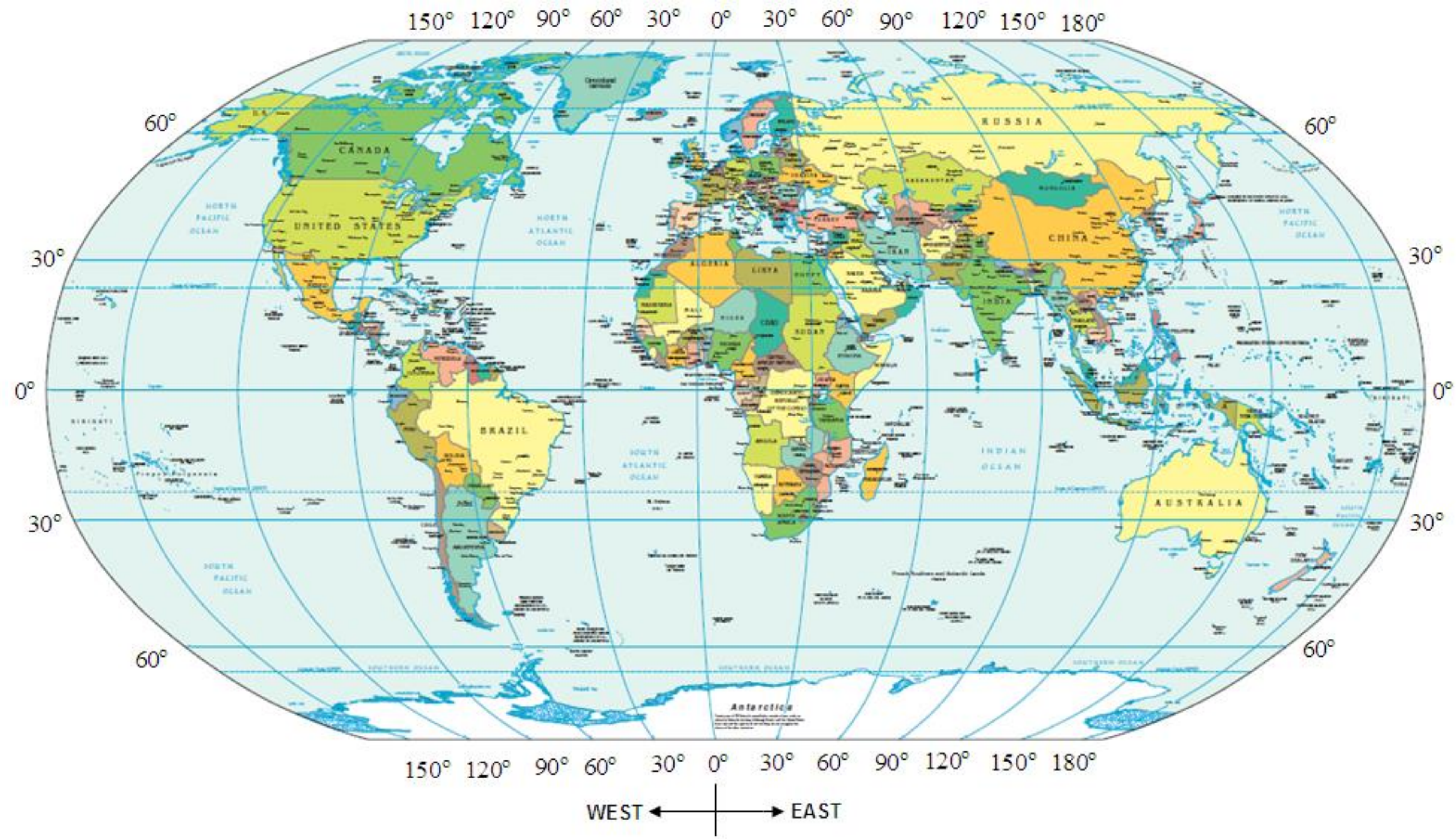
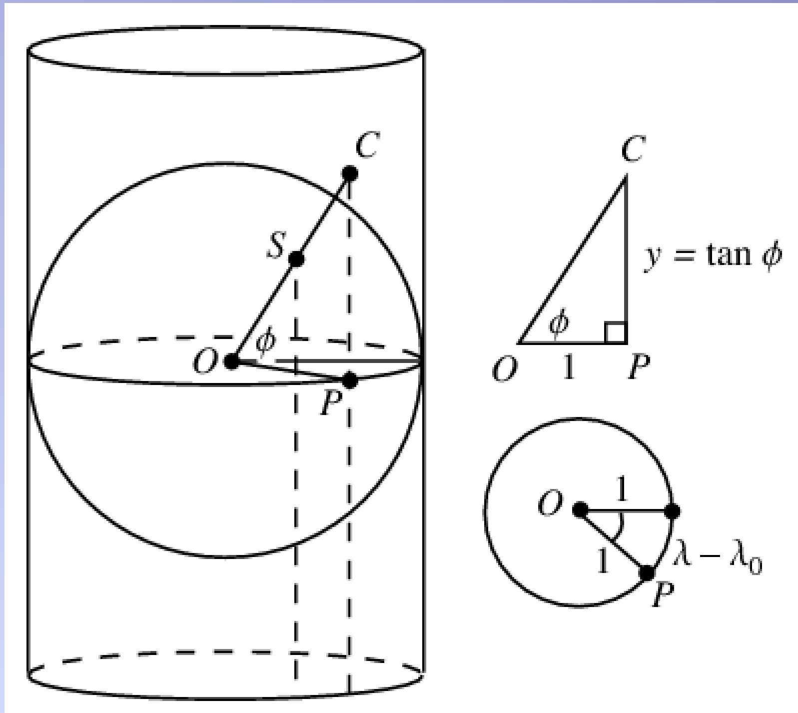
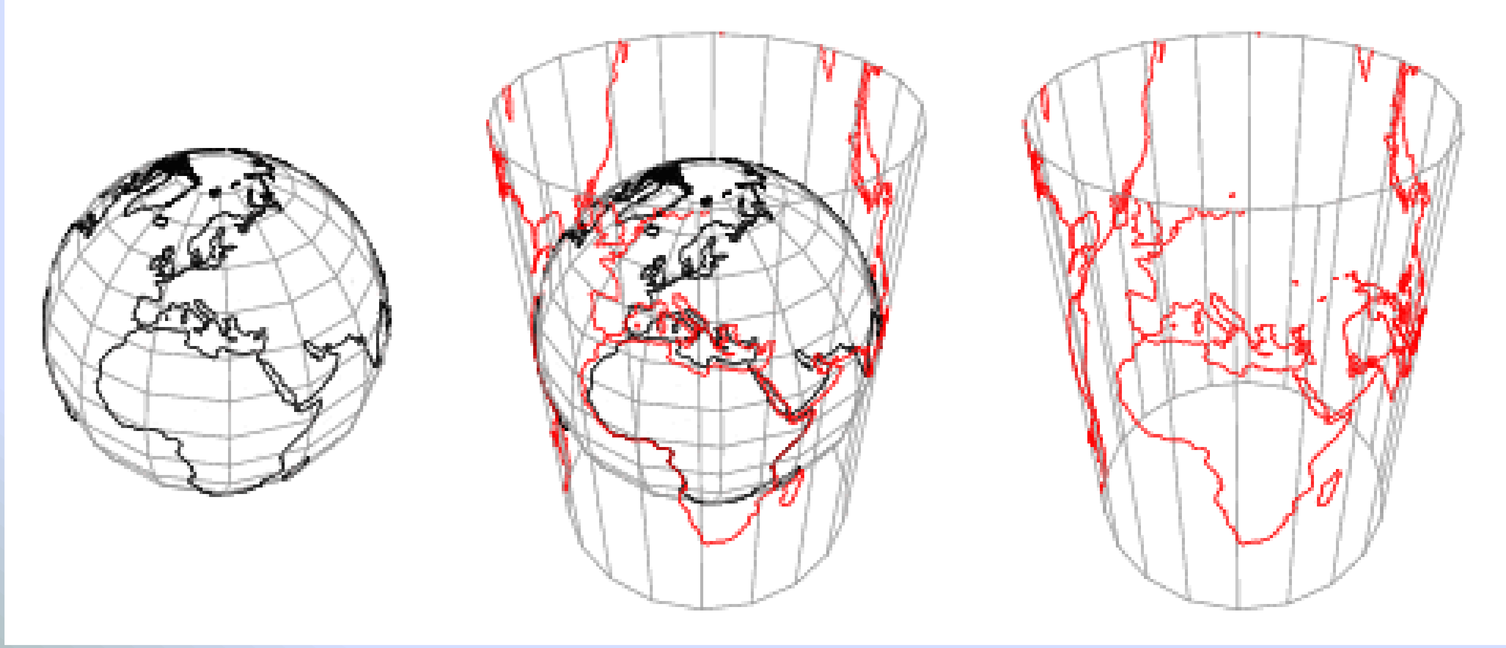
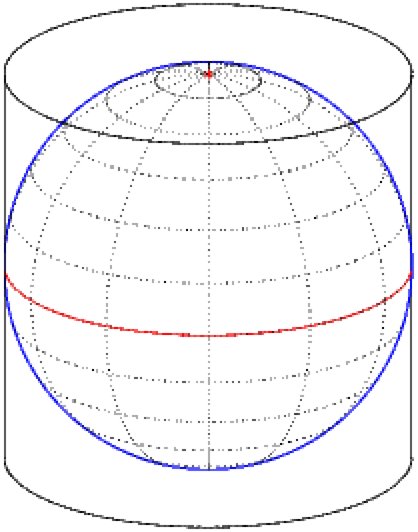
MAD 256 – SURVEYING
(CAD Practice)
Maps, Coordinates, Sections, etc.

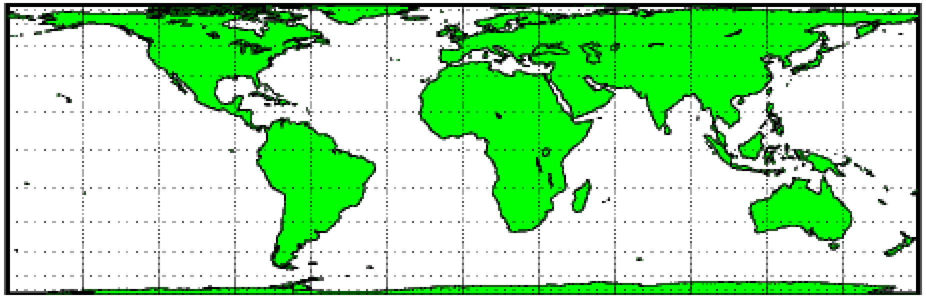

150° 120° 90° 60° 30° 0° 30° 60° 90° 120° 150° 180°
60°
30°
0°
CANADA
UNITED STATES
RUSSIA
CHINA
INDIA
IRAN
ALGERIA
LIBYA
SUDAN
BRAZIL
AUSTRALIA
NORTH PACIFIC OCEAN
NORTH ATLANTIC OCEAN
SOUTH ATLANTIC OCEAN
SOUTH PACIFIC OCEAN
INDIAN OCEAN
Antarctica
WEST
EAST

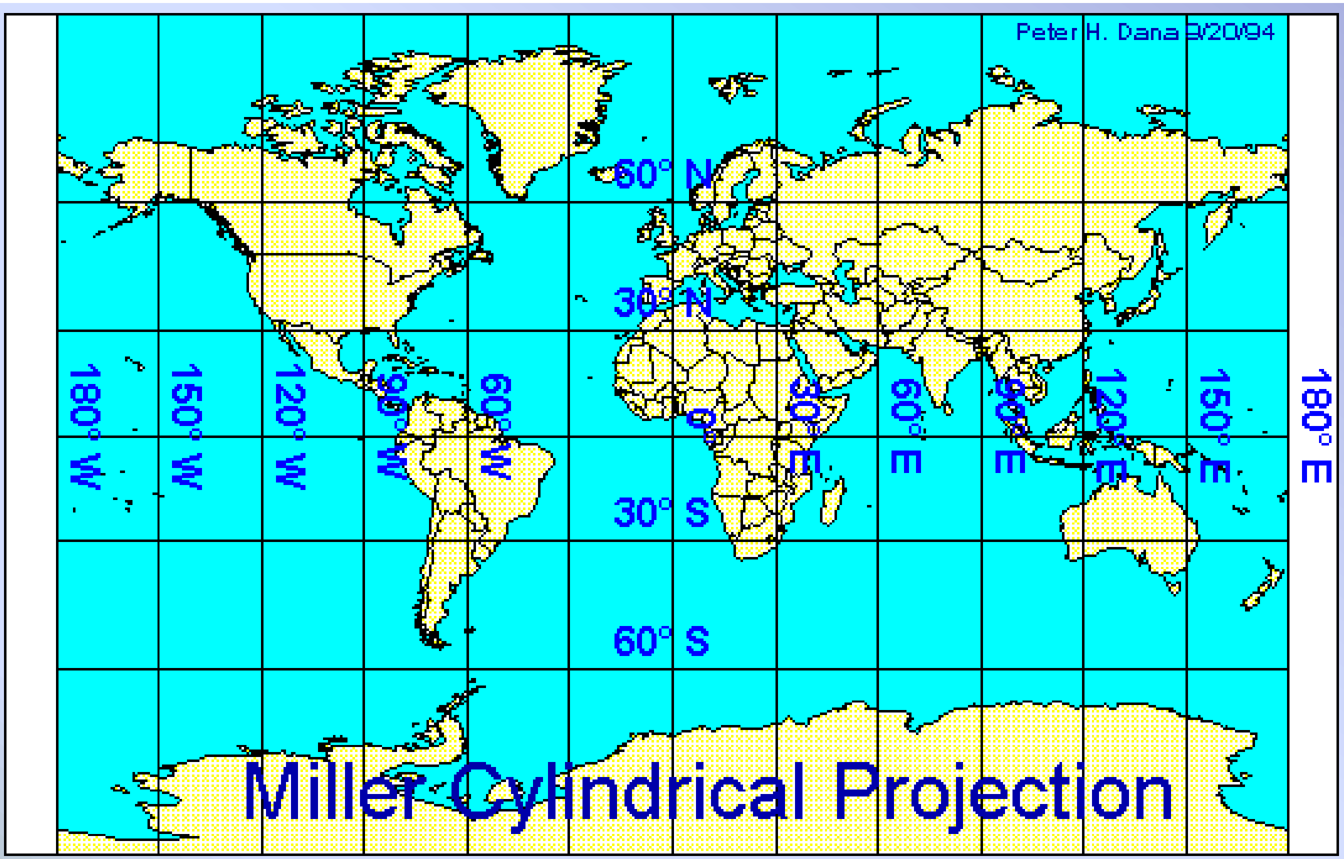
Cylindrical Projection

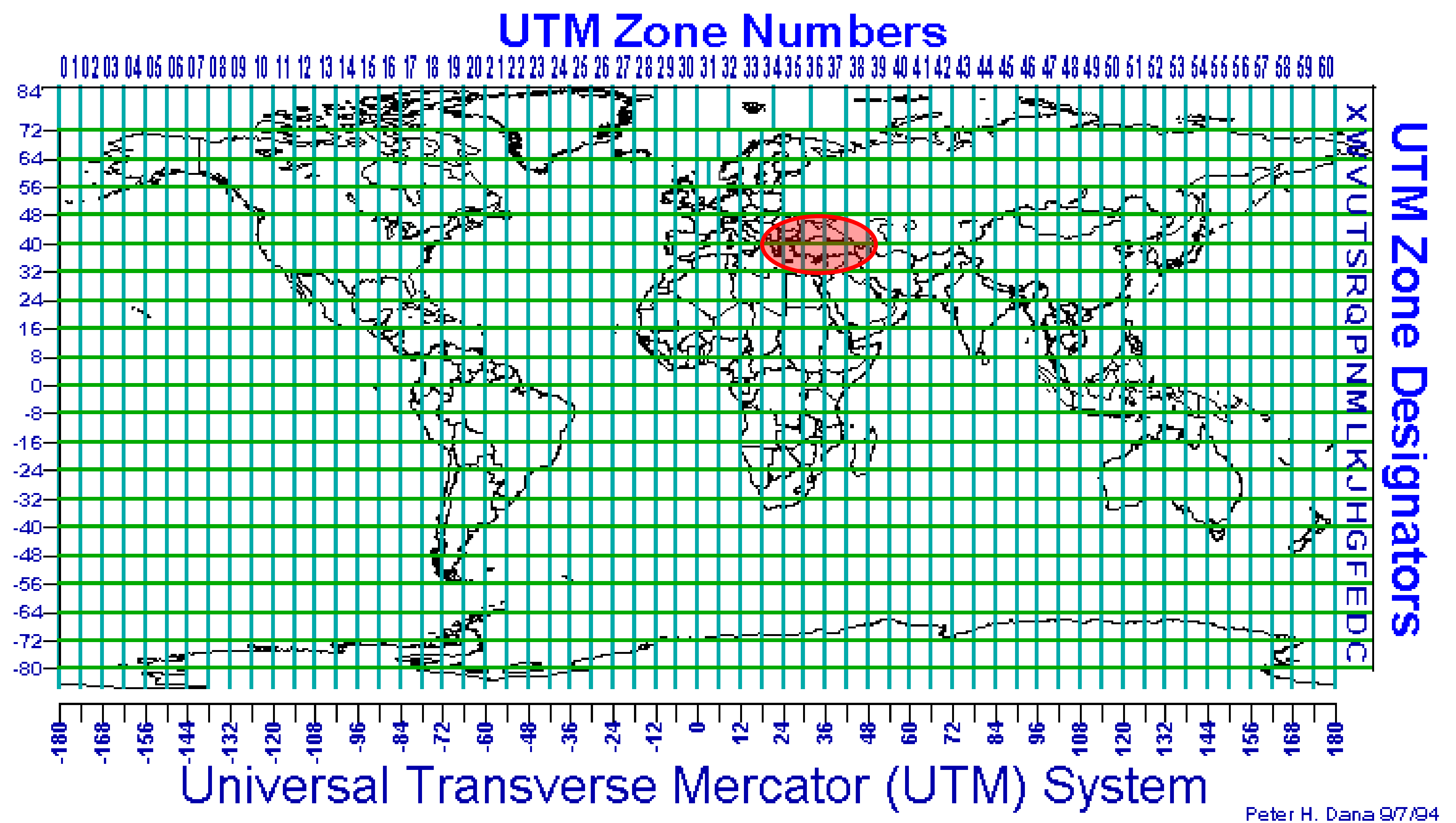




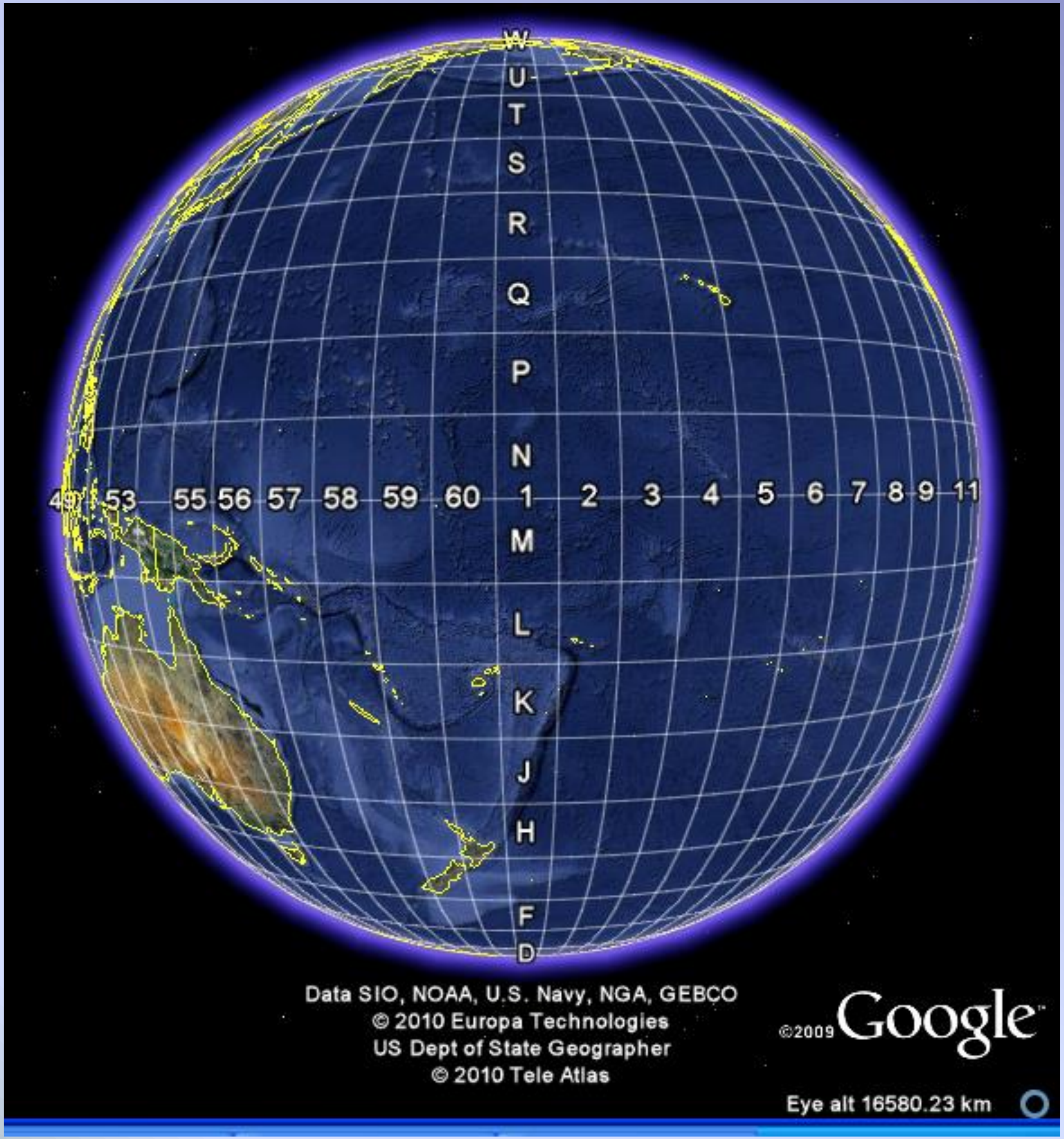


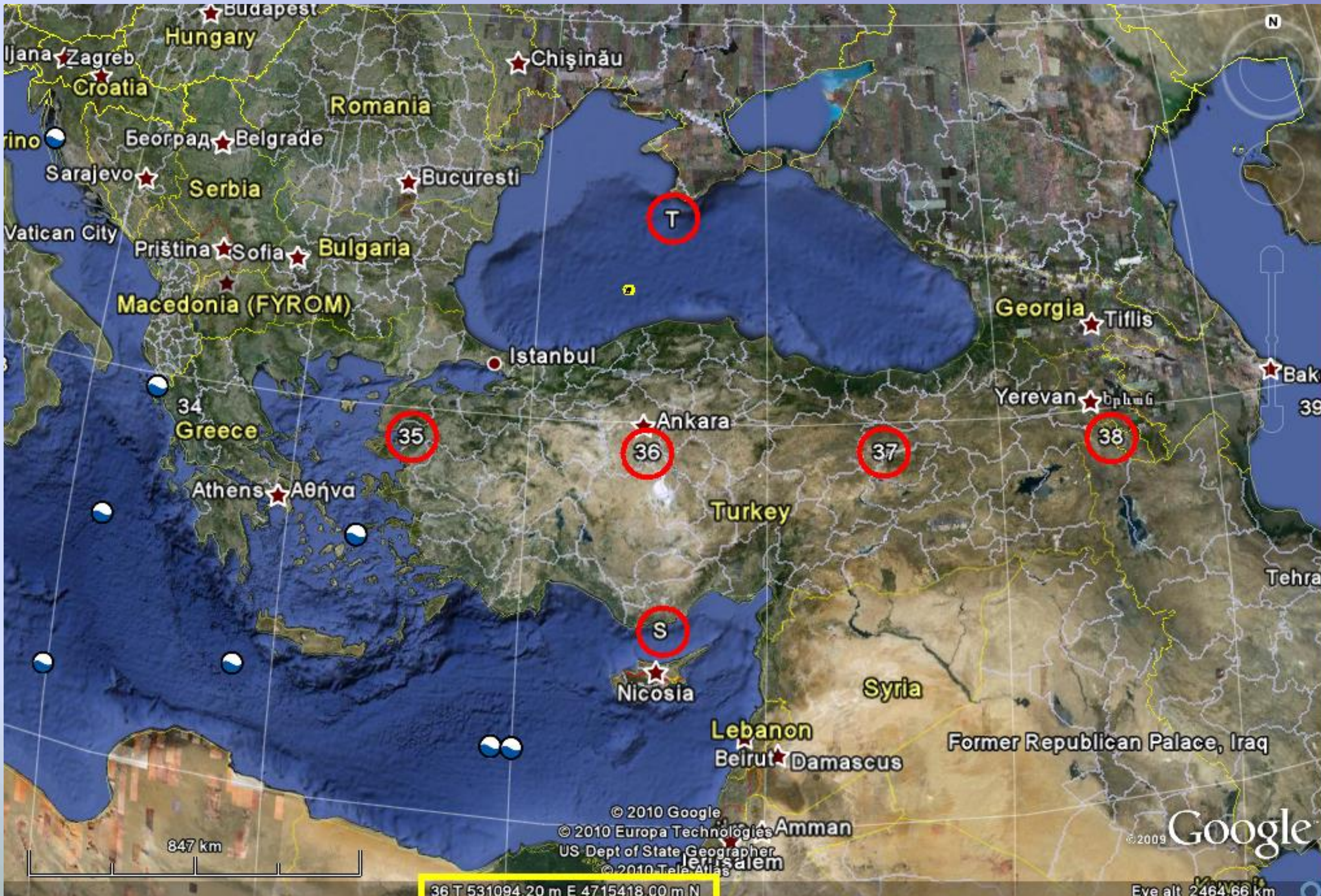



Peter H. Dana 9/20/94
60° N
30° N
30° S
60° S
180° W
150° W
120° W
90° W
60° W
0°
30° E
60° E
90° E
120° E
150° E
180° E
Miller Cylindrical Projection

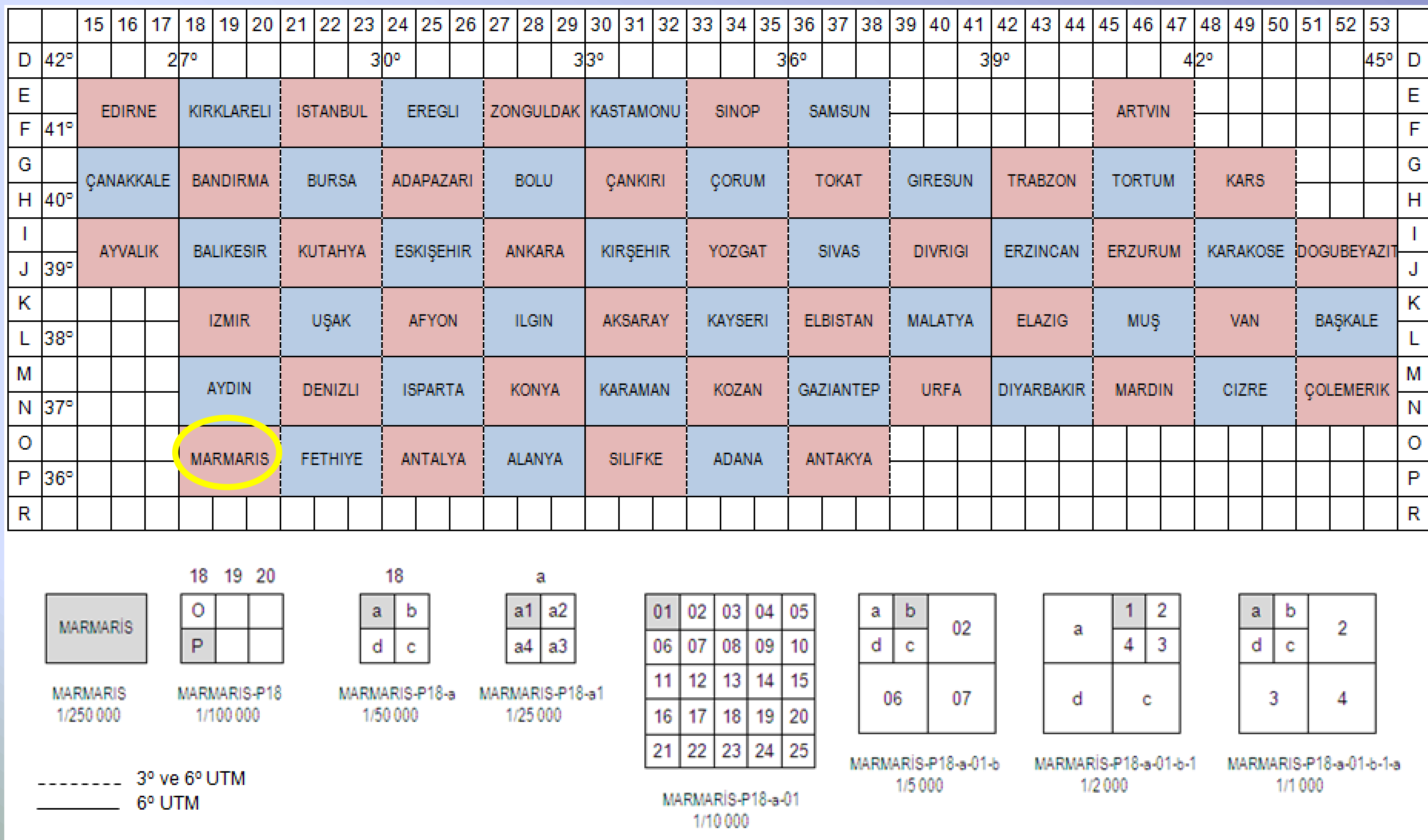


UTM Zone Numbers
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
84 72 64 56 48 40 32 24 16 8 0 -8 -16 -24 -32 -40 -48 -56 -64 -72 -80
X W V U T S R Q P N M L K J H G F E D C
UTM Zone Designators
-180 -168 -156 -144 -132 -120 -108 -96 -84 -72 -60 -48 -36 -24 -12 0 12 24 36 48 60 72 84 96 108 120 132 144 156 168 180
Universal Transverse Mercator (UTM) System
Peter H. Dana 9/7/94

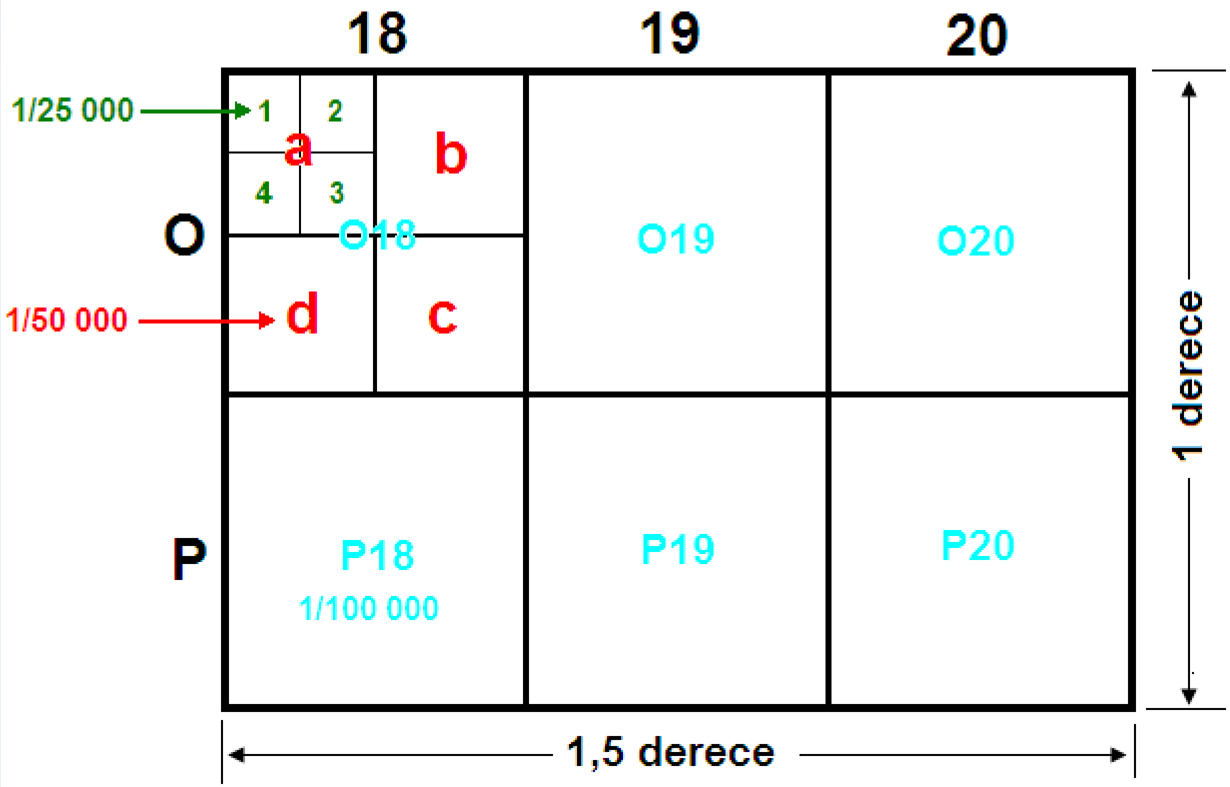

W
U
T
S
R
Q
P
N
49
53
55 56 57 58 59 60 1 2 3 4 5 6 7 8 9 11
M
L
K
J
H
F
D
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2010 Europa Technologies
US Dept of State Geographer
© 2010 Tele Atlas
©2009 Google
Eye alt 16580.23 km


Budapest
Hungary
Zagreb
Croatia
Chişinău
Romania
Београд
Belgrade
Sarajevo
Serbia
Bucuresti
T
Vatican City
Priština
Sofia
Bulgaria
Macedonia (FYROM)
Georgia
Tiflis
Istanbul
Yerevan
34
Greece
35
36
Ankara
37
38
39
Athens
Αθήνα
Turkey
S
Nicosia
Syria
Lebanon
Beirut
Damascus
Former Republican Palace, Iraq
847 km
© 2010 Google
© 2010 Europa Technologies
US Dept of State Geographer
© 2010 Tele Atlas
Amman
Jerusalem
Google
36 T 531094.20 m E 4715418.00 m N
Eye alt 2464.66 km

TÜRKİYE UTM Paftaları



1/250 000 Ölçekli MARMARİS Paftası

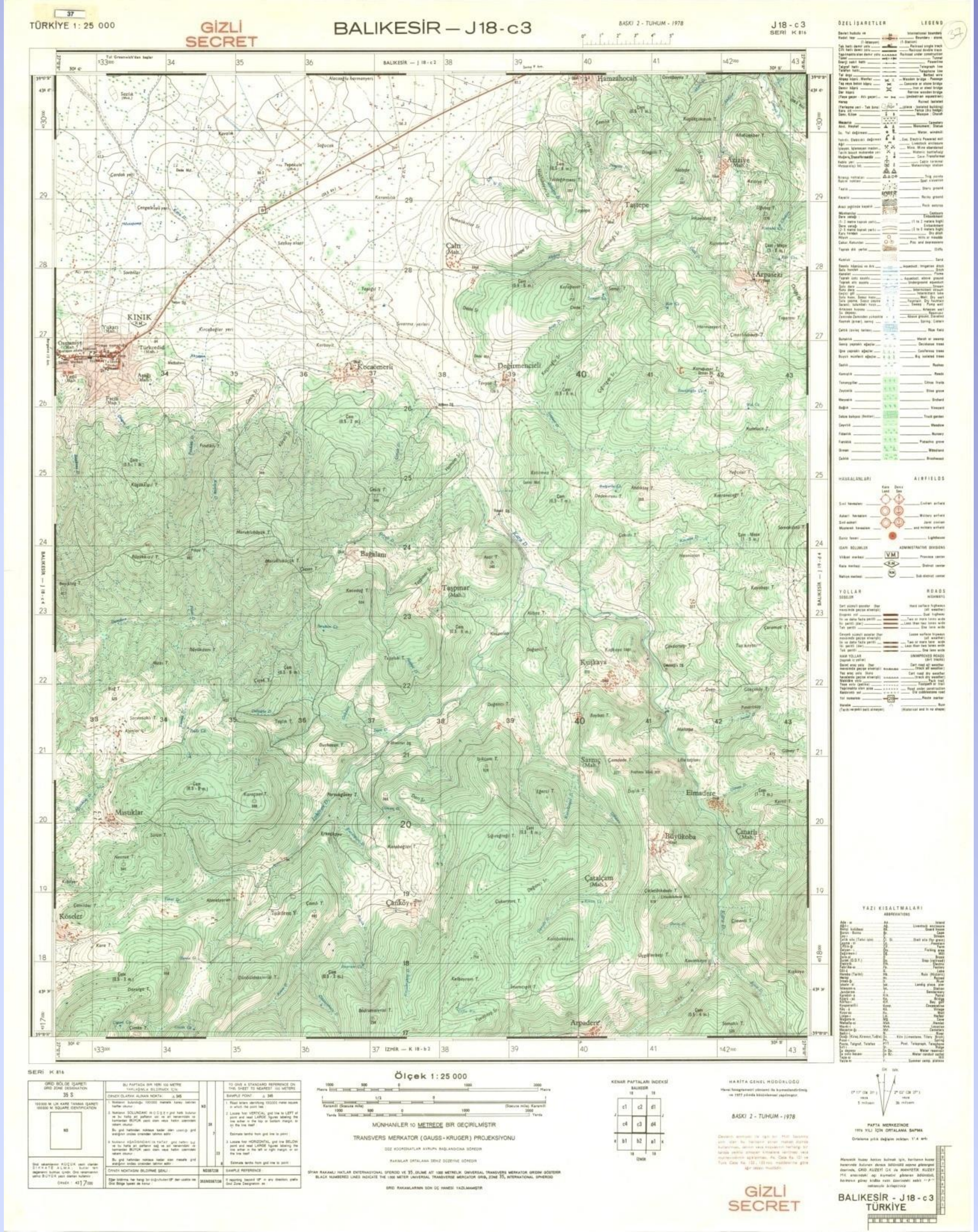


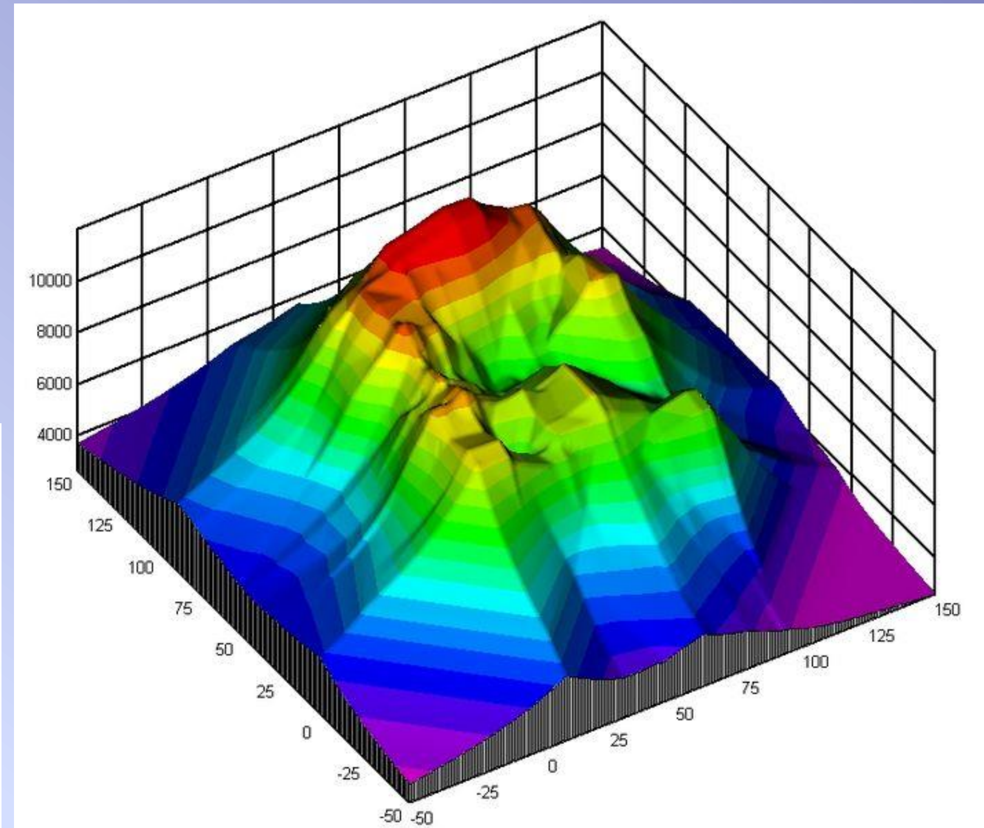
TÜRKİYE : 65 adet 1/250 000'lik pafta
1/250 000'lik pafta 96 adet 1/25 000'lik, 24 adet 1/50 000'lik ve 6 adet 1/100 000'lik pafta içermektedir.

Türkiye'nin tamamında

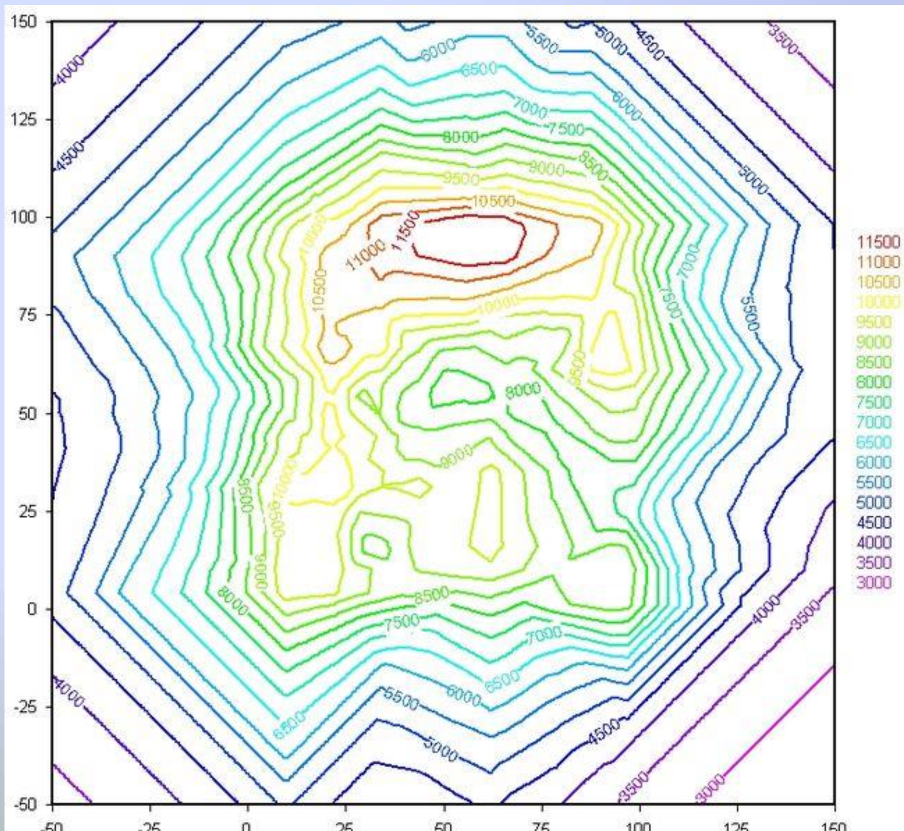
96x65 =6240

adet 1:25000 ölçekli harita bulunmaktadır.



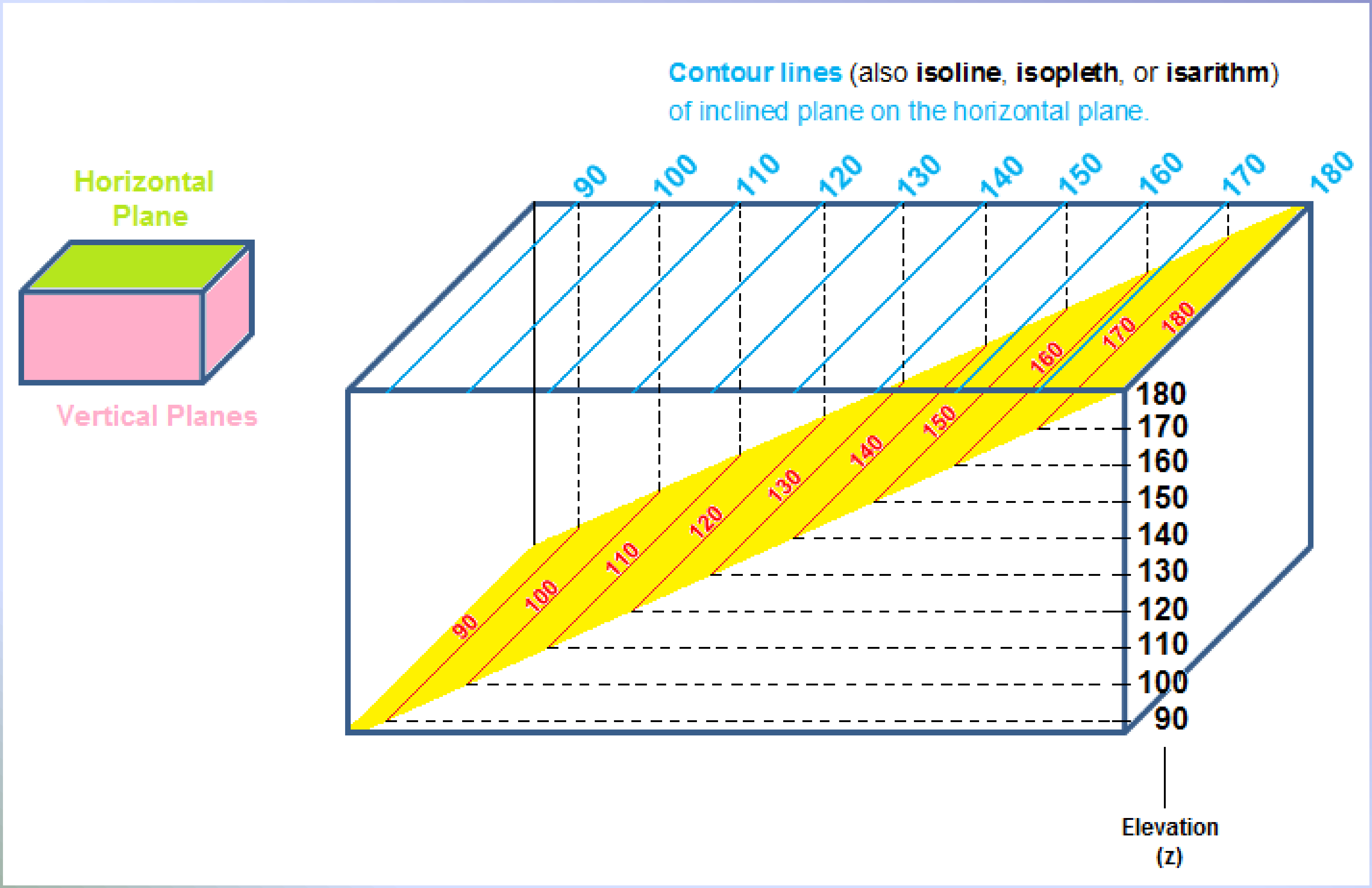


3D CONTOUR MAP

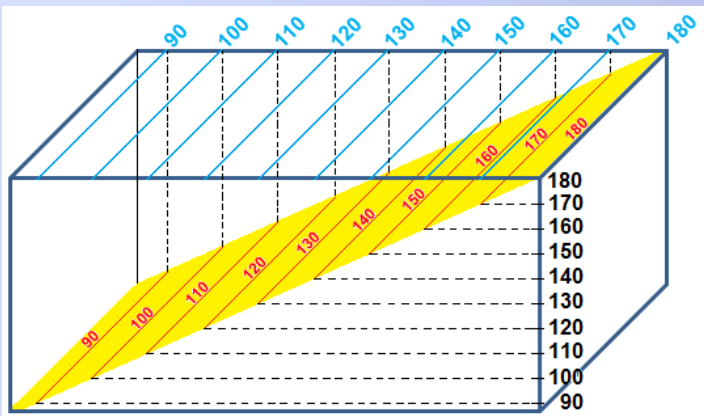


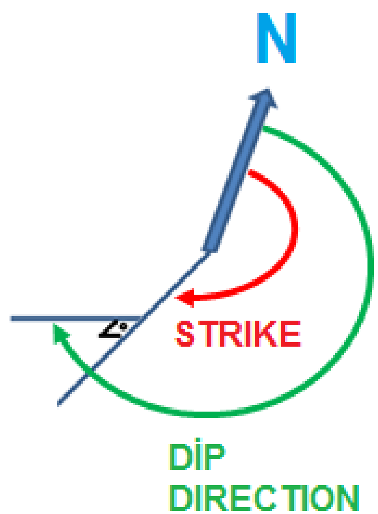
2D CONTOUR MAP

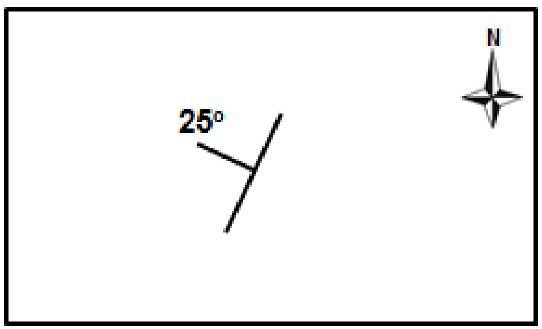
Drawing Contour Lines



Strike, Dip, Dip Direction







Showing the plane on the map

Dip : 25°

Strike : 205°

Dip Direction : 295°

Dip Direction = Strike + 90°

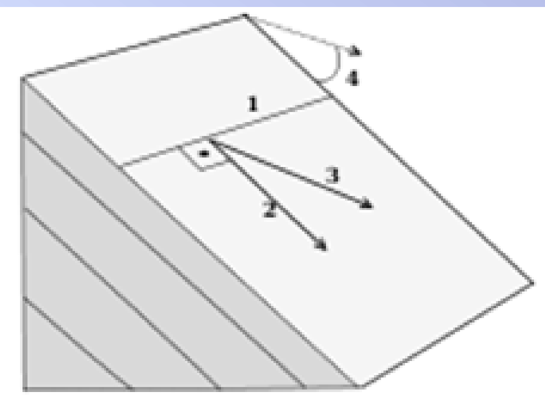
Writing a plane (seam, fault, etc.)

1) Dip/Dip Direction : 25°/295°
2) Strike/Dip : N25°E/25°NW (Strike as Bearing)
3) Strike/Dip : 205°E/25° (Strike as Azimuth)

Strike and dip refer to the orientation or *attitude* of a geologic feature. The *strike line* of a bed, fault, or other planar feature is a line representing the intersection of that feature with a horizontal plane. On a geologic map, this is represented with a short straight line segment oriented parallel to the strike line. *Strike* (or strike angle) can be given as either a quadrant compass bearing of the strike line (N25°E for example) or in terms of east or west of true north or south, a single three digit number representing the azimuth, where the lower number is usually given (where the example of N25°E would simply be 025, and the other value of 205 is discarded), or the azimuth number followed by the degree sign (example of N25°E would be 25° or 205°).

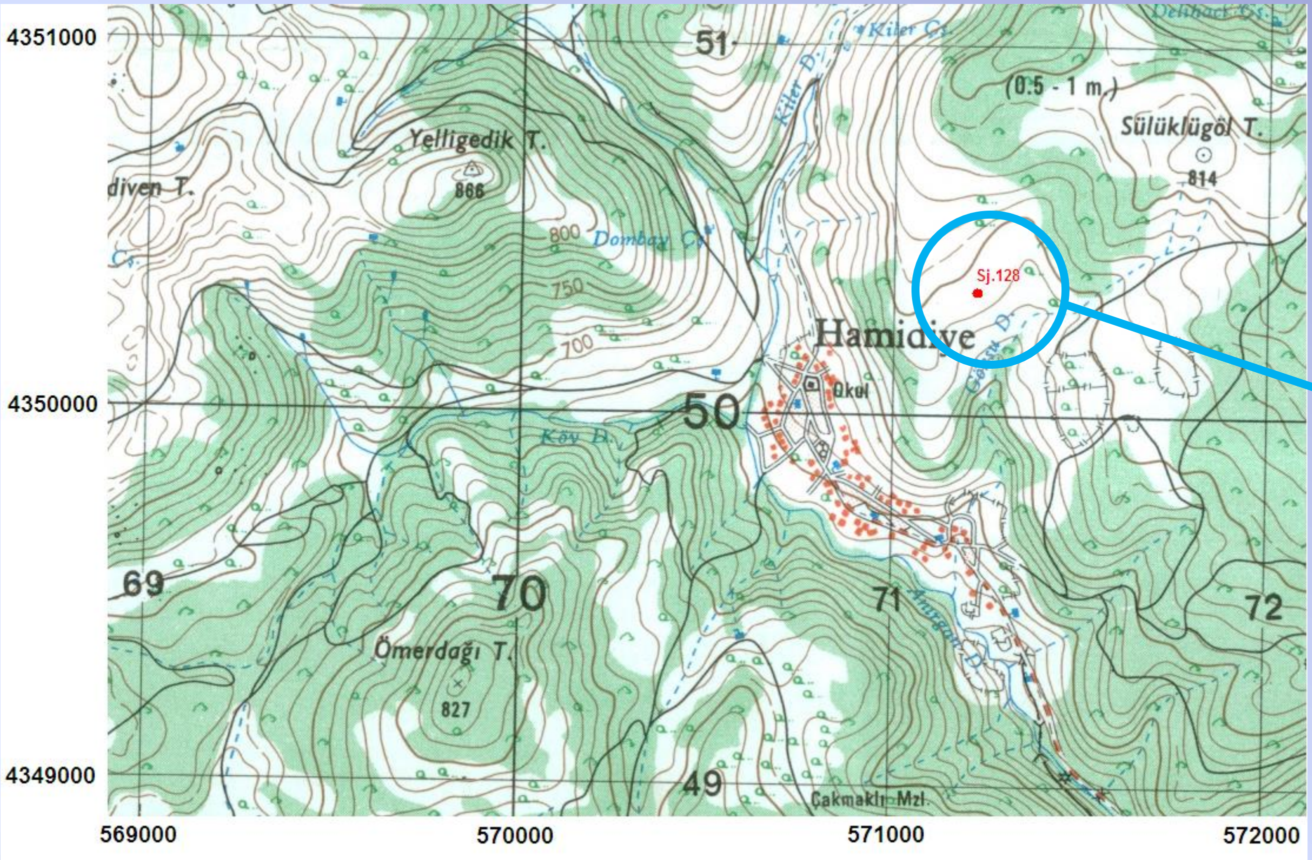
The *dip* gives the steepest angle of descent of a tilted bed or feature relative to a horizontal plane, and is given by the number (0°-90°) as well as a letter (N,S,E,W) with rough direction in which the bed is dipping. One technique is to always take the strike so the dip is 90° to the right of the strike, in which case the redundant letter following the dip angle is omitted. The map symbol is a short line attached and at right angles to the strike symbol pointing in the direction which the planar surface is dipping down. The angle of dip is generally included on a geologic map without the degree sign. Beds that are dipping vertically are shown with the dip symbol on both sides of the strike, and beds that are flat are shown like the vertical beds, but with a circle around them. Both vertical and flat beds do not have a number written with them.

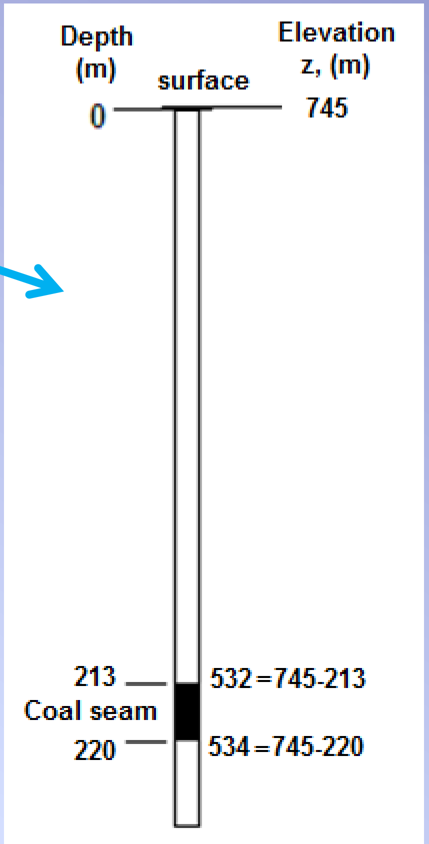
Another way of representing strike and dip is by **dip and dip direction**. The dip direction is the azimuth of the direction the dip as projected to the horizontal (like the trend of a linear feature in trend and plunge measurements), which is 90° off the strike angle. For example, a bed dipping 30° to the South, would have an East-West strike (and would be written 90°/30° S using strike and dip), but would be written as 30/180 using the dip and dip direction method.



Strike and dip of the beds. 1-Strike, 2-Dip, 3-Apparent dip 4-Angle of dip

A typical drillhole (Sj.128)





BOREHOLE INFORMATION:

Borehole ID ➔ Sj.128

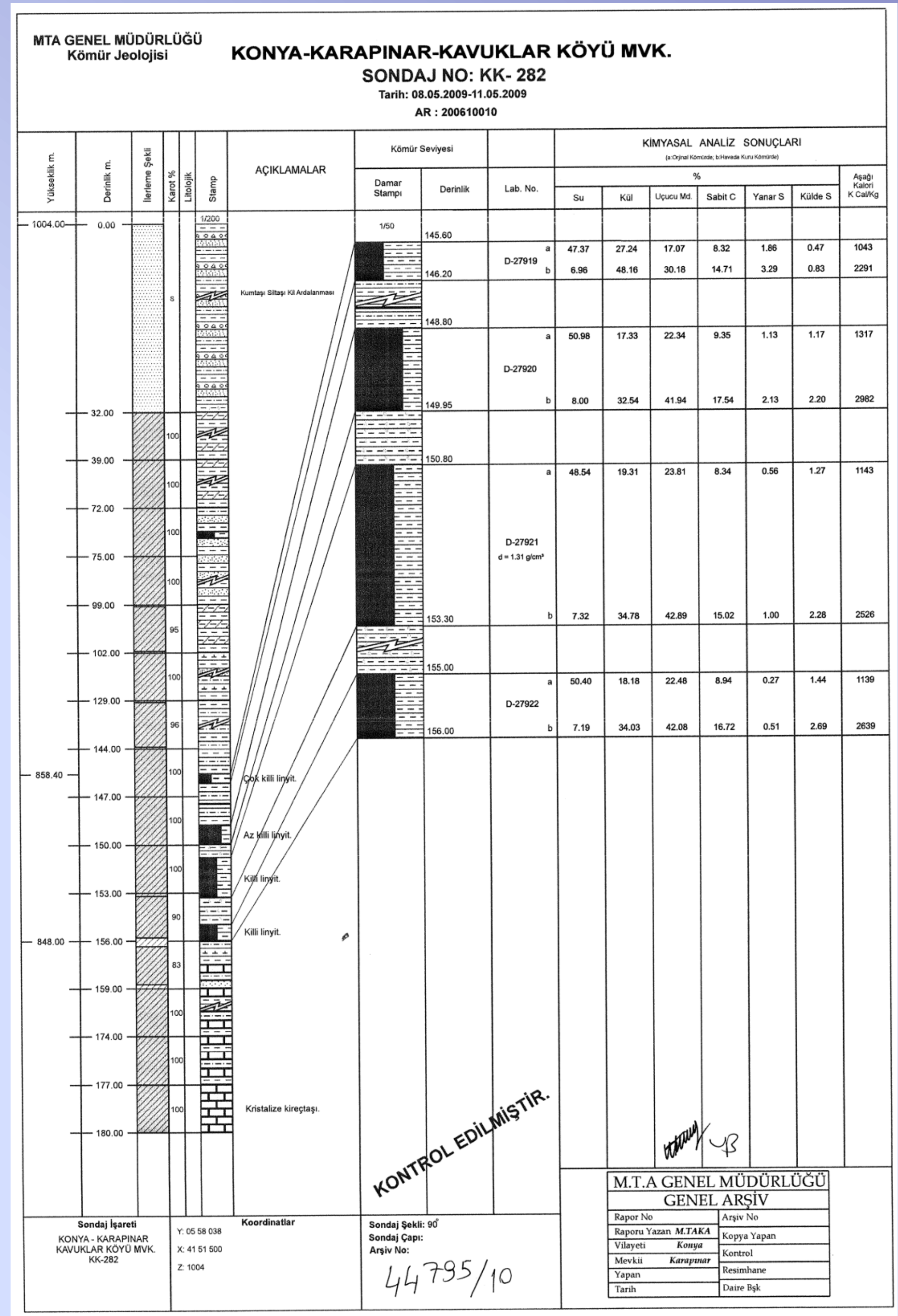
X: 4350335 (Northing)

Y: 571223 (Easting)

Z: 745 m (Elevation)

Coal seam roof elevation = 745-213 = 532 m

A typical drillhole log



MTA GENEL MÜDÜRLÜĞÜ
Kömür Jeolojisi

KONYA-KARAPINAR-KAVUKLAR KÖYÜ MVK.
SONDAJ NO: KK- 282
Tarih: 08.05.2009-11.05.2009
AR : 200610010

Yükseklik m.	Derinlik m.	İlerleme Şekli	Karot %	Litolojik Stamp	AÇIKLAMALAR
1004.00	0.00	S		1/200	Kumtaşı Siltaşı Kil Ardalanması
	32.00		100		
	39.00		100		
	72.00		100		
	75.00		100		
	99.00		95		
	102.00		100		
	129.00		96		
	144.00		100		
858.40					Çok killi linyit.
	147.00		100		Az killi linyit.
	150.00		100		Killi linyit.
	153.00		90		Killi linyit.
848.00	156.00		83		
	159.00		100		
	174.00		100		
	177.00		100		Kristalize kireçtaşı.
	180.00				

Kömür Seviyesi — KİMYASAL ANALİZ SONUÇLARI (a:Orjinal Kömürde; b:Havada Kuru Kömürde)

Damar Stampı	Derinlik	Lab. No.		Su %	Kül %	Uçucu Md. %	Sabit C %	Yanar S %	Külde S %	Aşağı Kalori K Cal/Kg
1/50	145.60									
	146.20	D-27919	a	47.37	27.24	17.07	8.32	1.86	0.47	1043
			b	6.96	48.16	30.18	14.71	3.29	0.83	2291
	148.80									
	149.95	D-27920	a	50.98	17.33	22.34	9.35	1.13	1.17	1317
			b	8.00	32.54	41.94	17.54	2.13	2.20	2982
	150.80									
	153.30	D-27921 d = 1.31 g/cm³	a	48.54	19.31	23.81	8.34	0.56	1.27	1143
			b	7.32	34.78	42.89	15.02	1.00	2.28	2526
	155.00									
	156.00	D-27922	a	50.40	18.18	22.48	8.94	0.27	1.44	1139
			b	7.19	34.03	42.08	16.72	0.51	2.69	2639

KONTROL EDİLMİŞTİR.

Sondaj İşareti: KONYA - KARAPINAR KAVUKLAR KÖYÜ MVK. KK-282

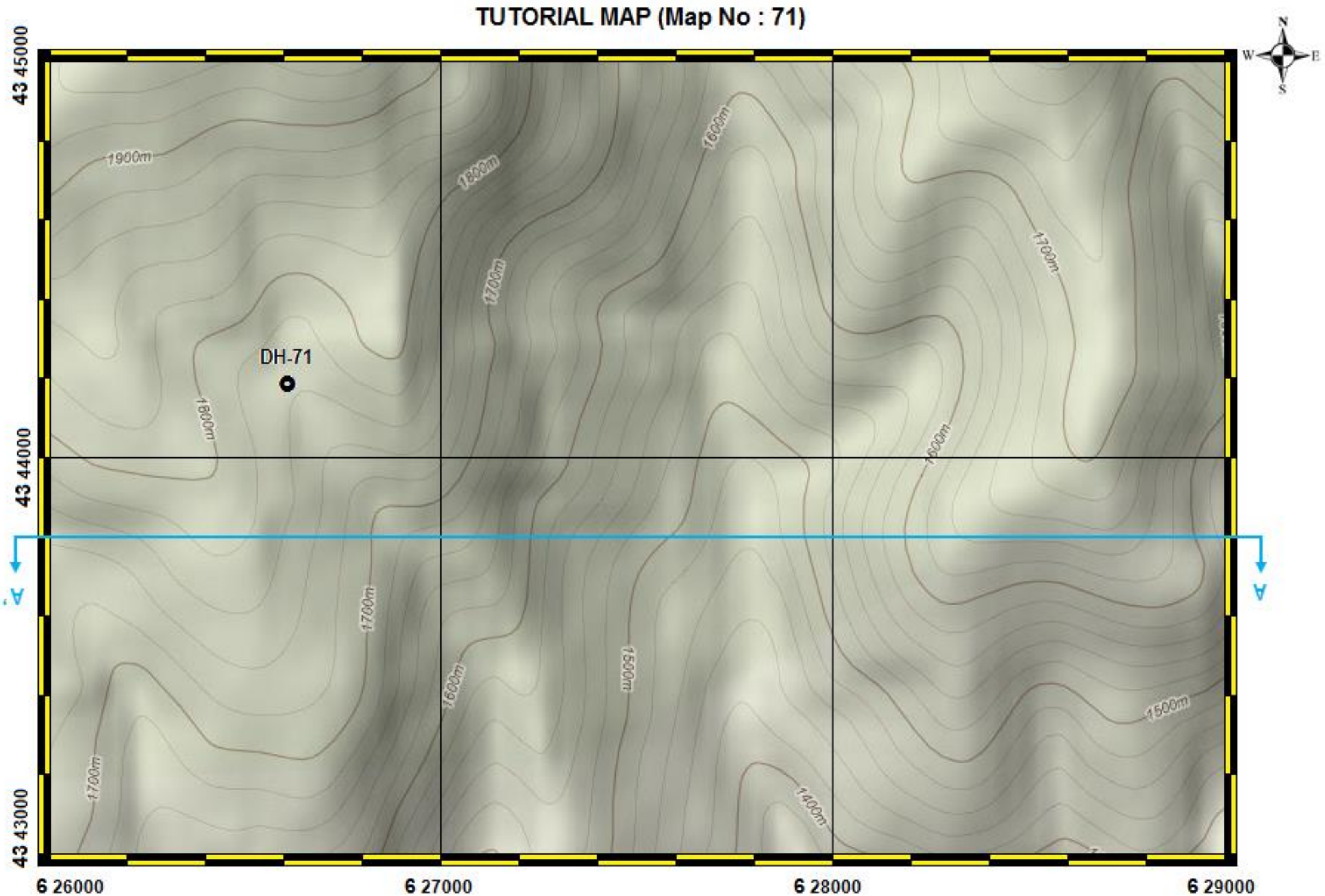
Koordinatlar: Y: 05 58 038; X: 41 51 500; Z: 1004

Sondaj Şekli: 90°
Sondaj Çapı:
Arşiv No: 44795/10

M.T.A GENEL MÜDÜRLÜĞÜ
GENEL ARŞİV

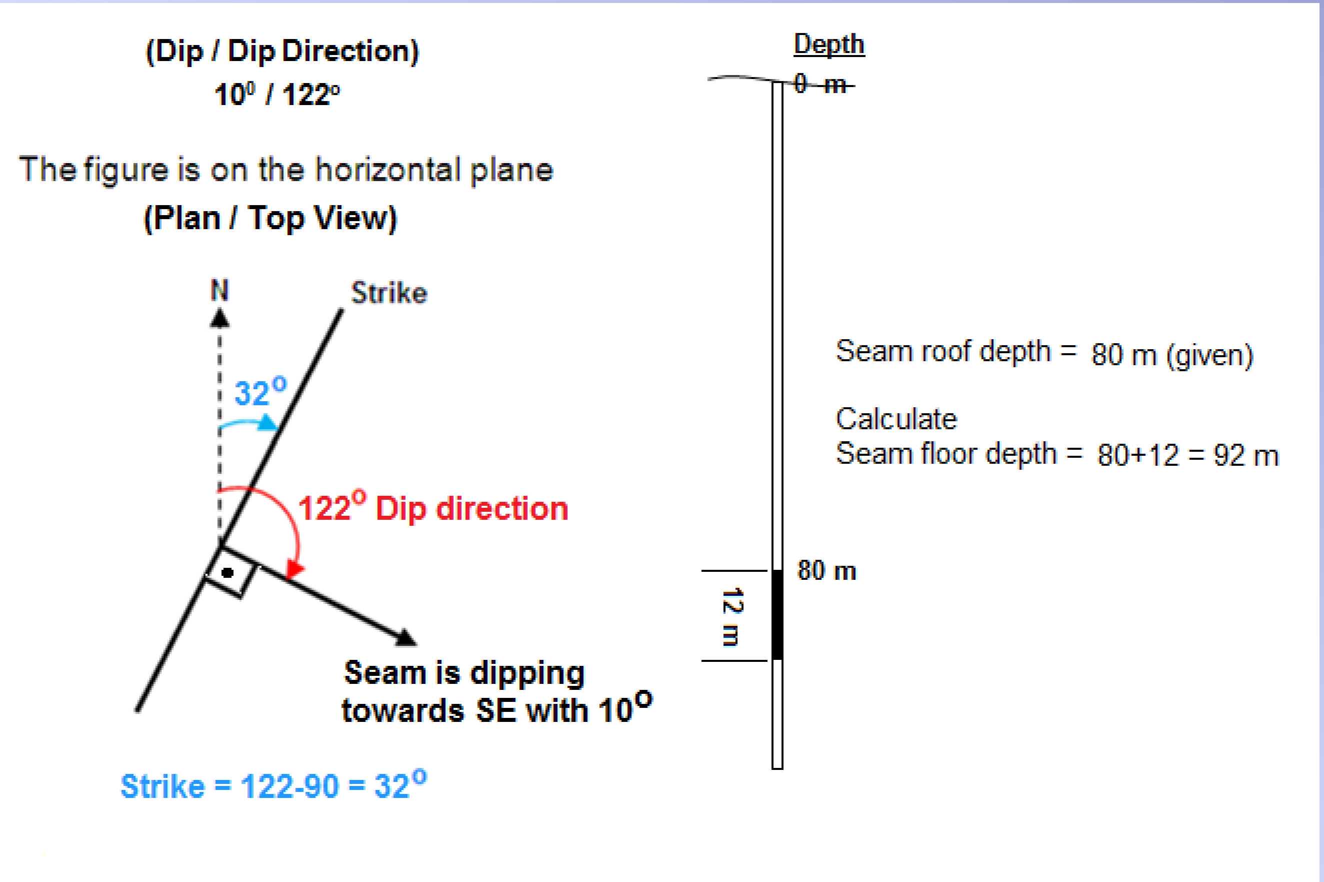
Rapor No	Arşiv No
Raporu Yazan M.TAKA	Kopya Yapan
Vilayeti Konya	Kontrol
Mevkii Karapınar	Resimhane
Yapan	Daire Bşk
Tarih	

Raw Data (a map is given as follows)

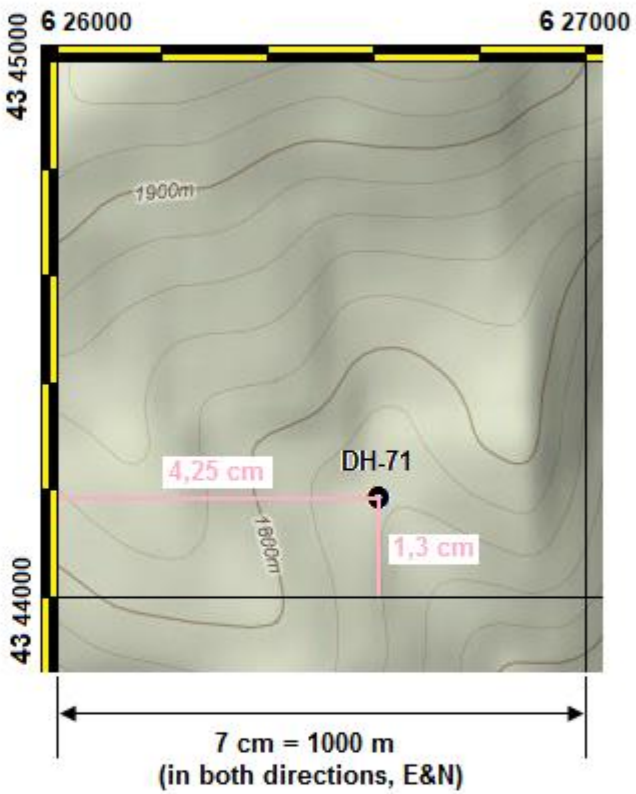


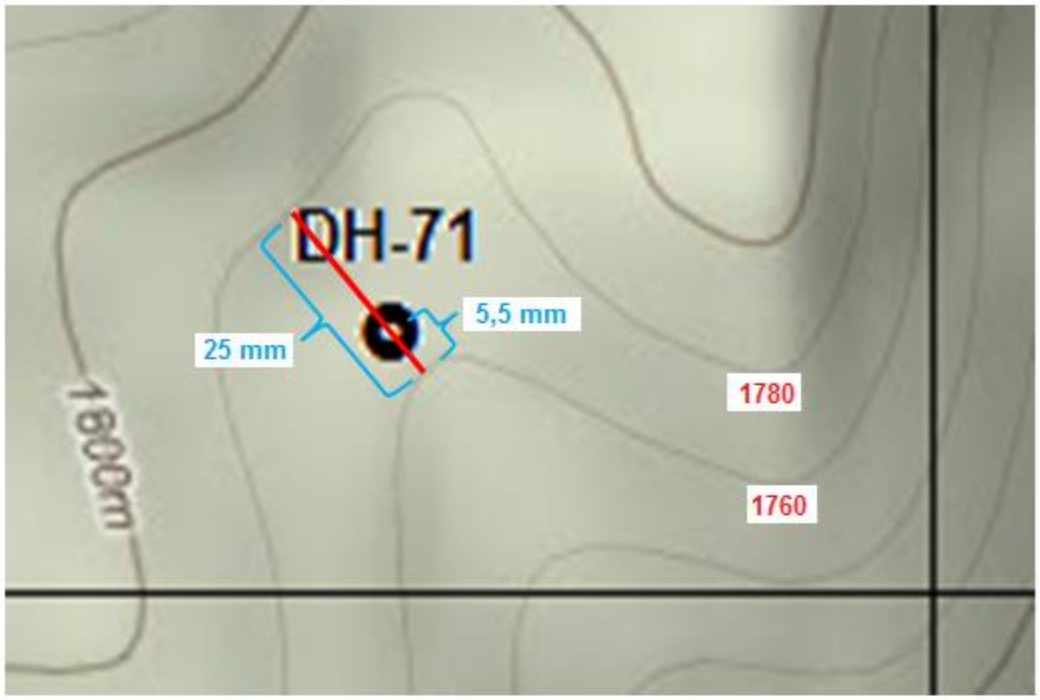
Map No	Dip (°)	Dip direction (°)	Seam roof depth (m)	Seam thickness (m)	Contour interval (m)
71	10	122	80	12	20

Reading data and calculations



Find drill-hole coordinates (X, Y and Z), then seam roof and floor elevations (Z values)

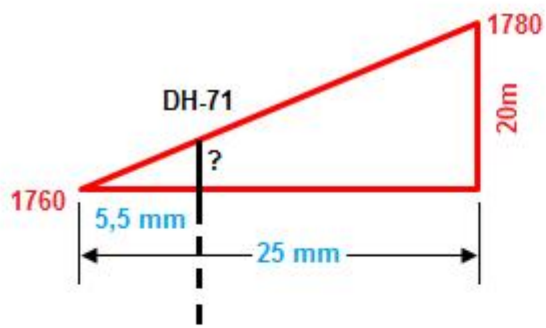




X, Y Coordinates of drill-hole

Northing (X) = 4344000+(1,3/7)*1000 = 4344186

Easting (Y) = 626000+(4,25/7)*1000 = 626607



Z (DH-71) = 1760 + (5,5/25)*20 = 1764,4 m

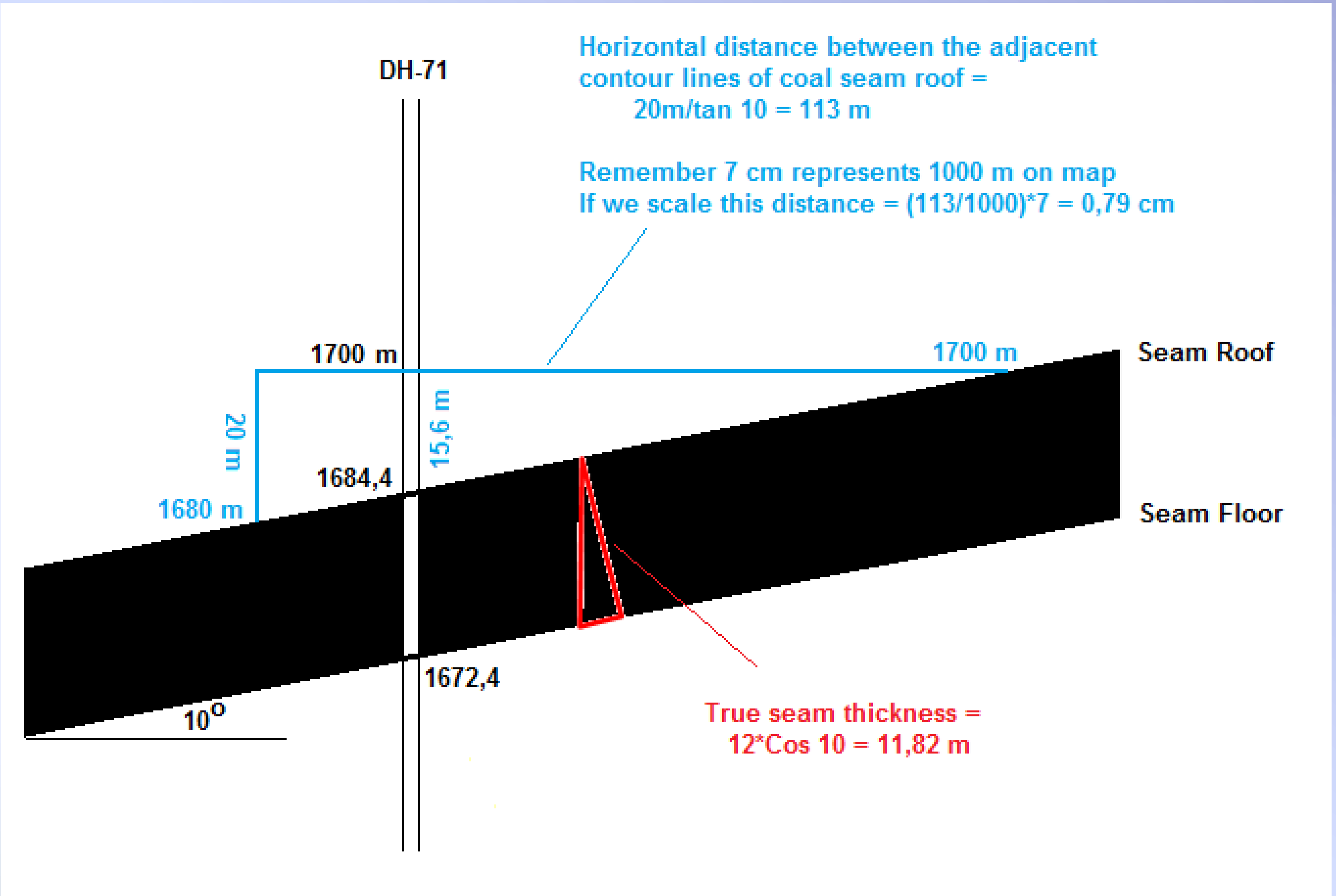
Z (Seam roof) = 1764,4 - 80 = 1684,4 m

Z (Seam floor) = 1764,4 - 92 = 1672,4 m

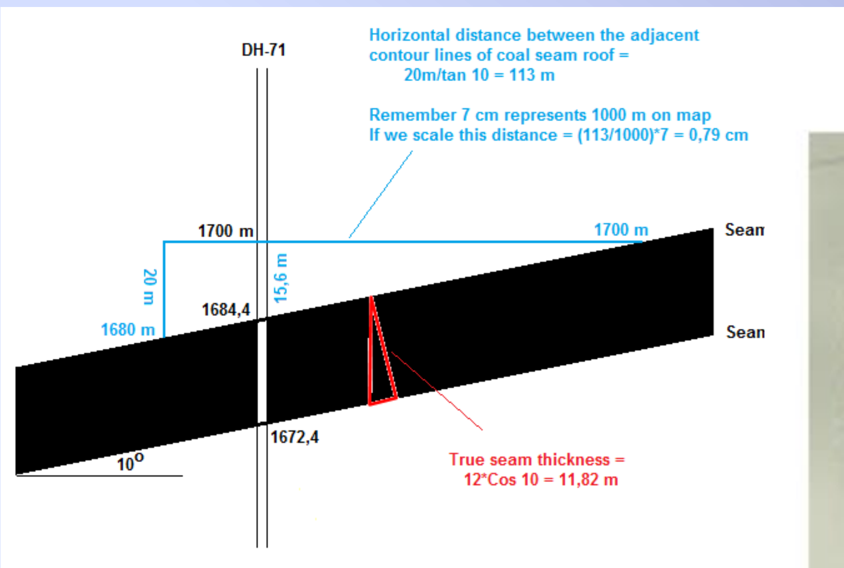
Drawing contour lines of coal seam roof

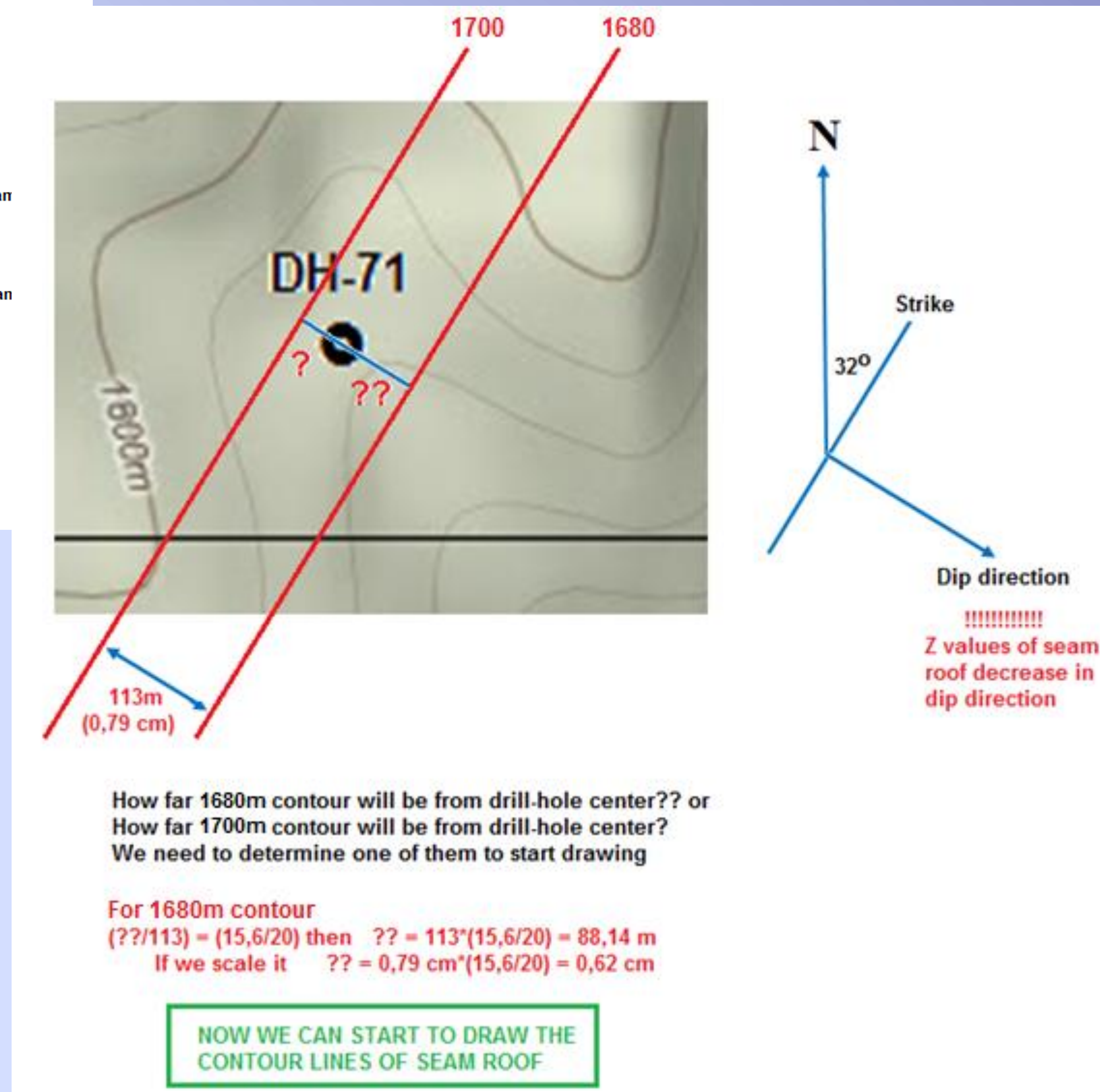
Contour line intervals is given as 20 m

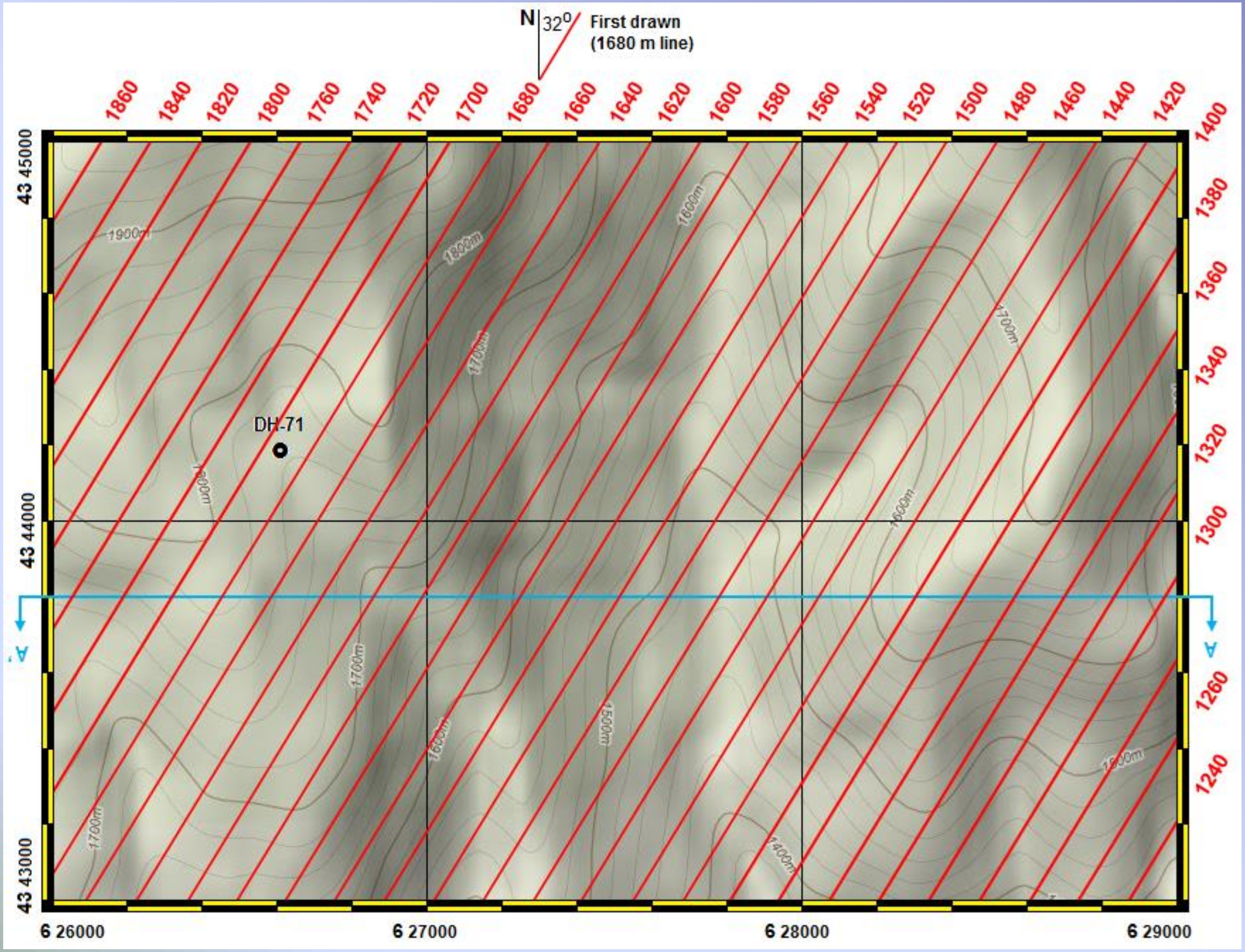
Roof elevation at the drill = 1684,4 m



Calculate distance of beginning contour from drill point

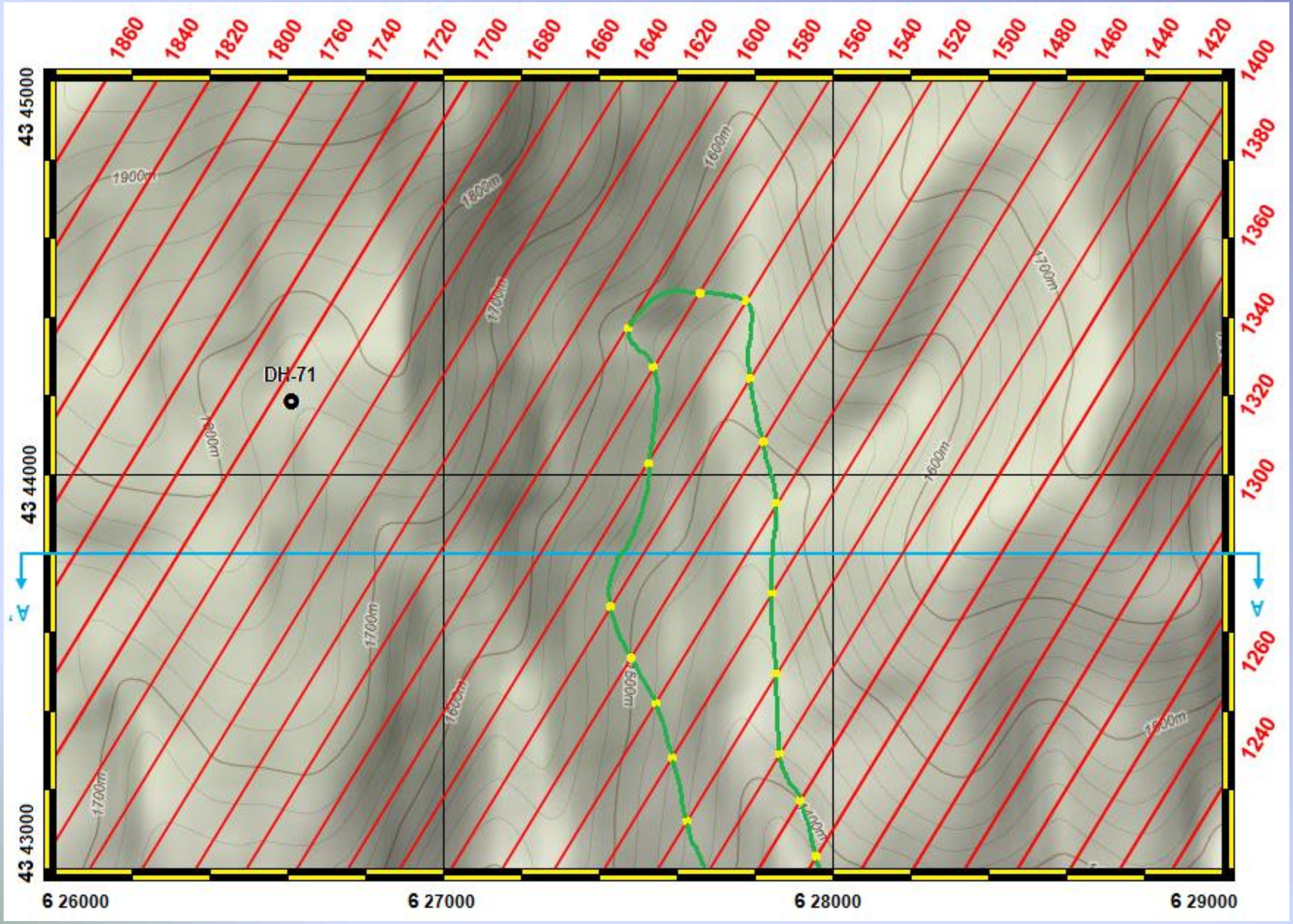




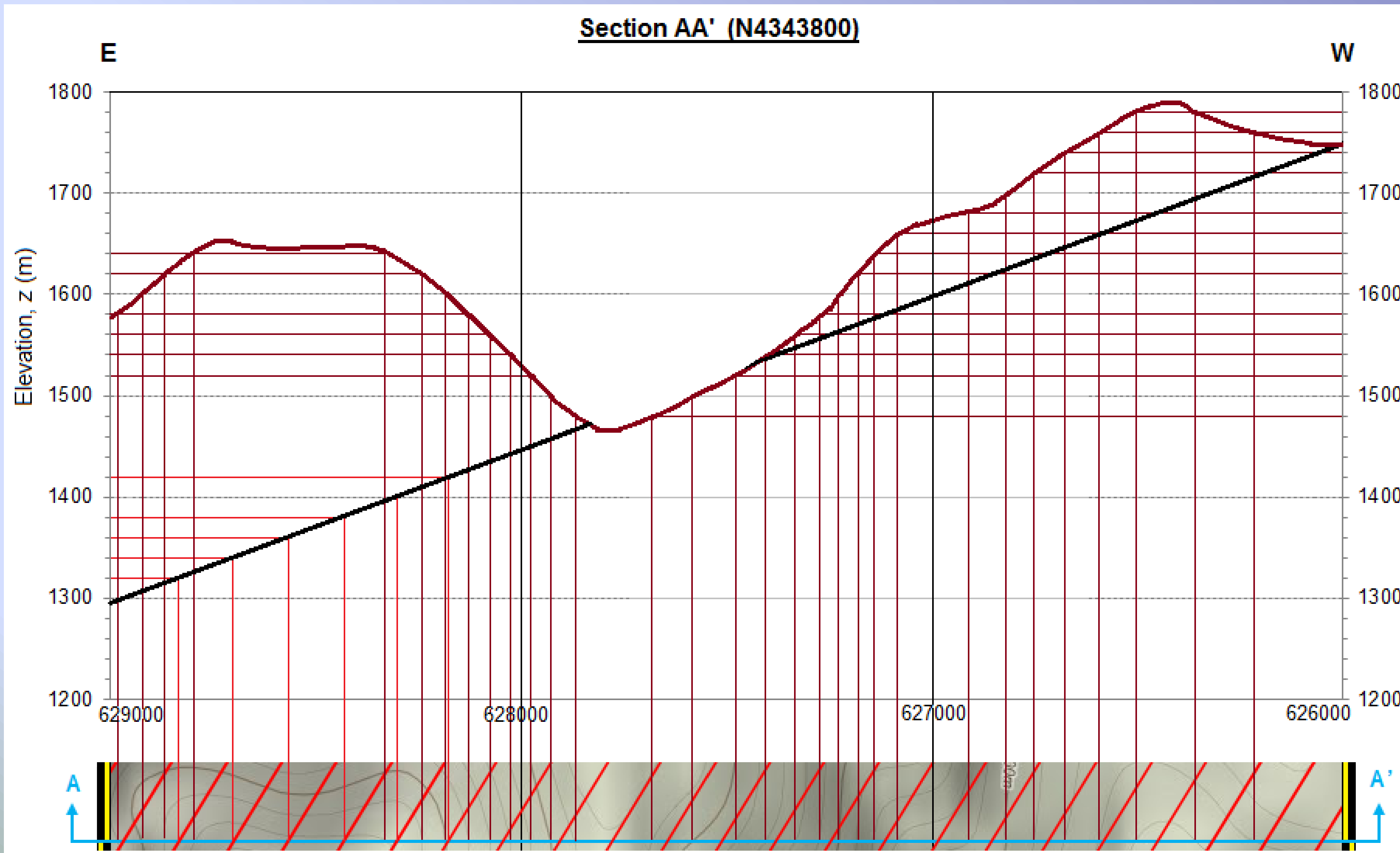

N
32°
First drawn
(1680 m line)
1860
1840
1820
1800
1760
1740
1720
1700
1680
1660
1640
1620
1600
1580
1560
1540
1520
1500
1480
1460
1440
1420
1400
1380
1360
1340
1320
1300
1260
1240
43 45000
43 44000
43 43000
6 26000
6 27000
6 28000
6 29000
DH-71
1900m
1800m
1700m
1600m
1500m
1400m
A'
A

Sample outcrops

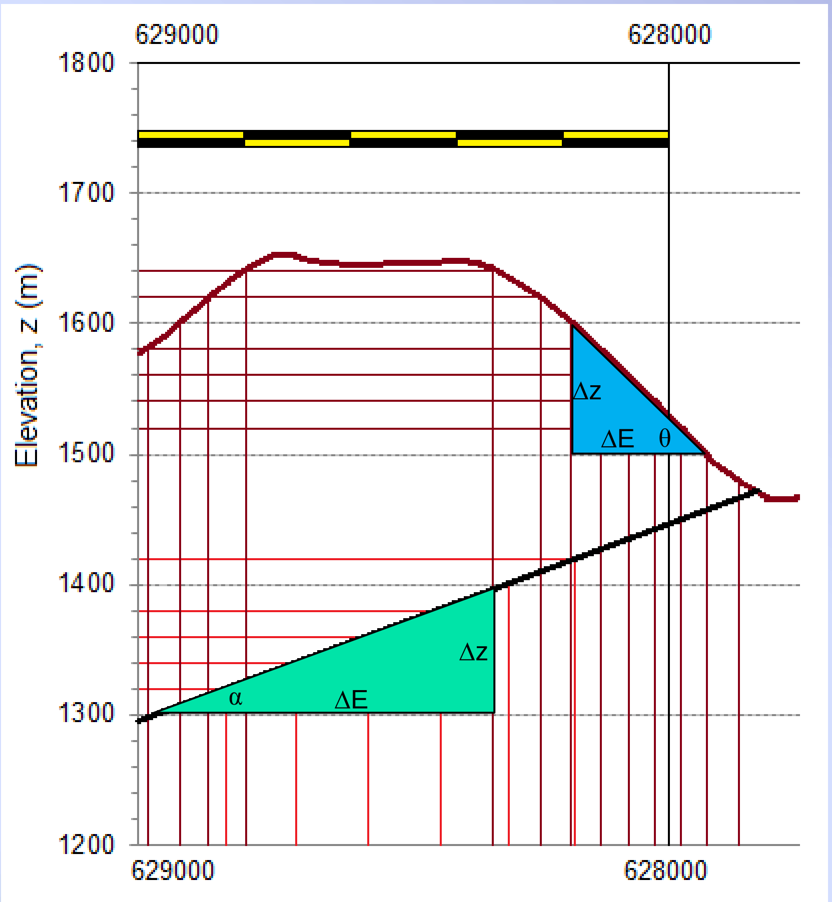
Drawing outcrop line



Drawing cross-section of line AA’



Calculation of some inclinations (seam, surface)



Seam inclination (α)

$\tan \alpha = \Delta z / \Delta E$

ΔE is 4,5 cm; if 7 cm = 1000 m, then

$\Delta E = (4{,}5/7)*1000 = 642{,}85$ m

$\Delta z = 1400-1300 = 100$ m

$\alpha = \tan^{-1}(100 / 642{,}85) = 8{,}84^{o}$

(!!!! this is apparent dip angle of the seam along section line)

Topographic inclination (θ)

$\tan \theta = \Delta z / \Delta E$

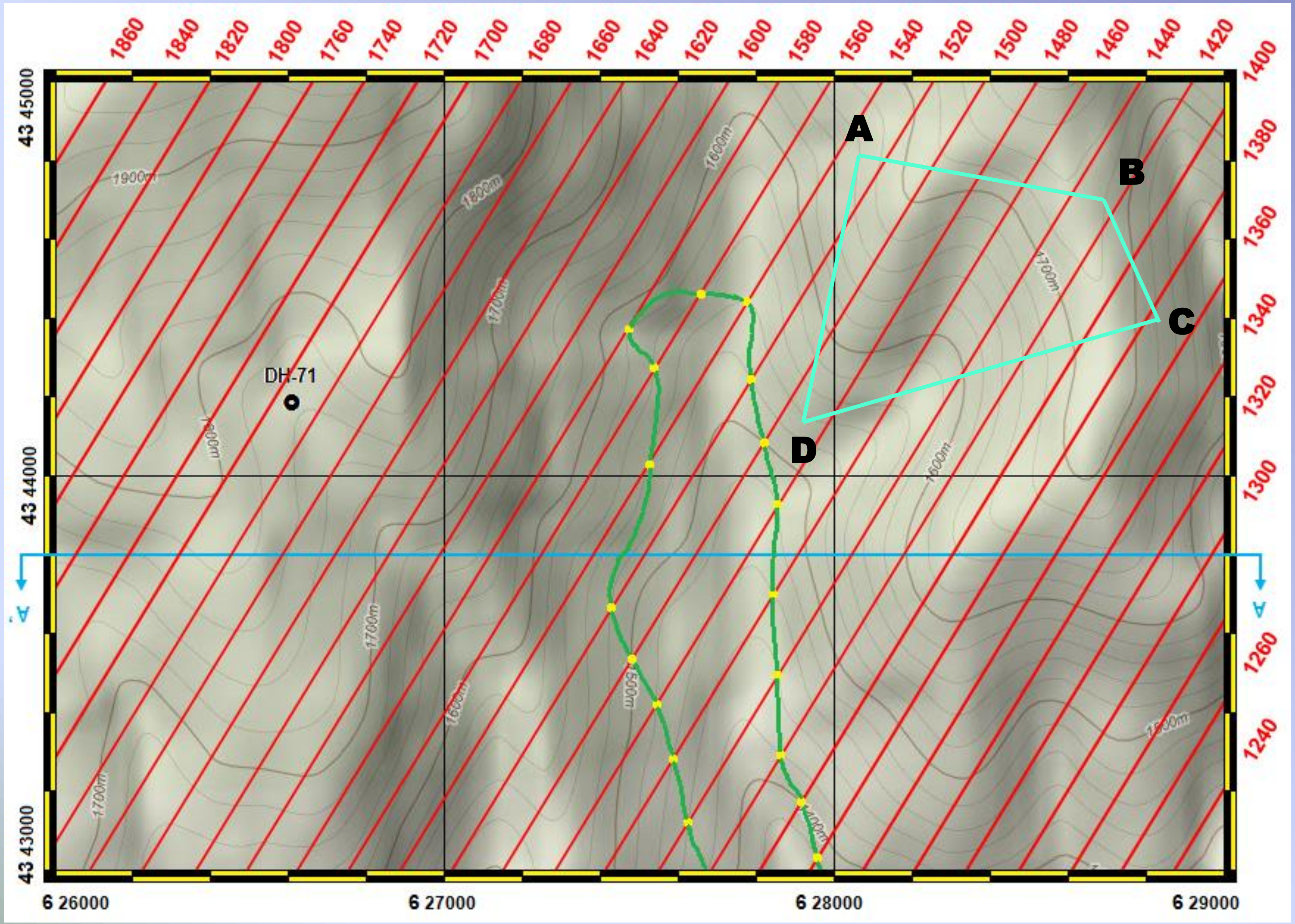
Δz is 100 m (=1600-1500)

ΔE is 1,7 cm, then

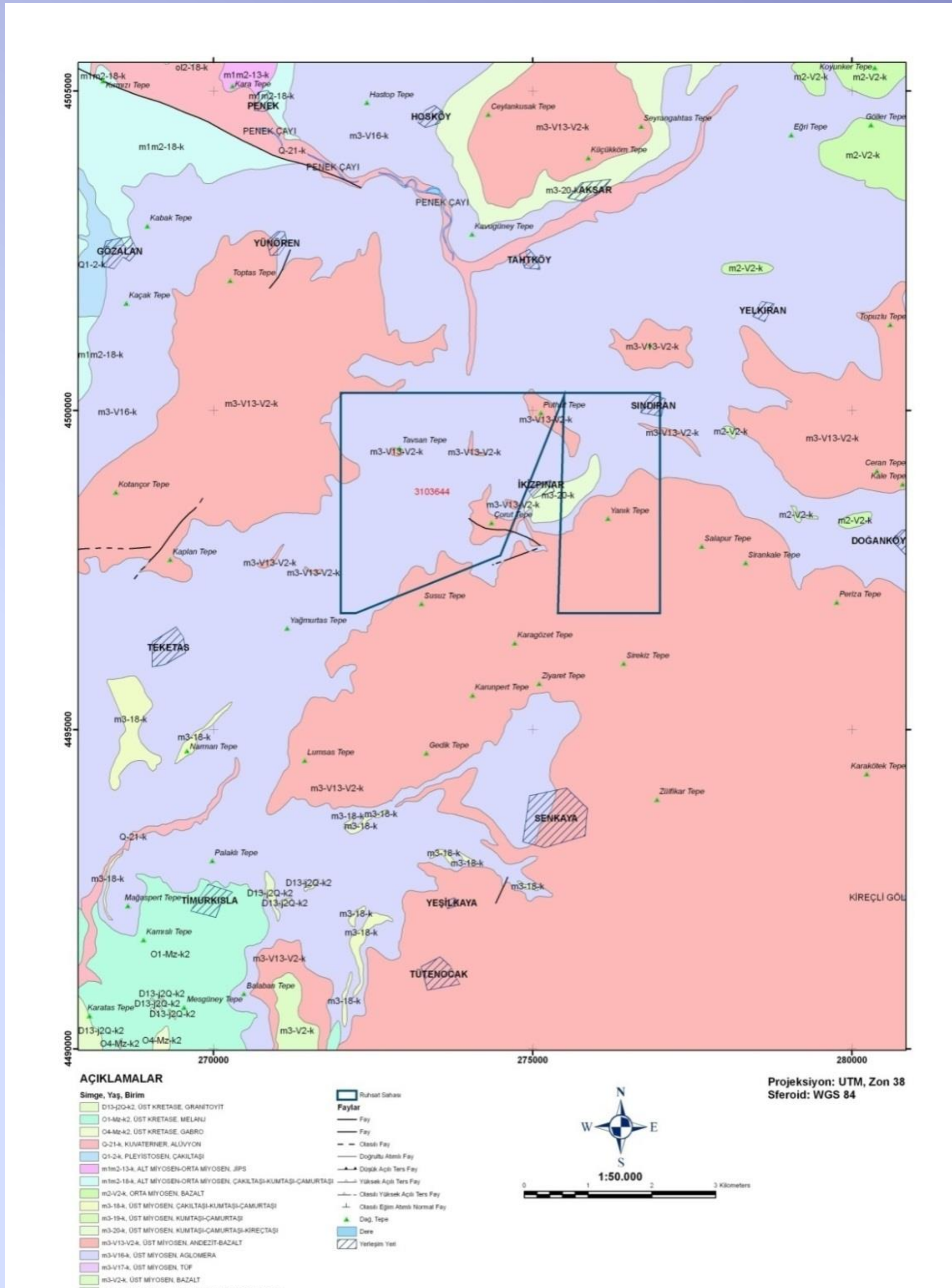
$\Delta E = (1{,}7/7)*1000 = 242{,}85$ m

$\theta = \tan^{-1}(100 / 242{,}85) = 22{,}38^{o}$

Drawing a four sided polygon and its area



A typical geological map



Şekil 17a. Erzurum - Şenkaya ruhsat sahasının jeolojik haritası ve cevherleşmeler

Reporting the work

* Reports should be submitted due 26 May 2014
* Reports should be not longer than 15 pages
* Reports should content
    - Cover page
    - Summary
    - Introduction
    - Procedure
    - Drawings and calculations
    - Discussion
    - Conclusion
    - References

Reporting the work

Works should be done in the following order

- Digitization of the map given
- Find the coordinates (X, Y, Z) of drill-hole
  (slide no 19)
- Draw seam contours according to given parameters of your map
  (follow the slides 17-22)
- Draw outcrop line if any exists
  (as the slide no 24)
- Draw a section along the line AA’
  (as the slide no 25)
- Determine slopes of both seam and surface from your section
  (as the slide no 26)
- Draw a four sided polygon (not square or rectangle) on your map and determine its area (Slide no. 27)
  1) from the software (netcad)
  2) by using DMD method after gathering the coordinates of the points
  3) Compare the both results and discuss