

# ÇEV 361

## Coğrafi Bilgi Sistemleri ve Uzaktan Algılama

### Coğrafi Analizler

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<http://www.ozgurzeydan.com/>

# Coğrafi Analizler

## Yüzey Analizleri

- Yüzey Modelleri
- Hacim Hesaplaması
- Eğim Analizi
- Bakı Analizi
- Görülebilirlik Analizi

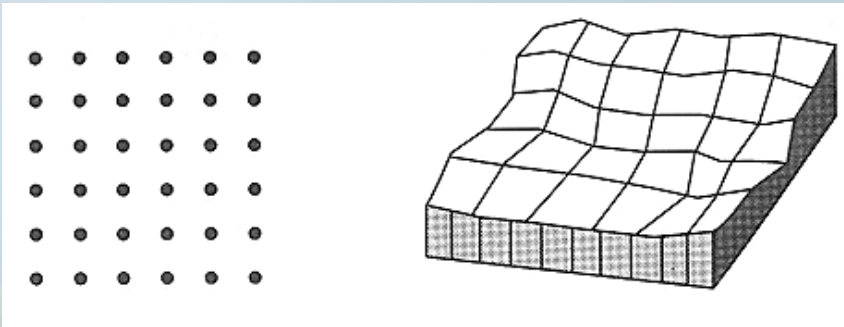
## Mekânsal Analiz

- Mesafe Ölçümü
- Alan Ölçümü
- Sınıflama
- Tampon Bölge Analizi
- Çakıştırma Analizi
- Tematik Haritalama
- Enterpolasyon

# Yüzey Modelleri

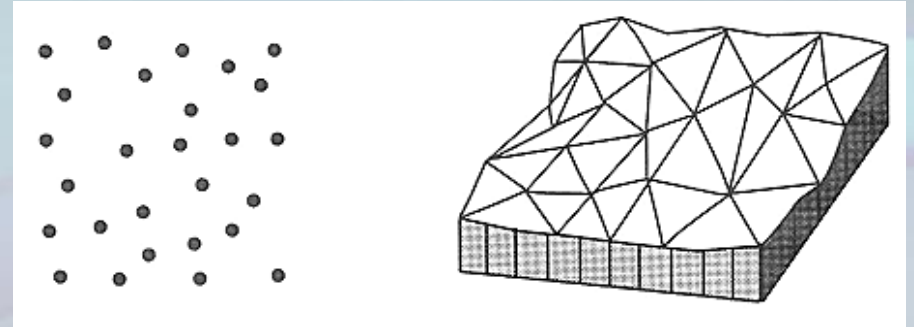
## Düzenli Topolojik Modelleme

Sayısal Yükseklik Modeli  
Digital Elevation Model  
(DEM)



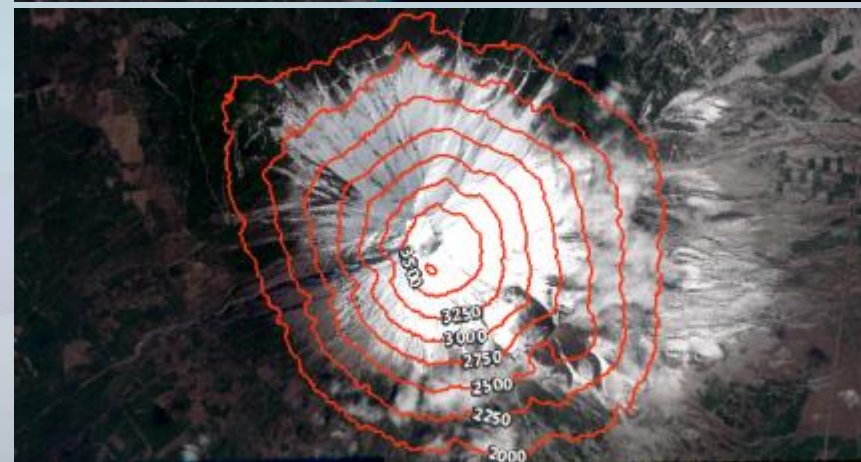
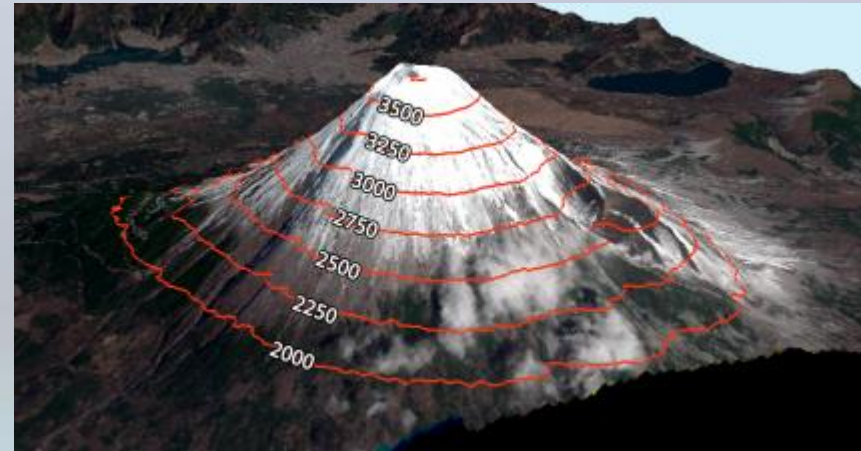
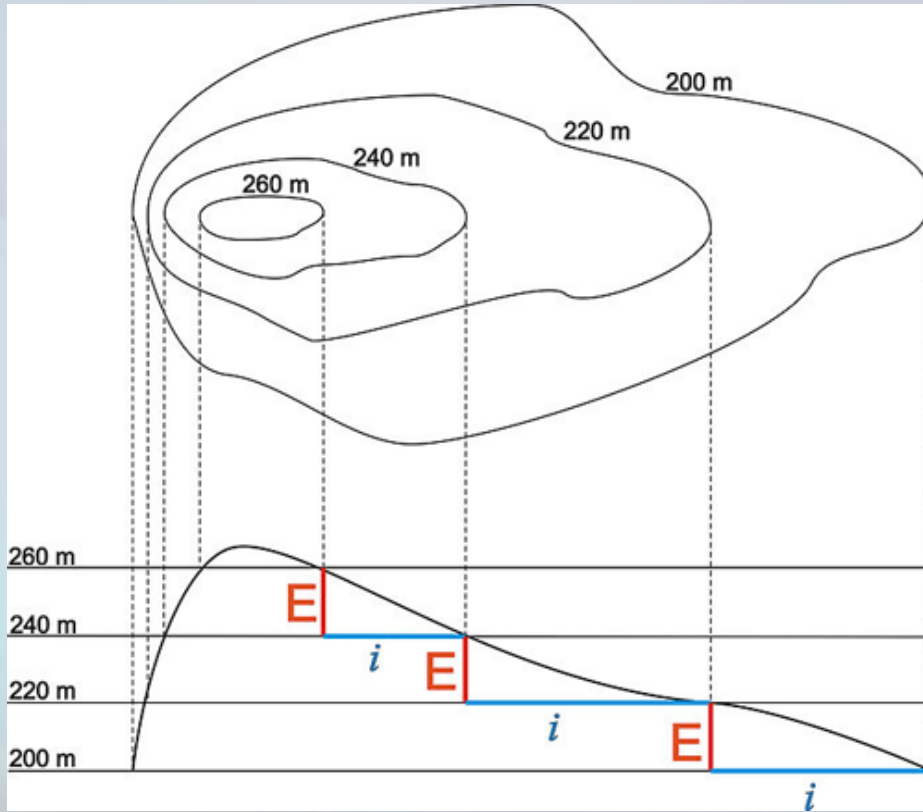
## Düzensiz Topolojik Modelleme

Düzensiz Üçgen Ağ  
Triangulated Irregular network  
(TIN)



# Yüzey Modelleri

## Eşyüksekti Eğrileri



<https://www.gislounge.com/gis-dictionary-letter-c/>

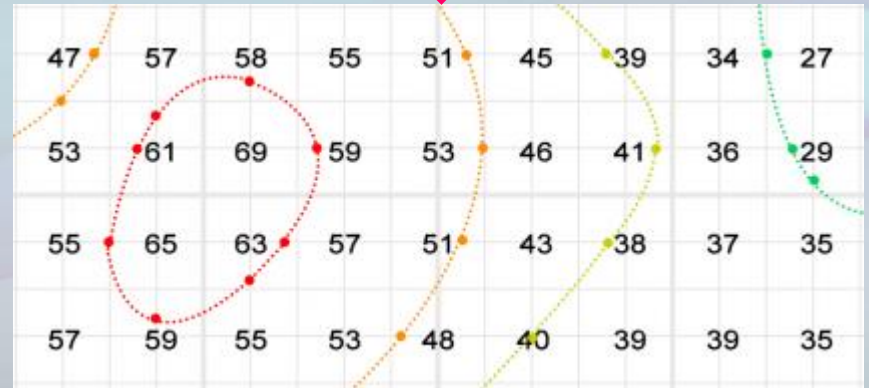
<https://gisgeography.com/contour-lines-topographic-map/>

# Eşyüksekti Eğrileri - Örnek Uygulama

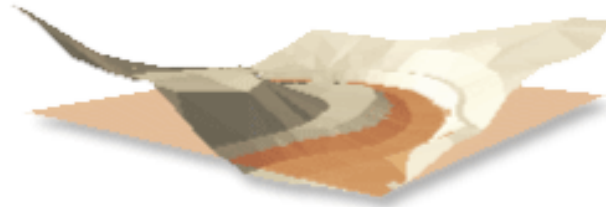
47	57	58	55	51	45	39	34	27
53	61	69	59	53	46	41	36	29
55	65	63	57	51	43	38	37	39
57	59	55	53	48	40	39	39	35



30, 40, 50 ve 60 için noktalar belirlenir ve çizgiler çizilir.



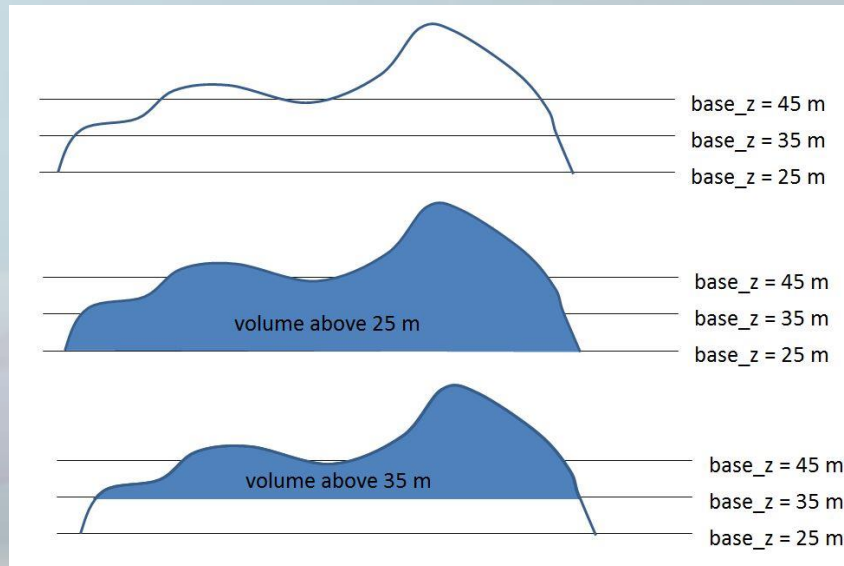
# Hacim Hesaplaması



Output Format

Dataset	Plane Height	Reference	Z Factor	Area 2D	Area 3D	Volume
D:\temp\GP\dtm_tin	100.00	ABOVE	1.00	15984467.82	16354331.40	1886012931.07

[http://resources.esri.com/help/9.3/arcgisdesktop/com/gp\\_toolref/3d\\_analyst\\_tools/surface\\_volume\\_3d\\_analyst.htm](http://resources.esri.com/help/9.3/arcgisdesktop/com/gp_toolref/3d_analyst_tools/surface_volume_3d_analyst.htm)



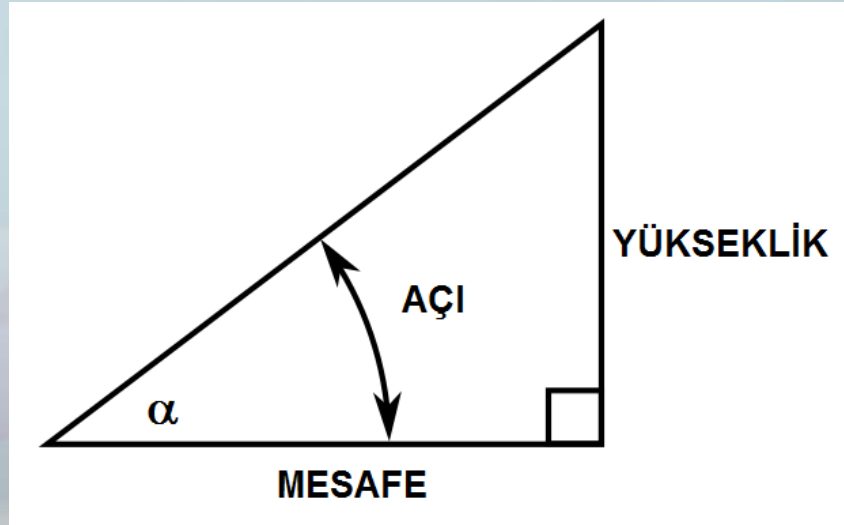
<https://gis.stackexchange.com/questions/91131/how-to-make-polygon-volume-in-tin-surface>

# Eğim Analizi

- Yüzeyin yatay ile yaptığı açının derece veya yüzde cinsinden ifadesi.

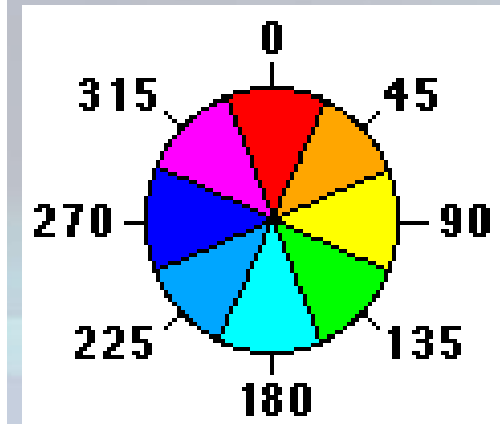
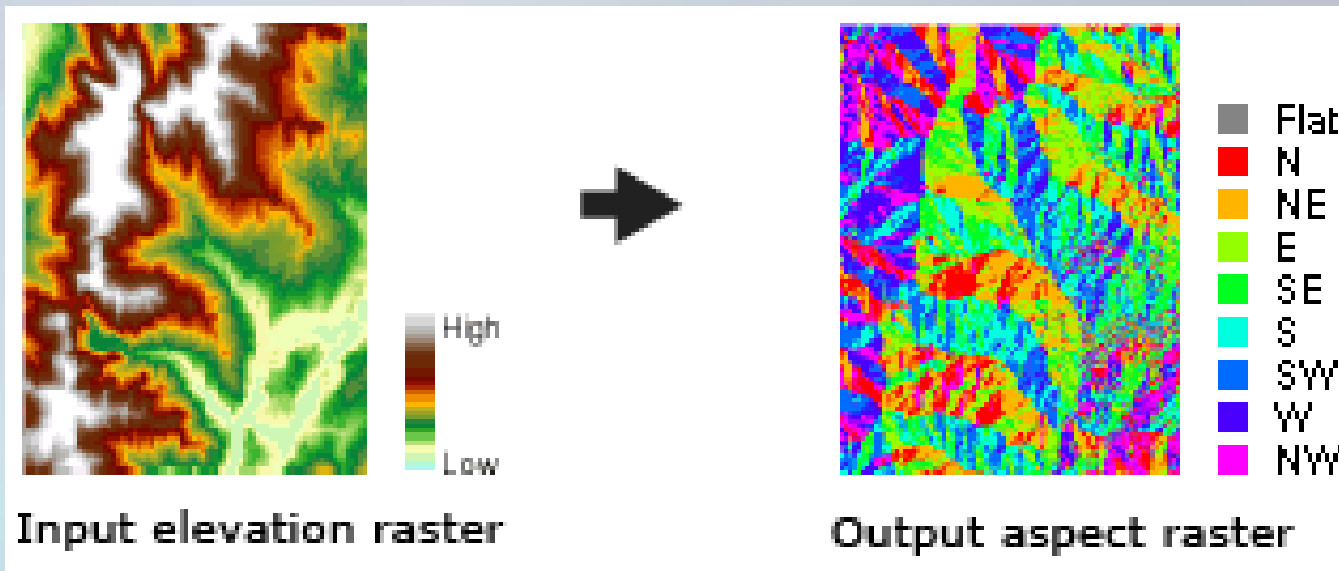
$$Eğim = \tan(\alpha) = \frac{Yükseklik}{Mesafe}$$

$$Eğim (\%) = \tan(\alpha) \times 100 = \frac{Yükseklik}{Mesafe} \times 100$$



# Bakı Analizi

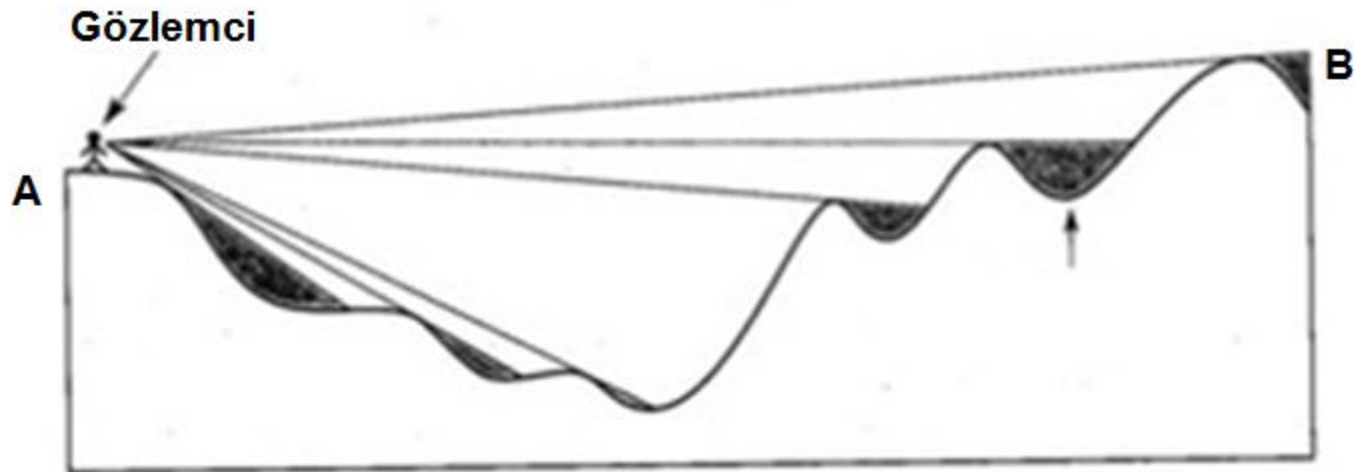
- Bir yüzeyin bakış yönünün analizidir.



<https://desktop.arcgis.com/en/arcmap/10.3/tools/spatial-analyst-toolbox/how-aspect-works.htm>



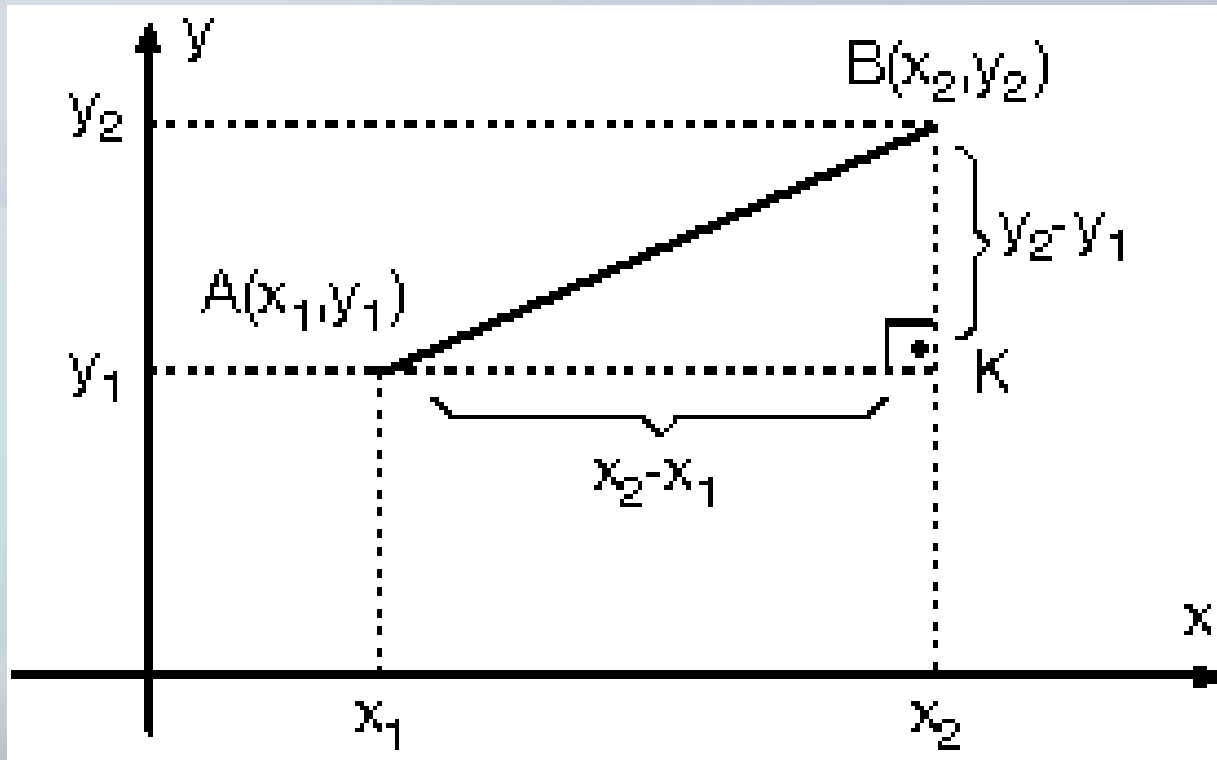
# Görülebilirlik Analizi



(Heywood, et al., 2006)

# Mesafe Ölçümü

$$Mesafe = |AB| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$



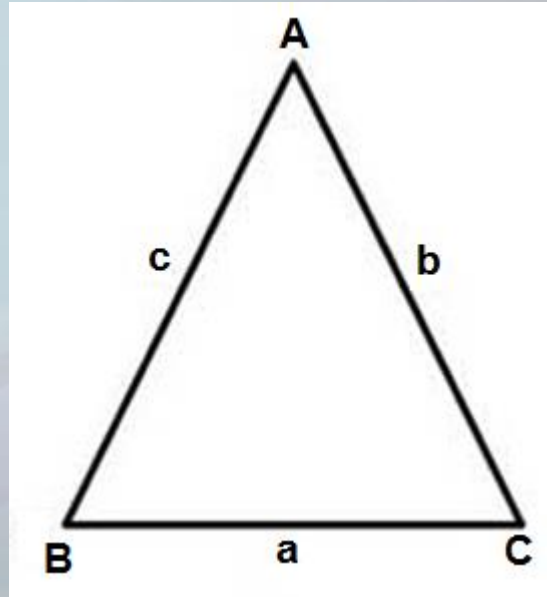
# Mesafe Ölçümü



Ö. Zeydan vd.: Hava Kalitesi Modellenmesinde Coğrafi Bilgi Sistemlerinin Kullanımı: Zonguldak Örneği

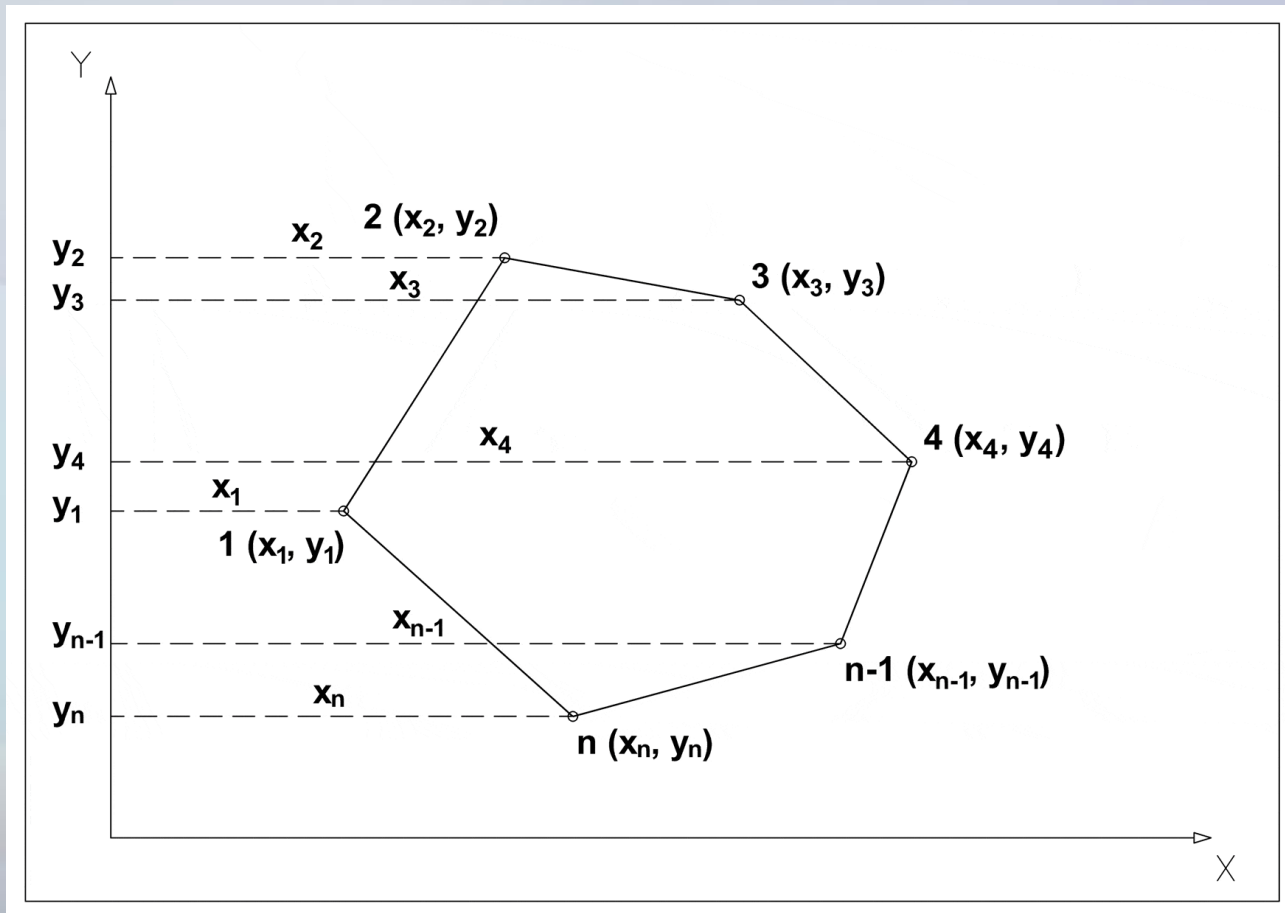
# Alan Ölçümü

- Üçgende yarı çevre (s) ile alan hesaplama
- $S = \frac{a+b+c}{2}$
- $Alan = \sqrt{s \cdot (s - a) \cdot (s - b) \cdot (s - c)}$



# Alan Ölçümü

- Gauss metodu ile alan hesaplama



# Alan Ölçümü (Gauss Metodu )

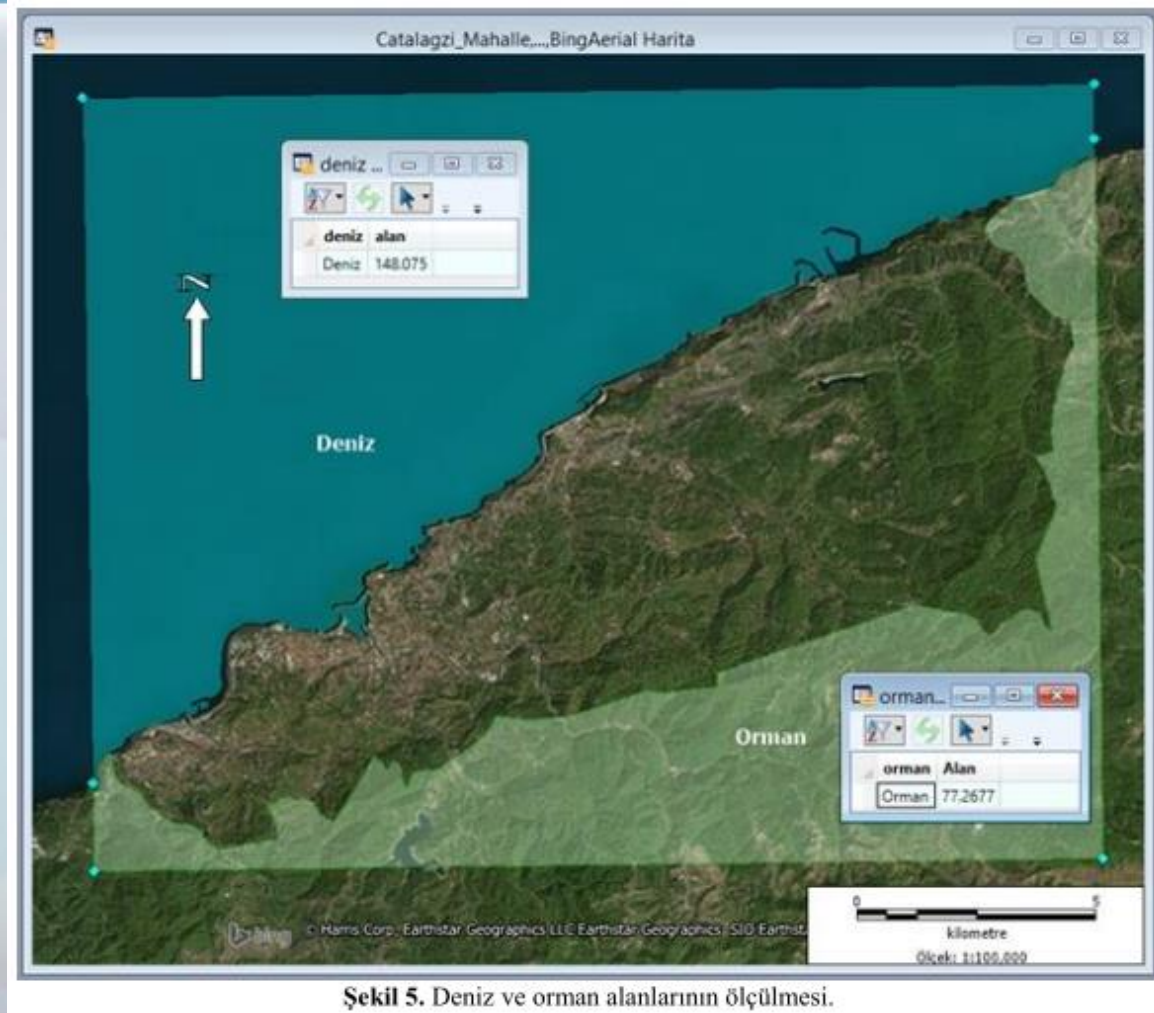
- Hatırlatma:

- *Yamuk alanı* = 
$$\frac{(\text{alt taban} + \text{üst taban}) \cdot \text{yükseklik}}{2}$$

$$2A = (x_3 + x_2) \cdot (y_2 - y_3) + (x_4 + x_3) \cdot (y_3 - y_4) + (x_{n-1} + x_4) \cdot (y_4 - y_{n-1}) + (x_n + x_{n-1}) \cdot (y_{n-1} - y_n) - (x_1 + x_2) \cdot (y_2 - y_1) - (x_n + x_1) \cdot (y_1 - y_n)$$

$$2A = \sum_{i=1}^n [x_i \cdot (y_{i-1} - y_{i+1})] \quad \text{or} \quad 2A = \sum_{i=1}^n [y_i \cdot (x_{i-1} - x_{i+1})]$$

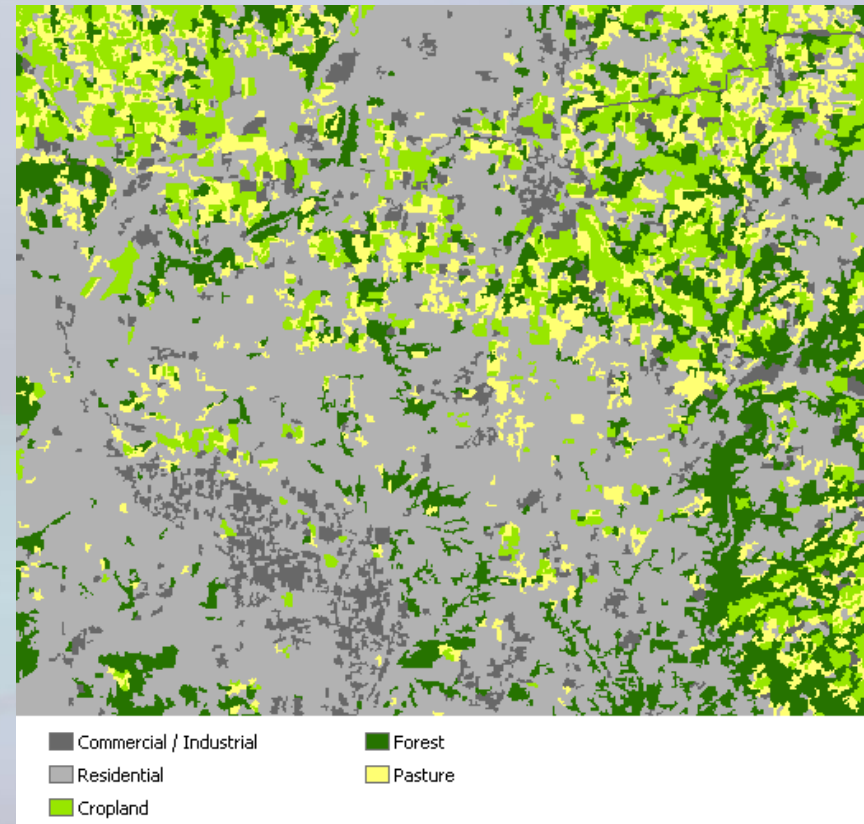
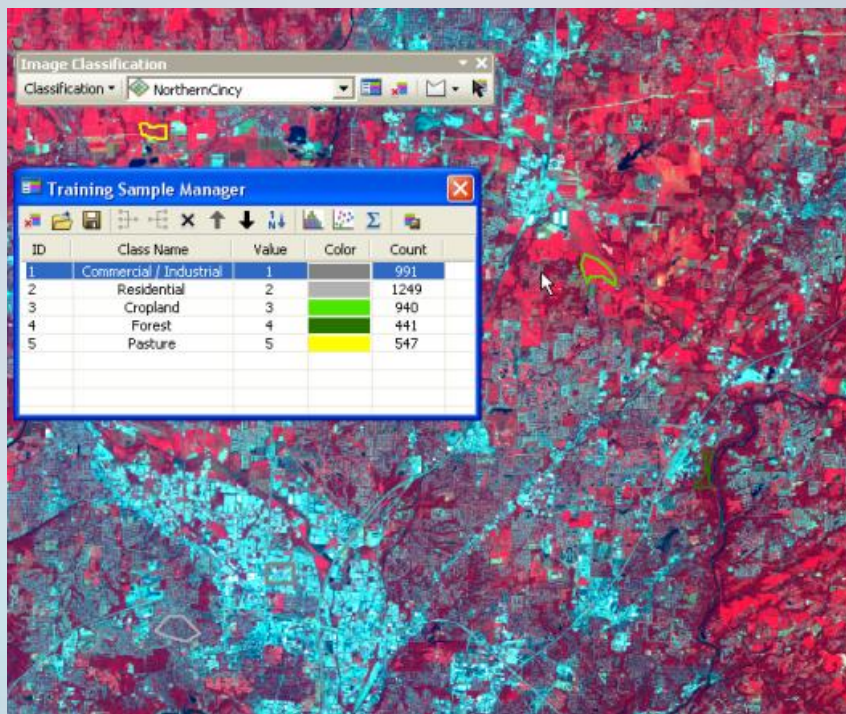
# Alan Ölçümü



Şekil 5. Deniz ve orman alanlarının ölçülmesi.

Ö. Zeydan vd.: Hava Kalitesi Modellenmesinde Coğrafi Bilgi Sistemlerinin Kullanımı: Zonguldak Örneği

# Sınıflama

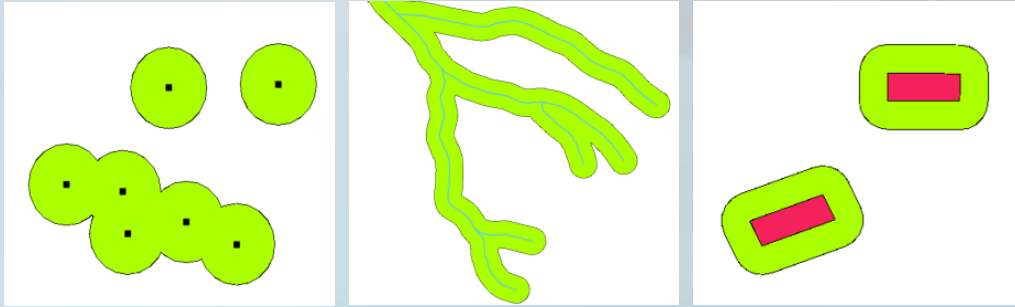


<https://desktop.arcgis.com/en/arcmap/10.6/extensions/spatial-analyst/image-classification/what-is-image-classification-.htm>



# Tampon Bölge Analizi

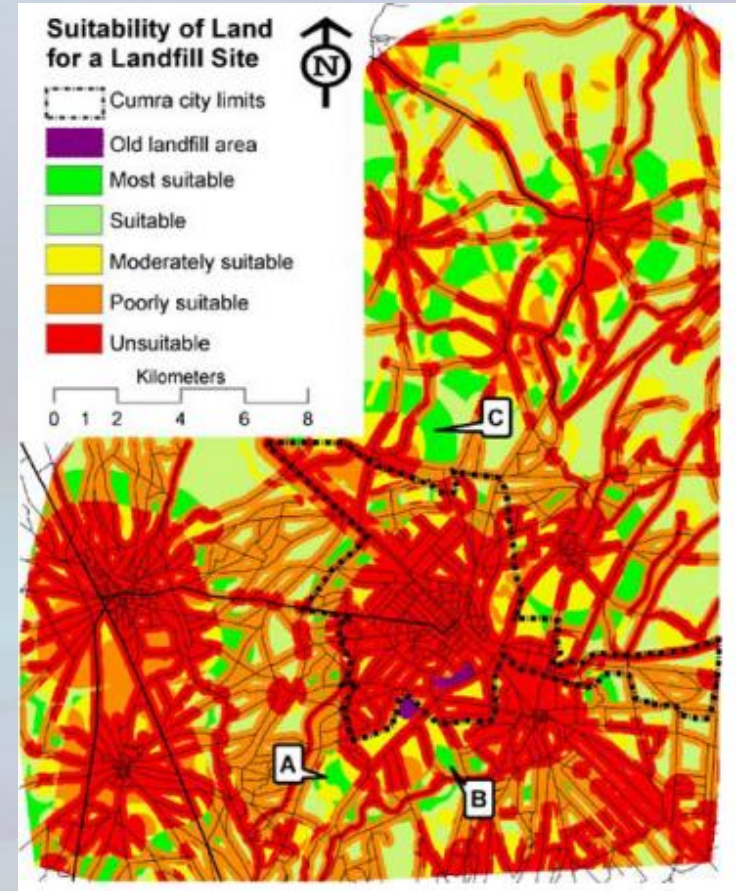
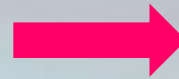
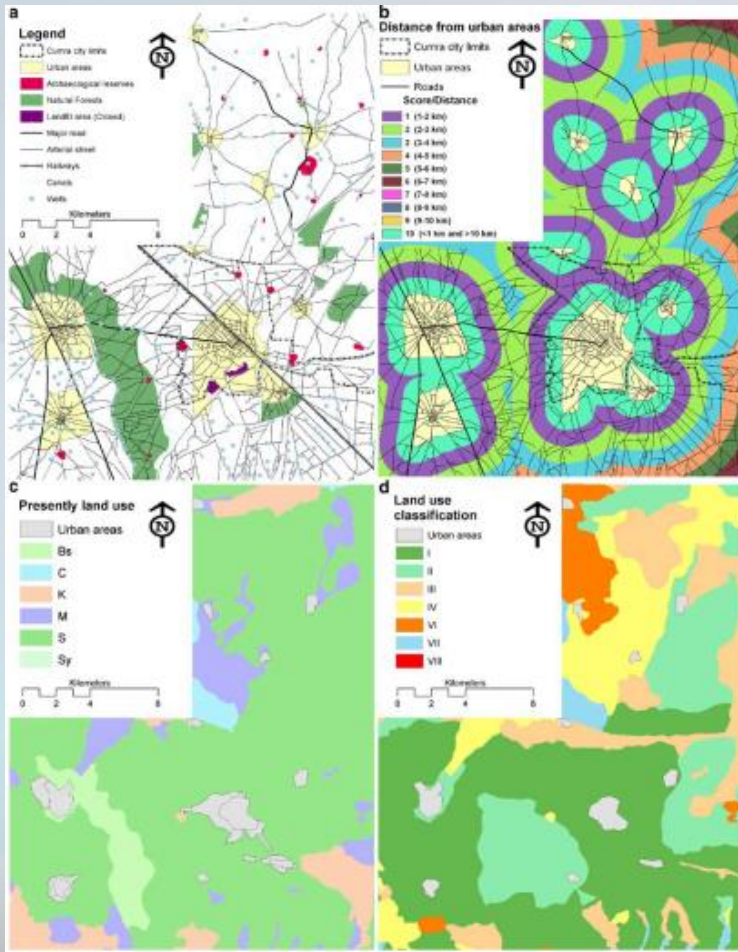
- Bir nokta, çizgi veya poligona belirli mesafedeki bölgelerin belirlenmesi.



Ulutan Barajı, Zonguldak  
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(ZBEÜ Çevre Müh. Mezunu)

[https://docs.qgis.org/2.14/en/docs/gentle\\_gis\\_introduction/vector\\_spatial\\_analysis\\_buffers.html](https://docs.qgis.org/2.14/en/docs/gentle_gis_introduction/vector_spatial_analysis_buffers.html)

# Çakıştırma Analizi



Nas, B., Cay, T., Iscan, F., Berktaş, A., Selection of MSW landfill site for Konya, Turkey using GIS and multi-criteria evaluation, Environ Monit Assess, 160, 491–500, 2010

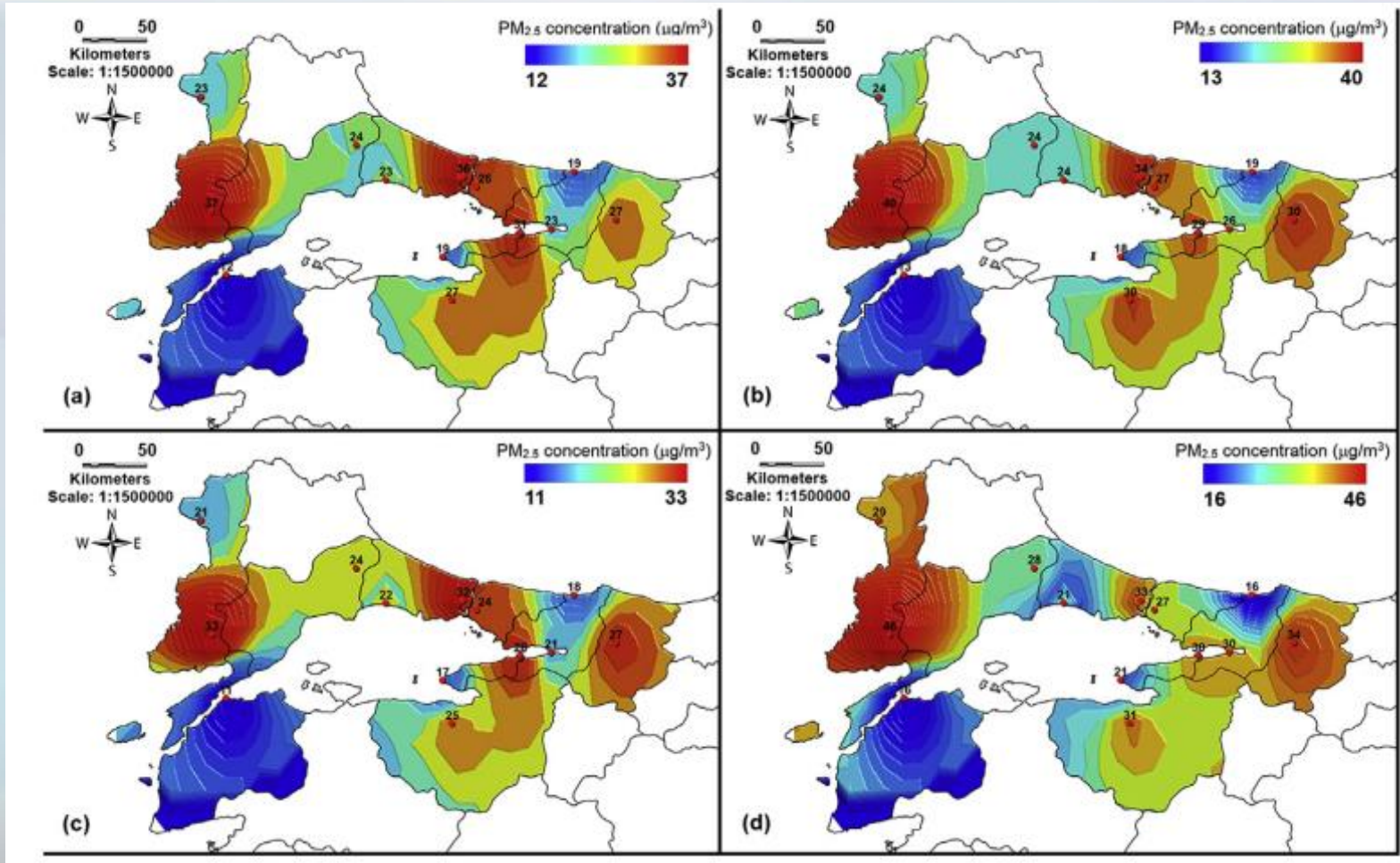
# Tematik Haritalama



Figure 4. PM<sub>10</sub> Limit Exceedances in 2016 (Limit: 80µg/m<sup>3</sup>)

Zeydan, Ö., Karakaya, B. (2017) Assessment of PM<sub>10</sub> Limit Exceedances in Turkish Cities, Journal of Young Scientist, 5, 115-120.

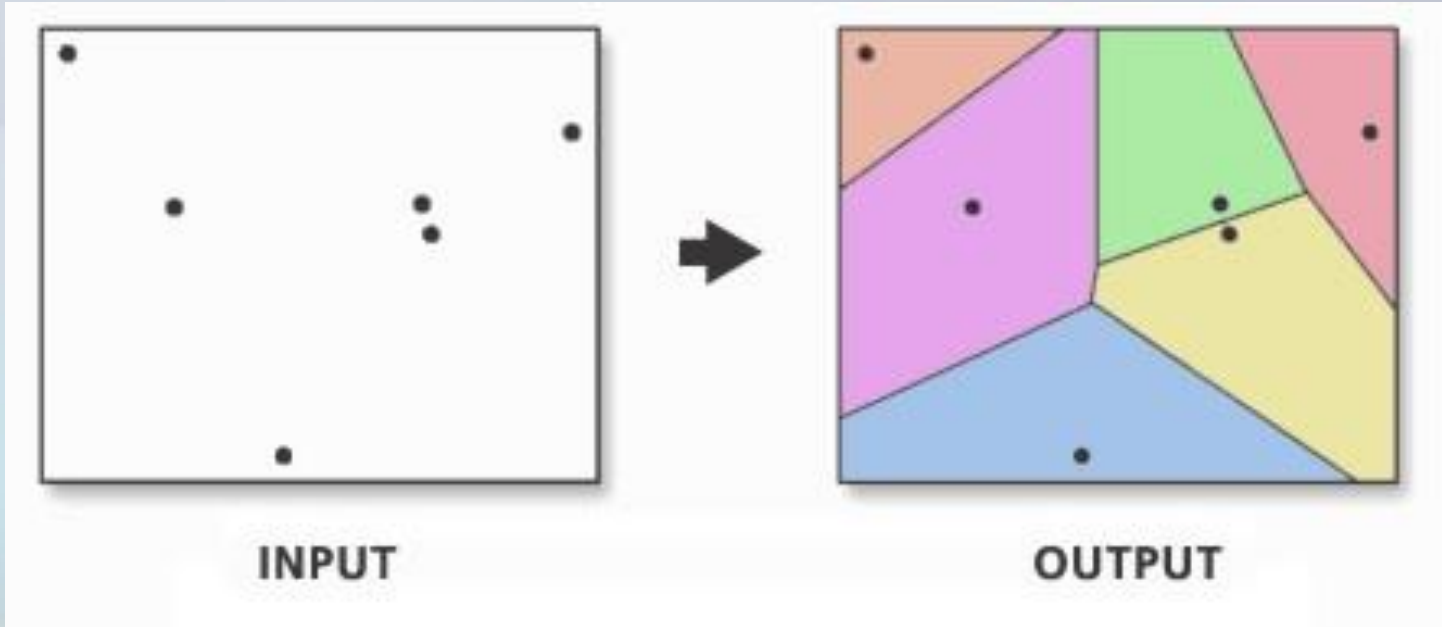
# Enterpolasyon



Zeydan O., Wang Y., (2019) Using MODIS derived aerosol optical depth to estimate ground-level PM 2.5 concentrations over Turkey, Atmospheric Pollution Research, 10 (5), 1565-1576

# Theissen Poligon

Voronoi diyagramı, bir düzlemin belirli bir nesne kümesinin her birine yakın bölgelere bölünmesidir.



# İleri Okuma

- Nas, B., Cay, T., Iscan, F., Berktaş, A., Selection of MSW landfill site for Konya, Turkey using GIS and multi-criteria evaluation, *Environ Monit Assess*, 160, 491–500, 2010 [Bağlantı](#)
- Tas, E ., (2018), Coğrafi Bilgi Sistemleri Teknikleri Kullanılarak Taşkın Risk Potansiyelinin Değerlendirilmesi: Afyonkarahisar Çay Deresi Havzası, İklim Değişikliği ve Çevre, 3, (1) 68–74. [Bağlantı](#)
- Zeydan, Ö., Karakaya, B. (2017) Assessment of PM<sub>10</sub> Limit Exceedances in Turkish Cities, *Journal of Young Scientist*, 5, 115-120. [Bağlantı](#)
- Zeydan Ö, Yıldırım Y, Karademir A, Durmuşoğlu E, *Hava Kalitesi Modellenmesinde Coğrafi Bilgi Sistemlerinin Kullanımı: Zonguldak Örneği*, 5. UZAKTAN ALGILAMA-CBS SEMPOZYUMU (UZAL-CBS 2014) 14-17 Ekim 2014, İstanbul [Bağlantı](#)