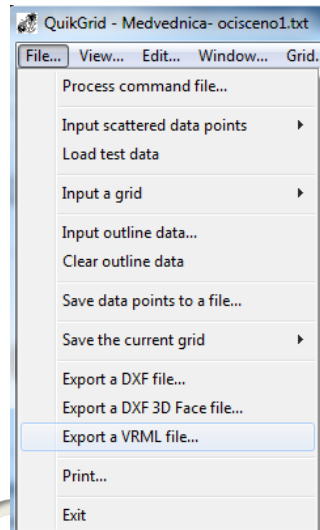






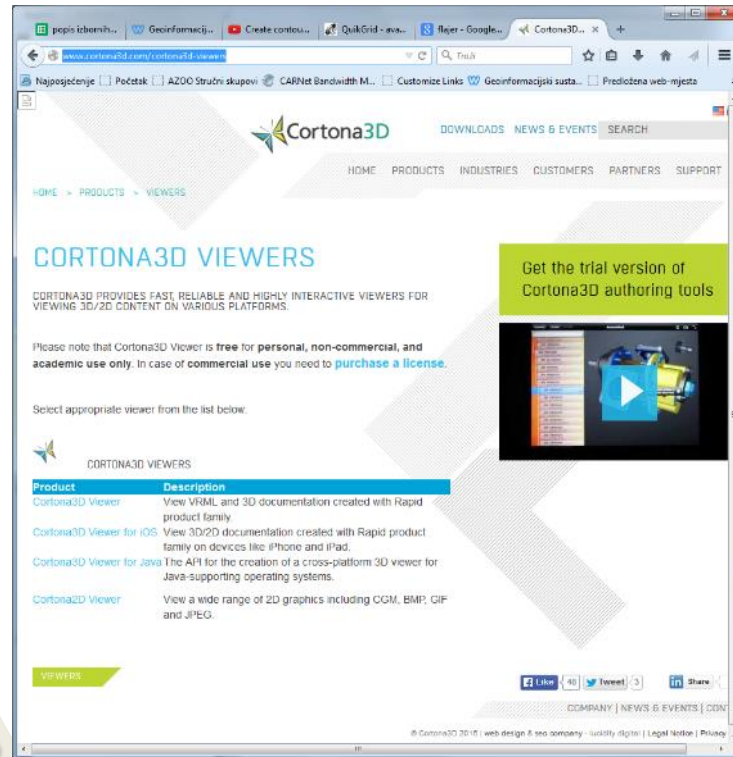


Export a VRML file (Virtual Reality Modeling Language)



VRML (Virtual Reality Modeling Language) je format koji opisuje interaktivne trodimenzionalne objekte i svjetove.

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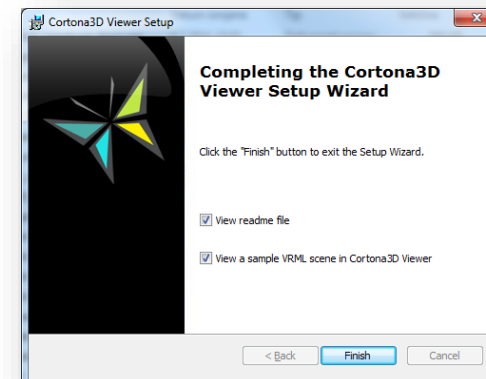
LICENSING

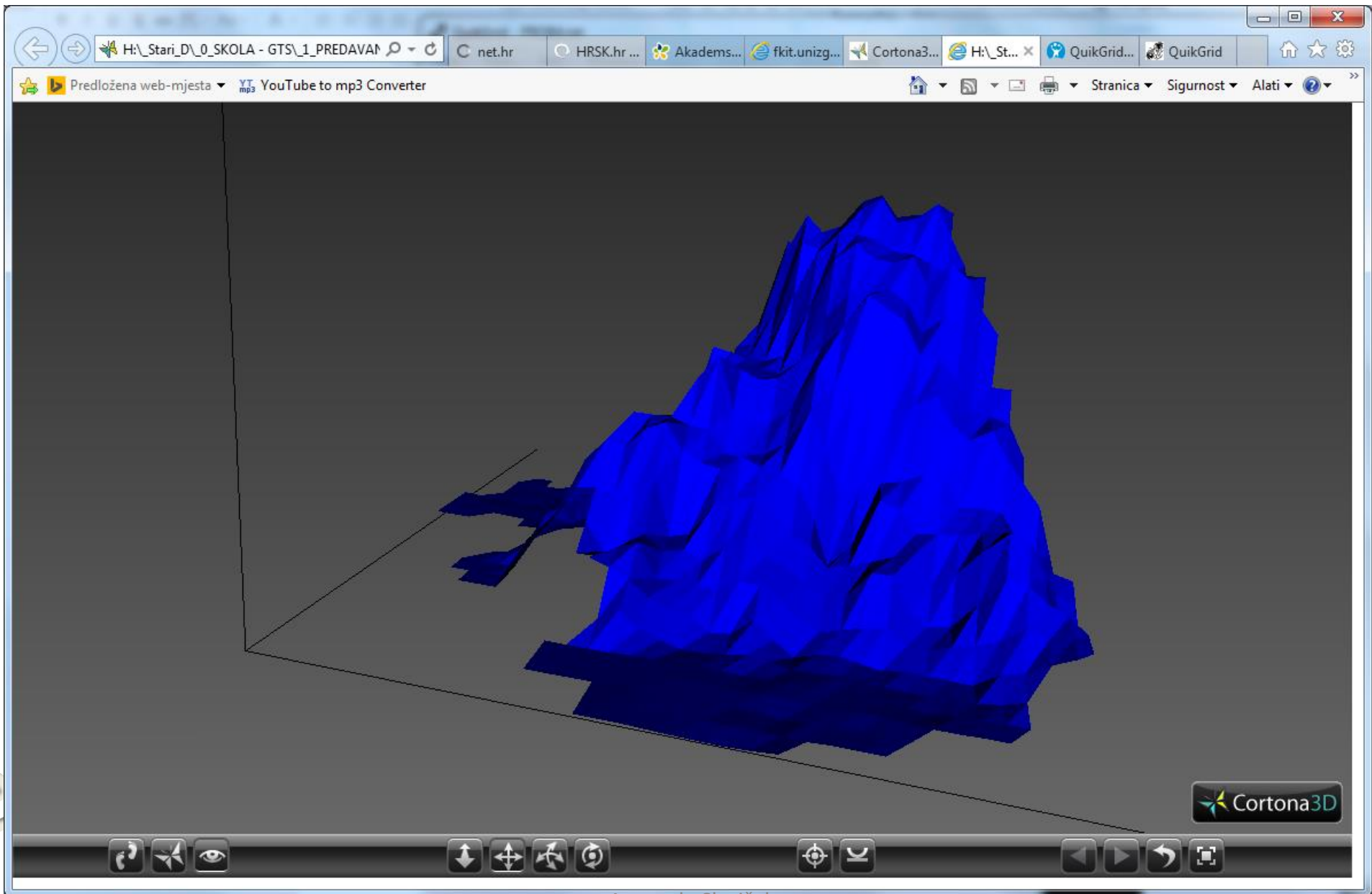
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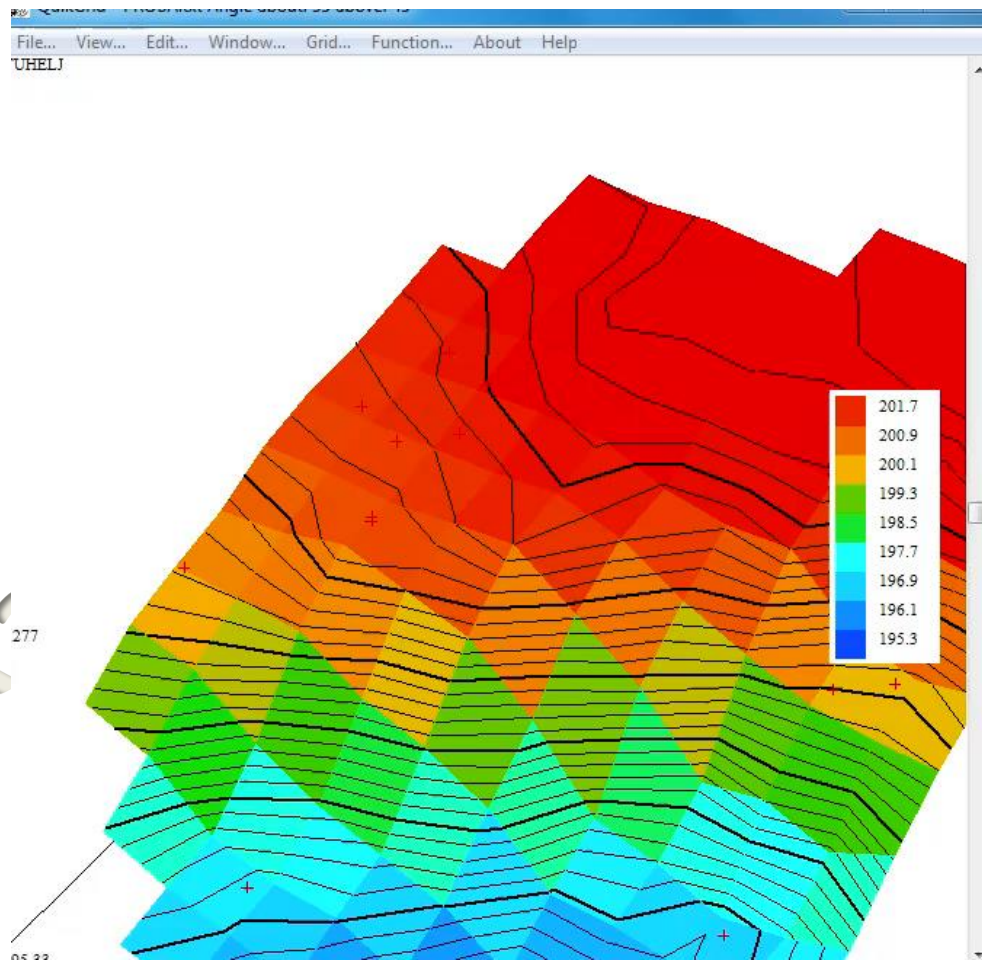
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Armando Slaviček
2015.