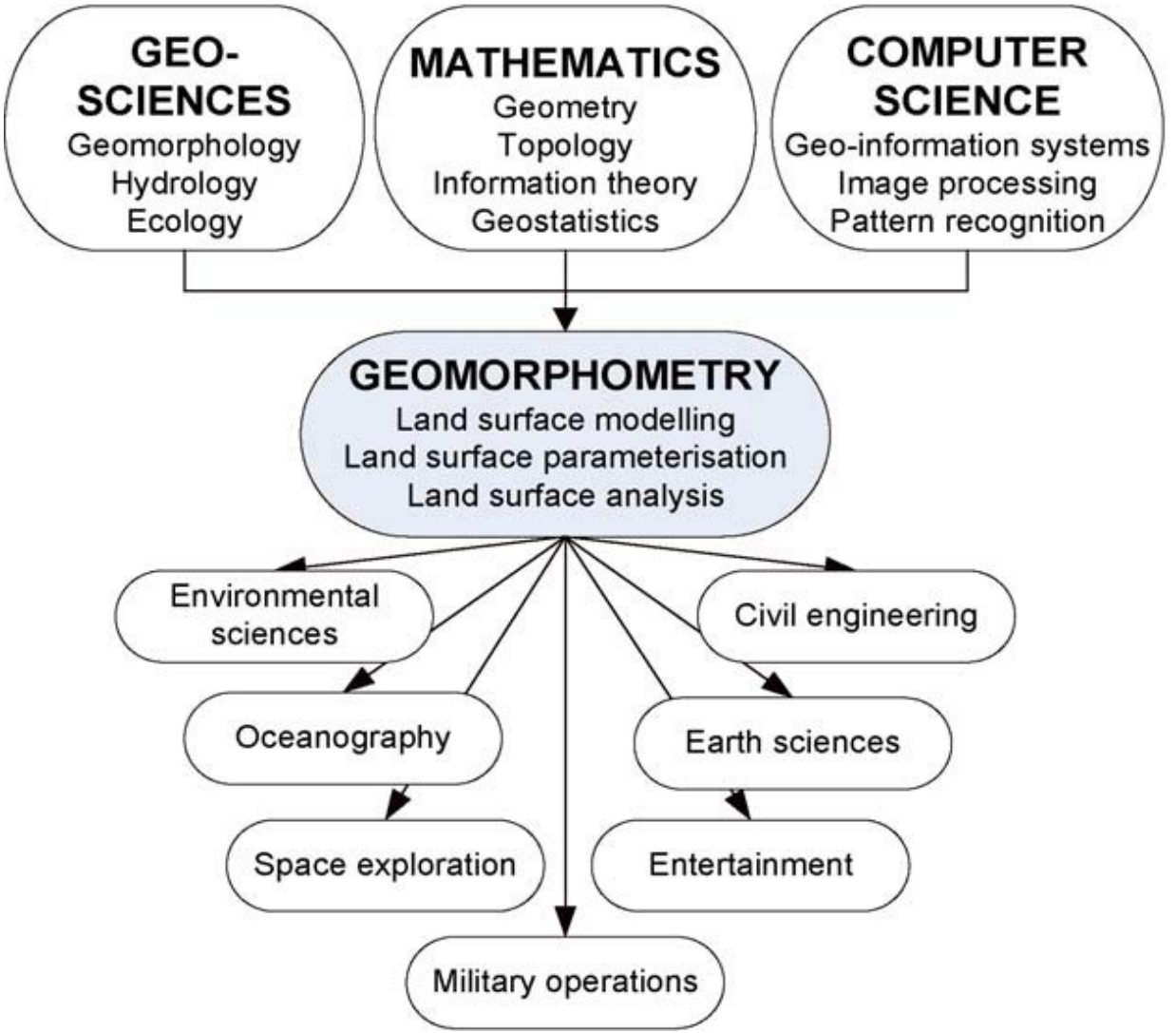
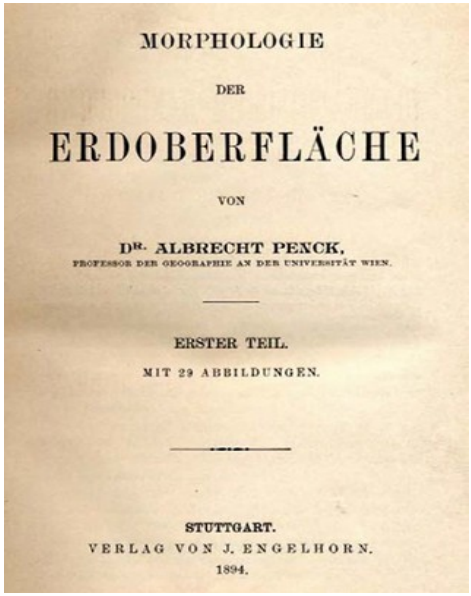

Co to jest Geomorfometria?

Geomorfometria jako nauka



Geomorfometria ogólna i szczególna

- Kartometria, orometria: Brisson, Gauss, Humbolt, Cayley, Maxwell, Penck, Sonklar, Gutherson, Horton, Strahler, Chorley, Richardson, Mandelbrodt, Hammond, Wood, Shereeve, Gravelius, Hack, Howard
- Geomorfometria ogólna jako ogólny zbiór metod opisu i analizy terenu, traktuje teren jako zjawisko ciągle (Evans 1972)
- Geomorfomteria szczególna geomorfometria poszczególnych typów form terenu (kratery, cyrki lodowcowe, stoki)


MORPHOLOGIE

DER

ERDOBERFLÄCHE

VON

DR. ALBRECHT PENCK,

PROFESSOR DER GEOGRAPHIE AN DER UNIVERSITÄT WIEN.

ERSTER TEIL.

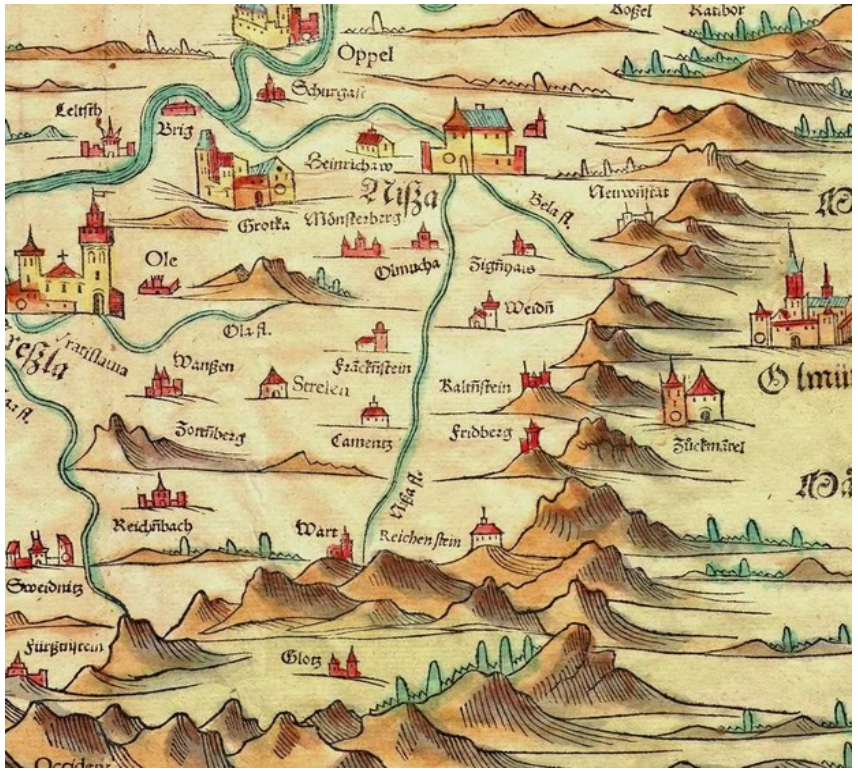
MIT 29 ABBILDUNGEN.

STUTTGART.

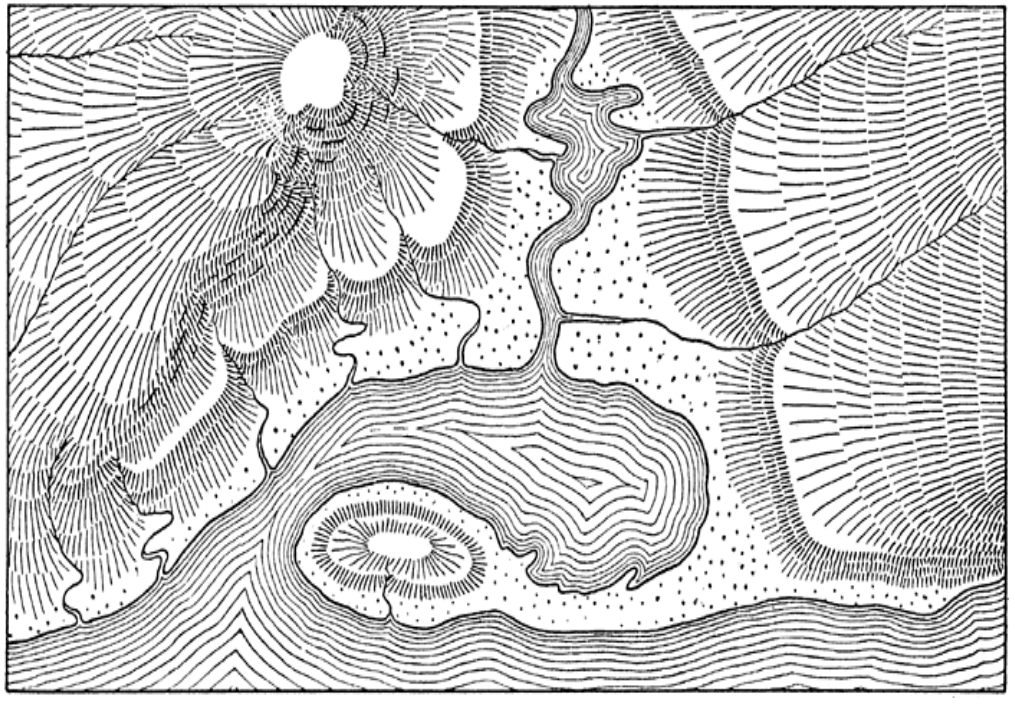
VERLAG VON J. ENGELHORN.

1894.

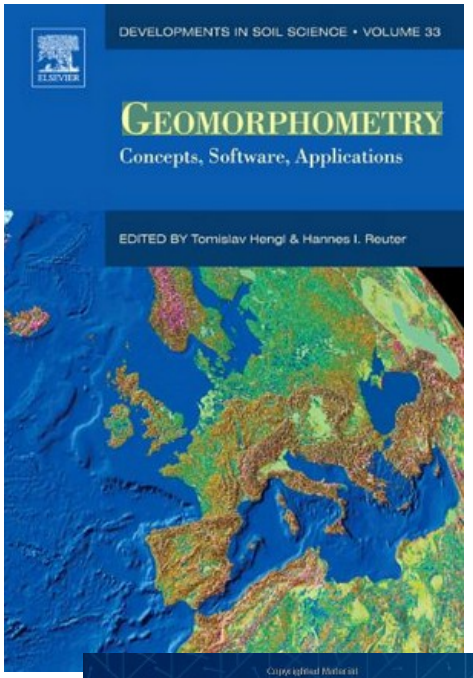
Prezentacja orografii

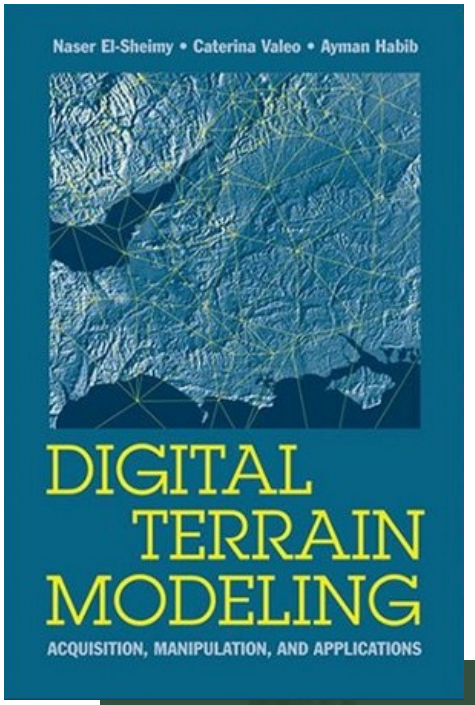


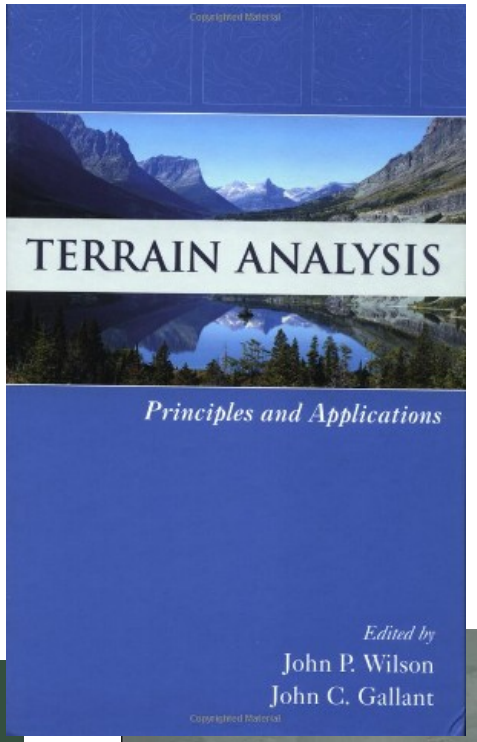
Cieniowanie rzeźby

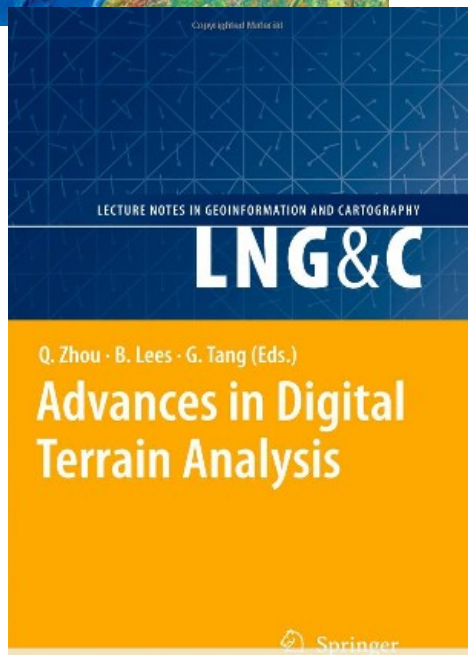


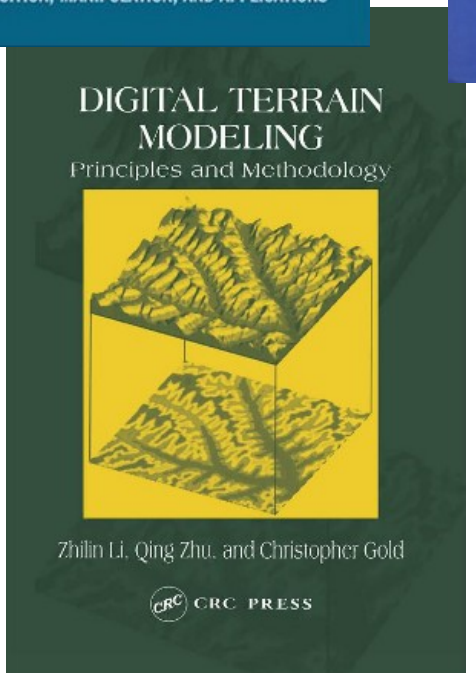
Podstawowe podręczniki

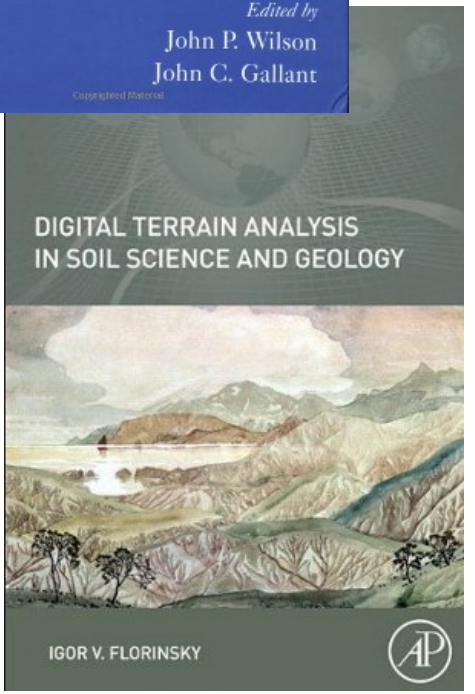




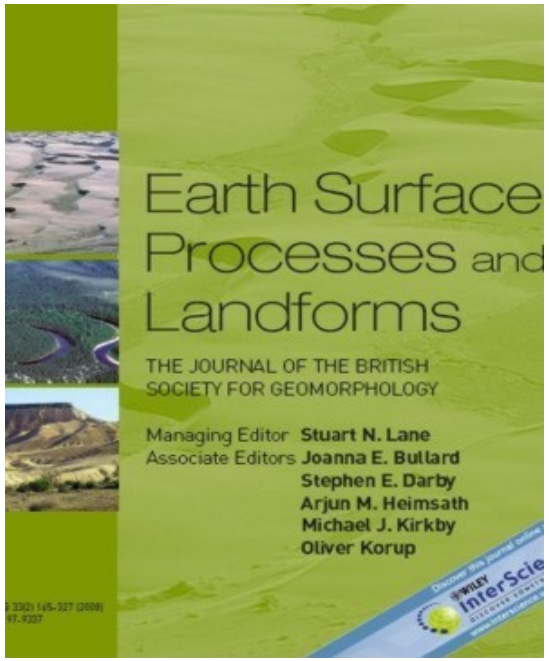




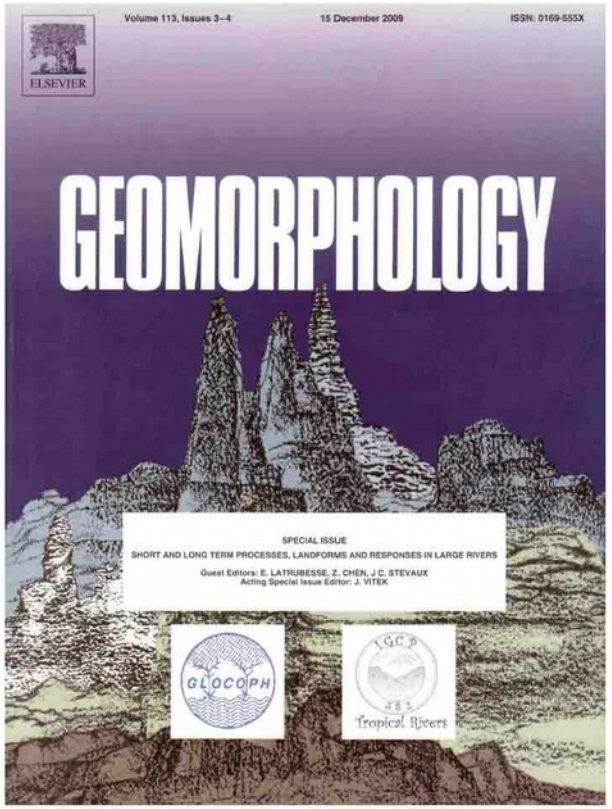


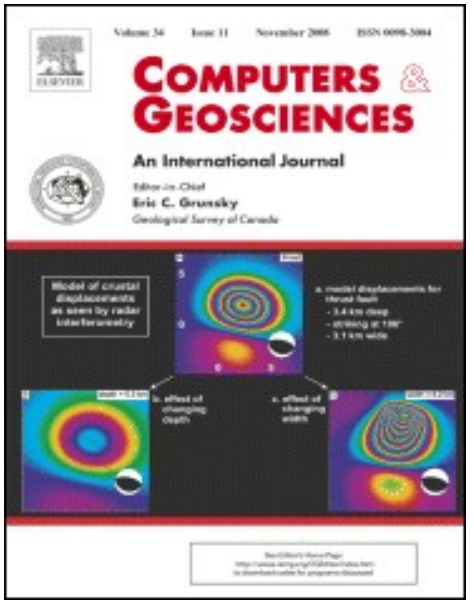


Czasopisma

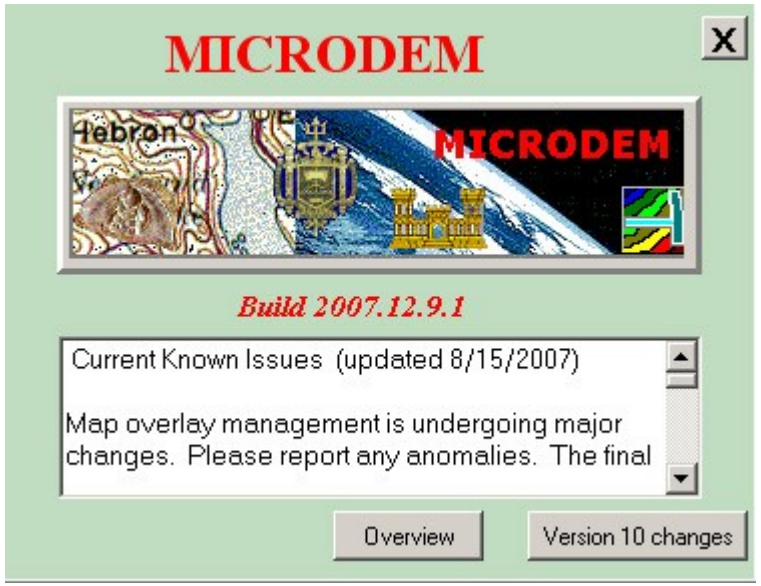


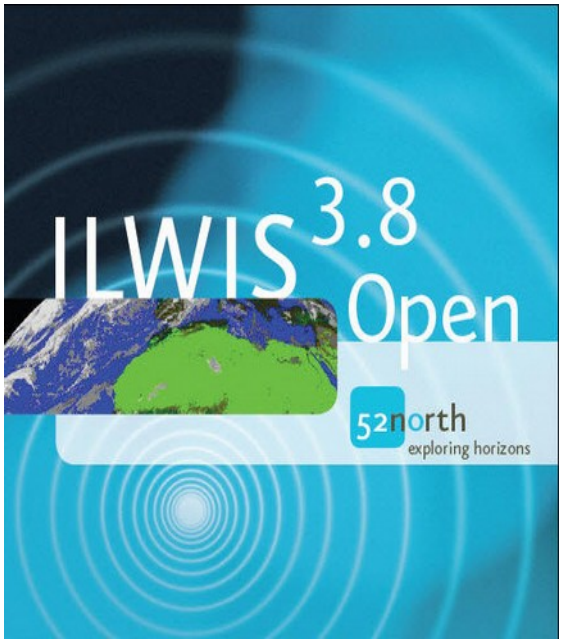
A Biliography of Geomorphometry, the Quantitative Representation of Topography, Supplement 2.0 by P. J. Pike





Oprogramowanie





SAGA

Graphical User Interface (GUI)

user interaction, visualisation

Module Management

loading, execution

Data Management

tables, vector- and raster data

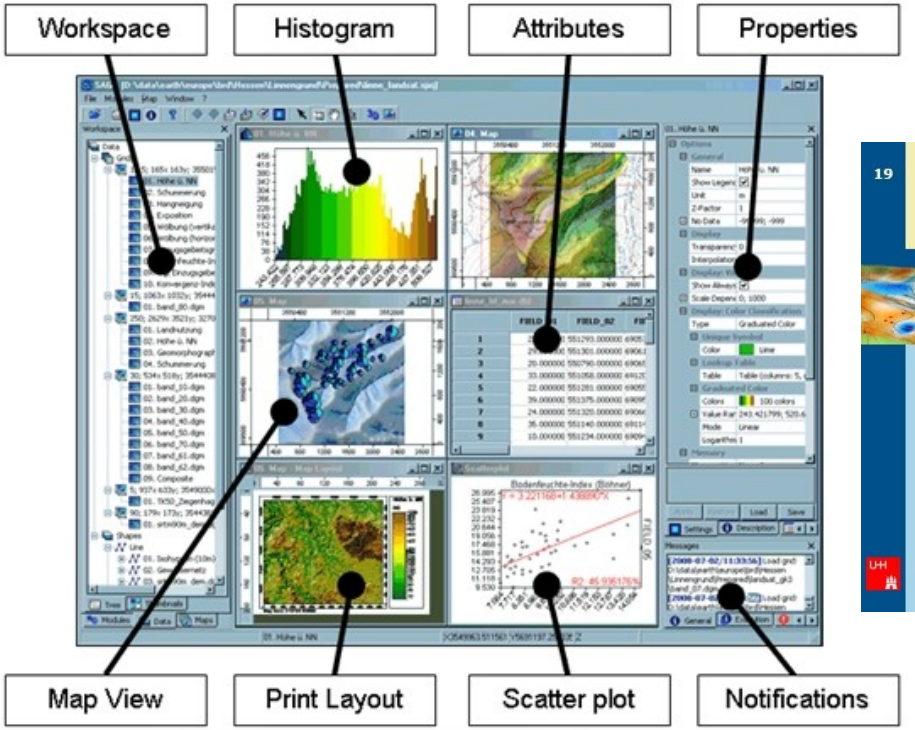
Module Libraries

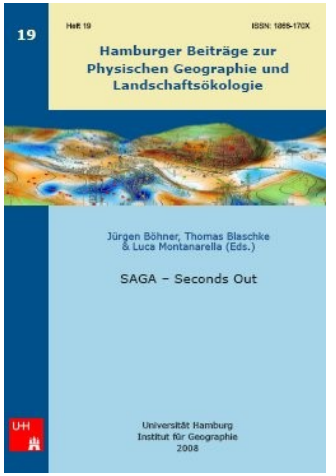
the implementation of scientific methods

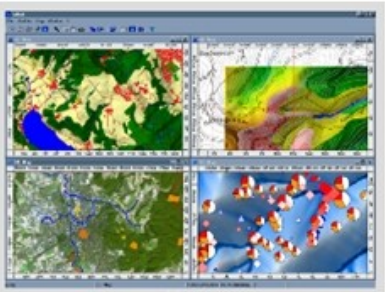
Library A | Library B | Library C | Library D | Library E

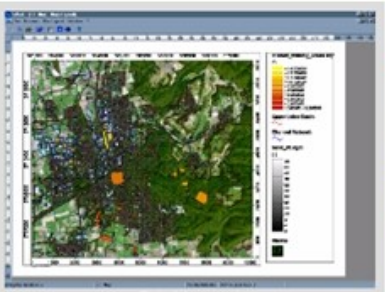
Application Programming Interface (API)

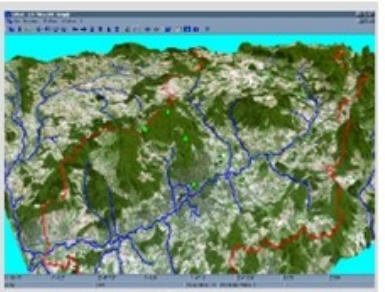
data objects, modules, tools and helpers






Maps


Print Layout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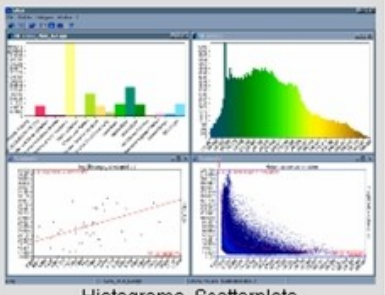
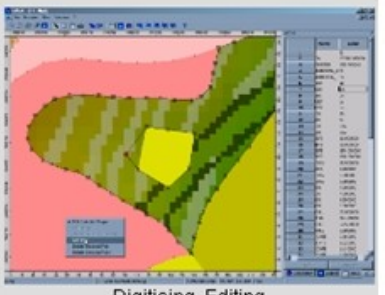
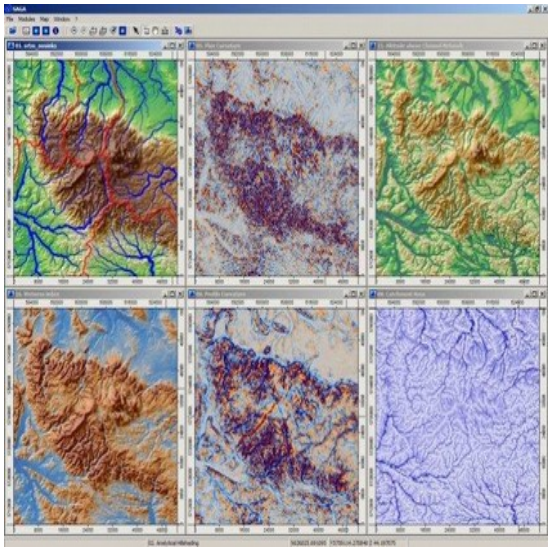

Histograms, Scatterplots

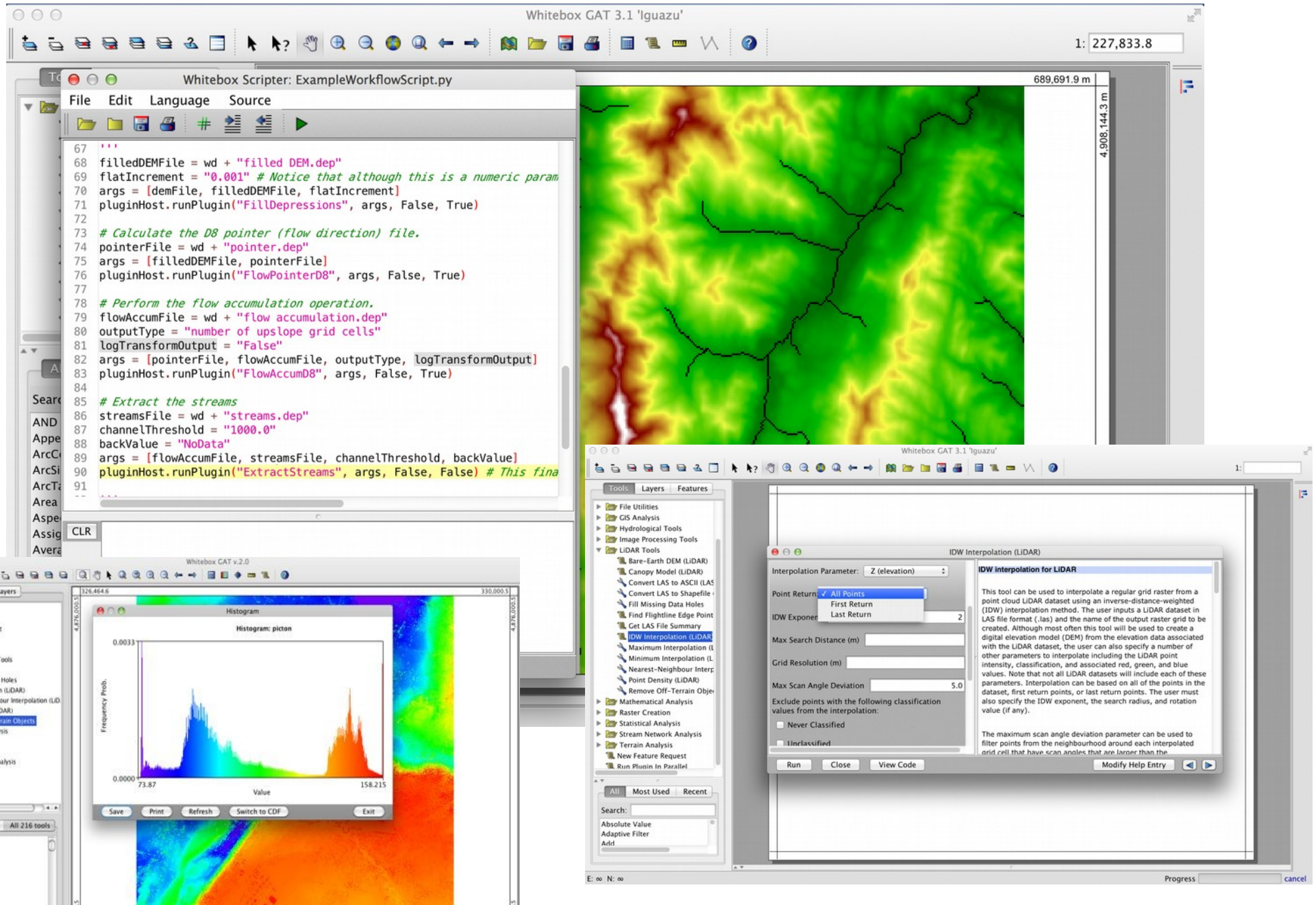

Tables, Diagrams


Digitising, Editing



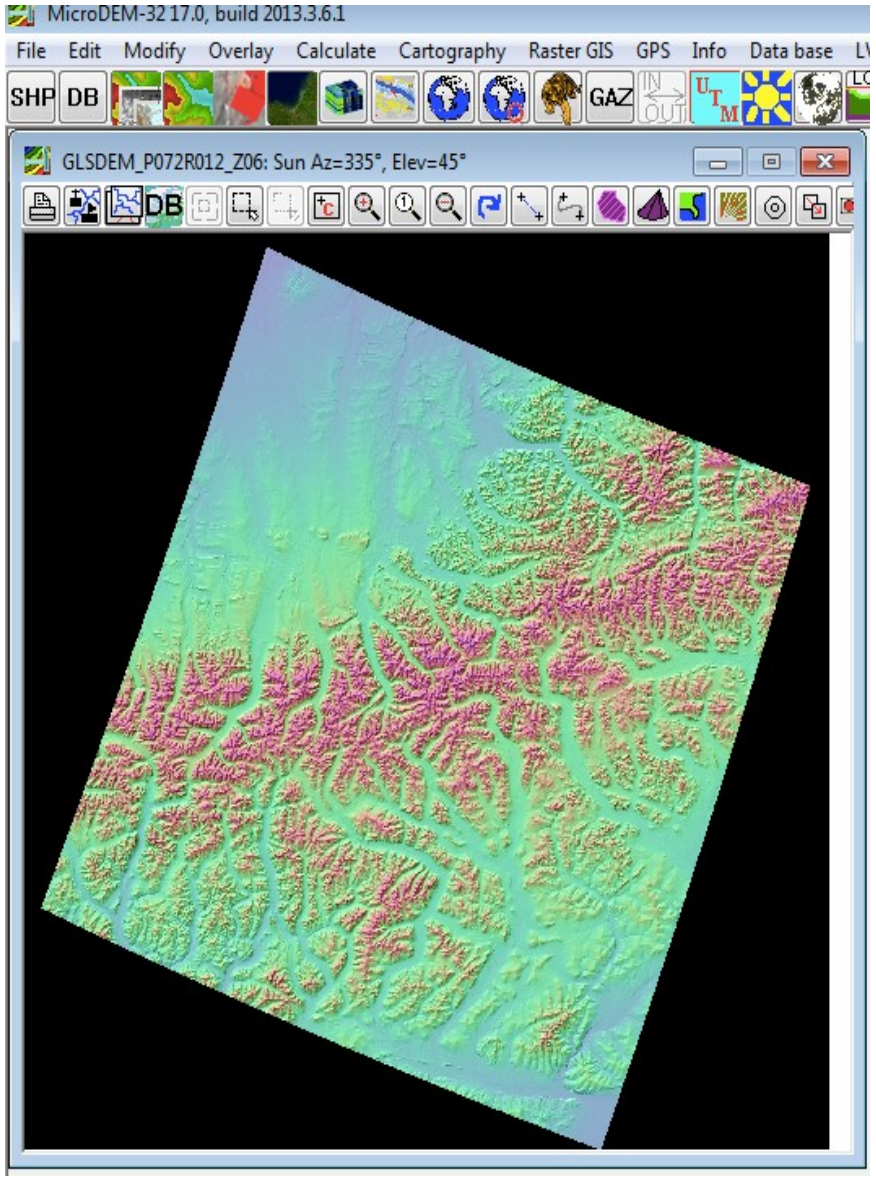
www.saga-gis.org

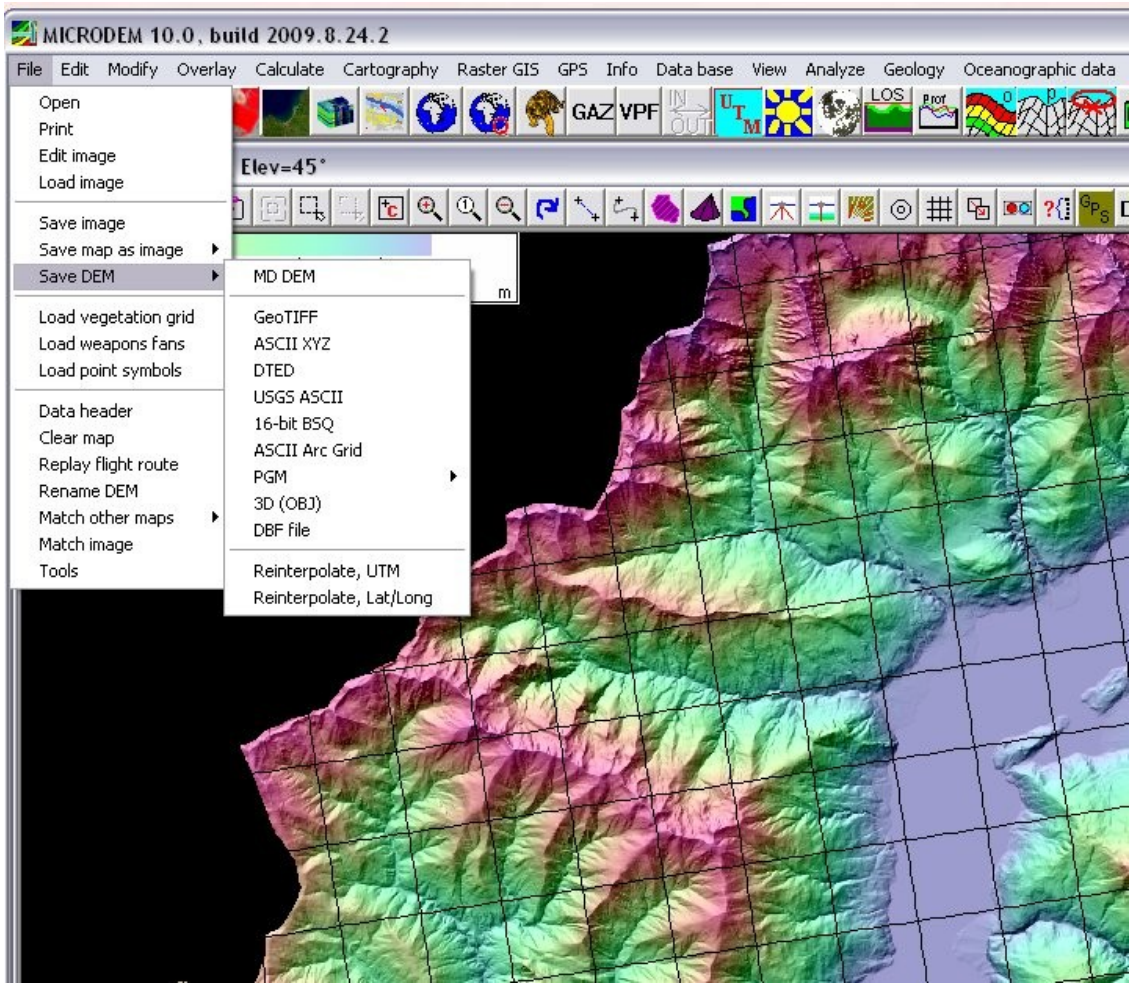
Whitebox GAT



http://www.uoguelph.ca/~hydrogeo/Whitebox/

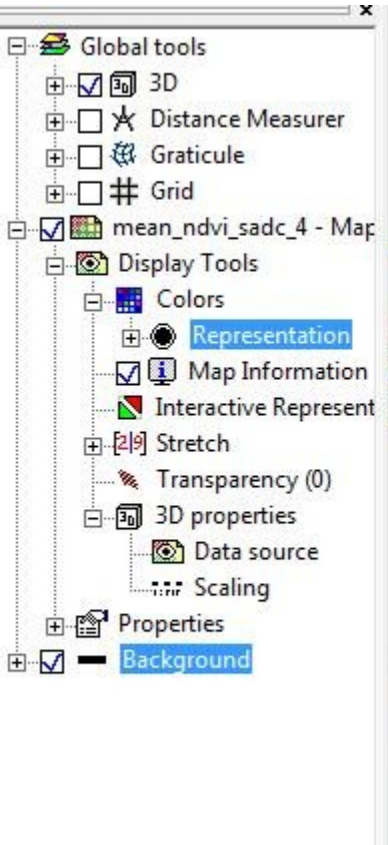
MICRODEM

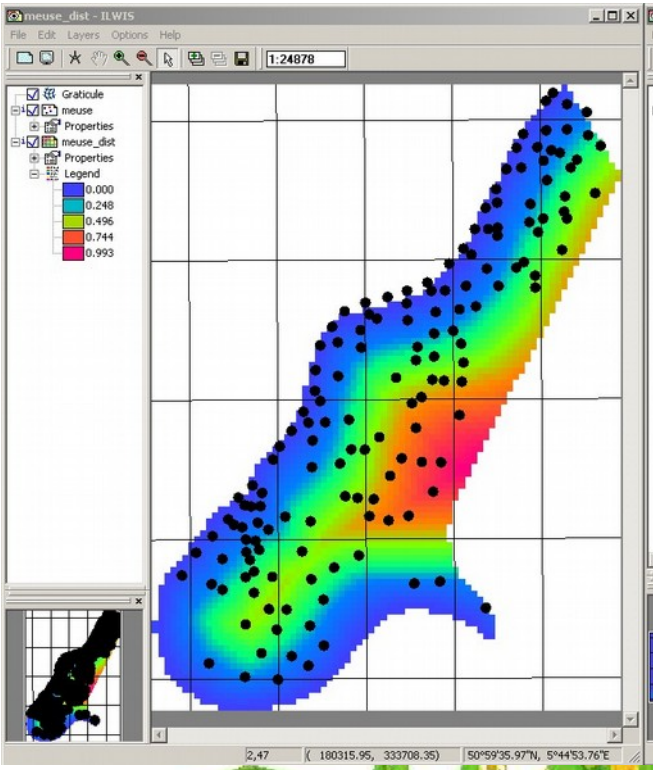


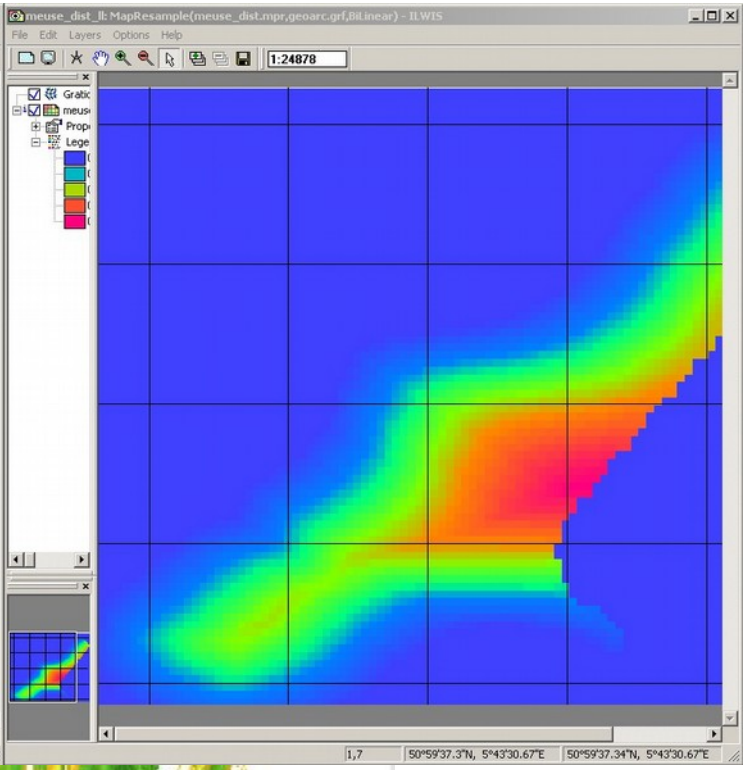


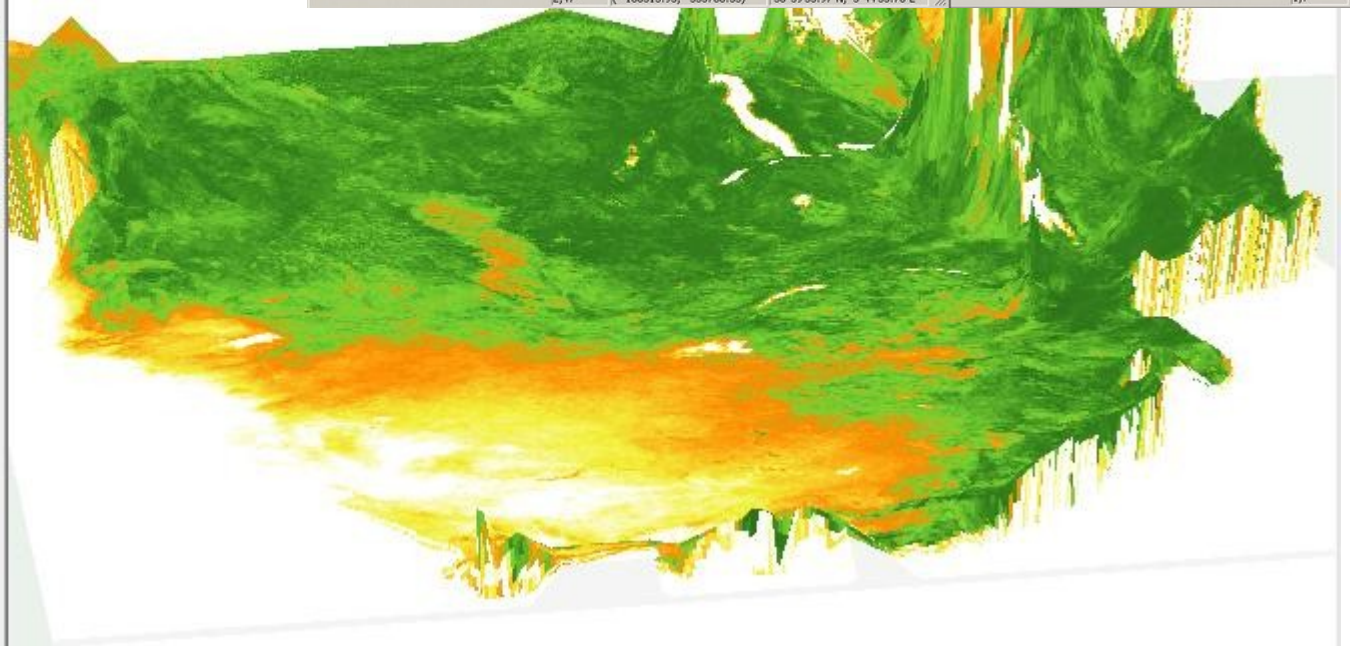
http://www.usna.edu/Users/oceano/pguth/website/microdem/microdem.htm

ILWIS



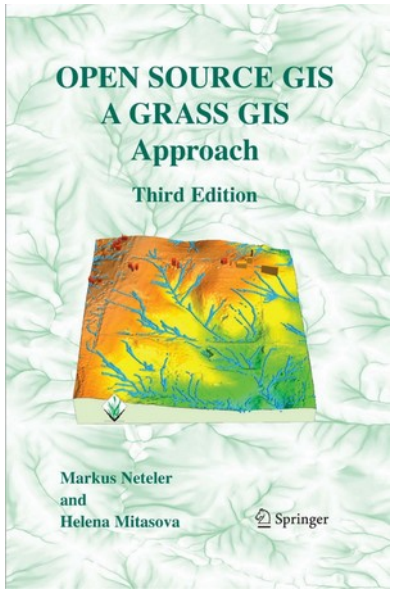


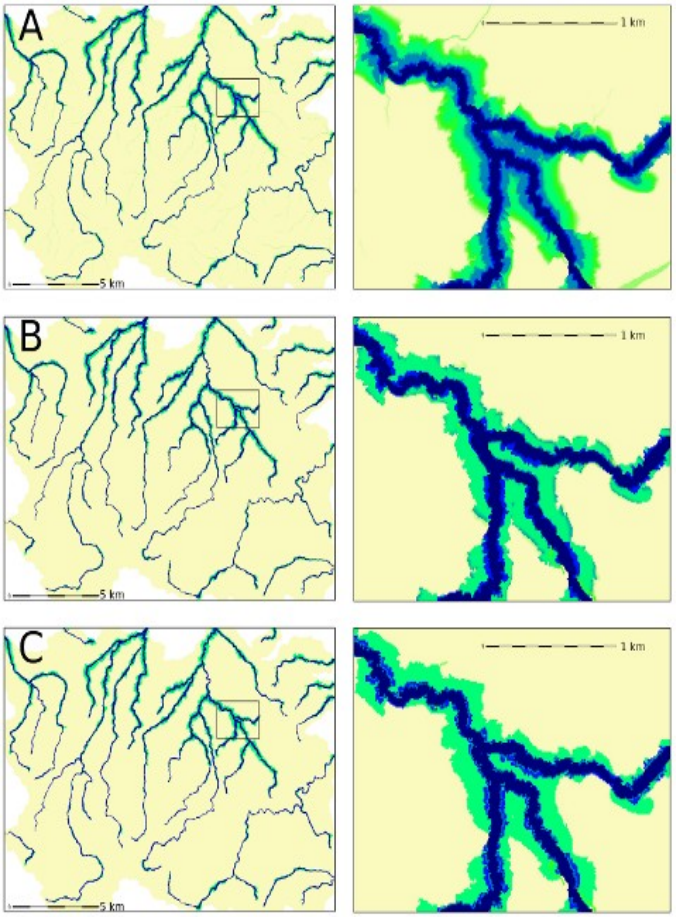


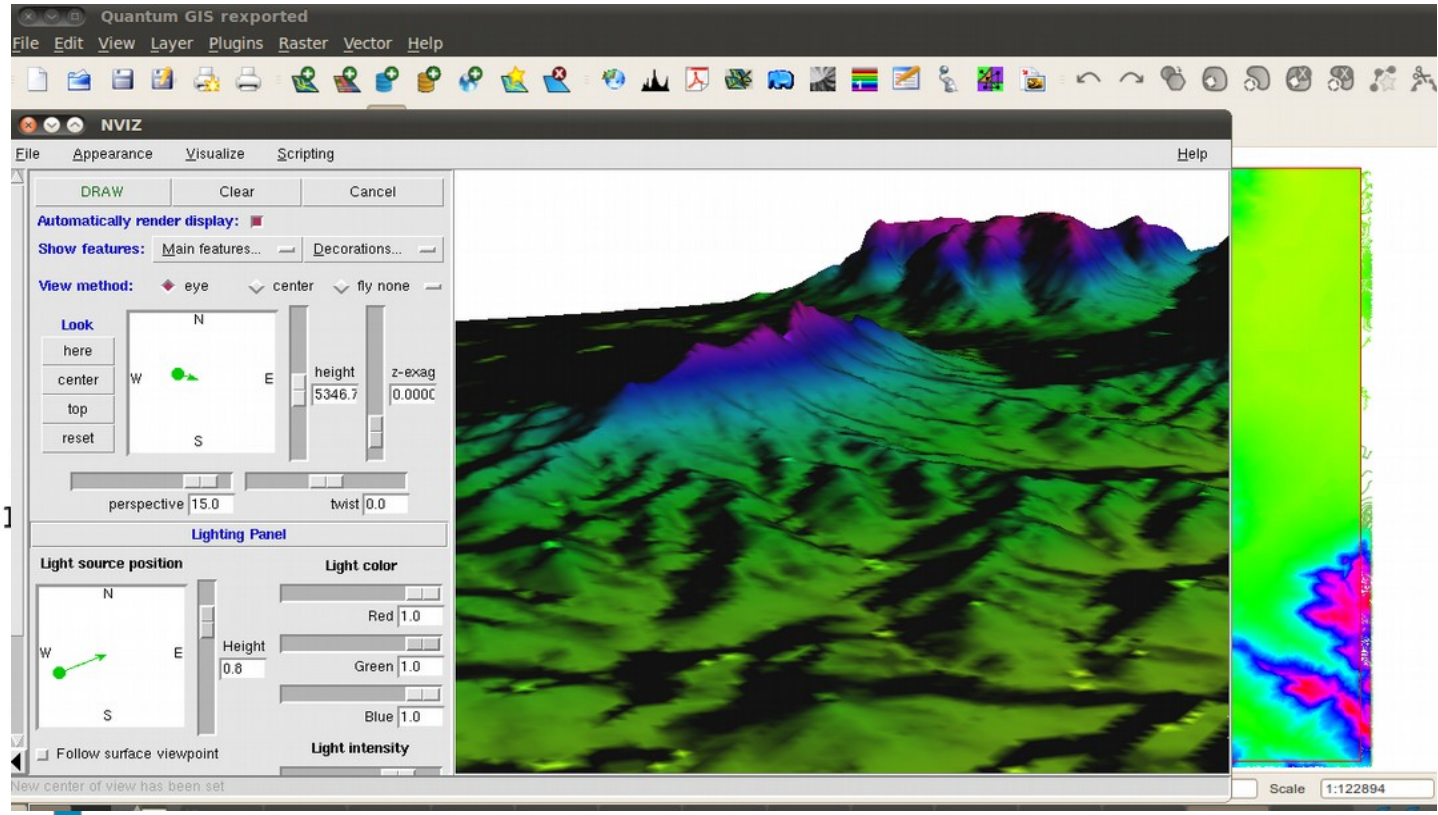


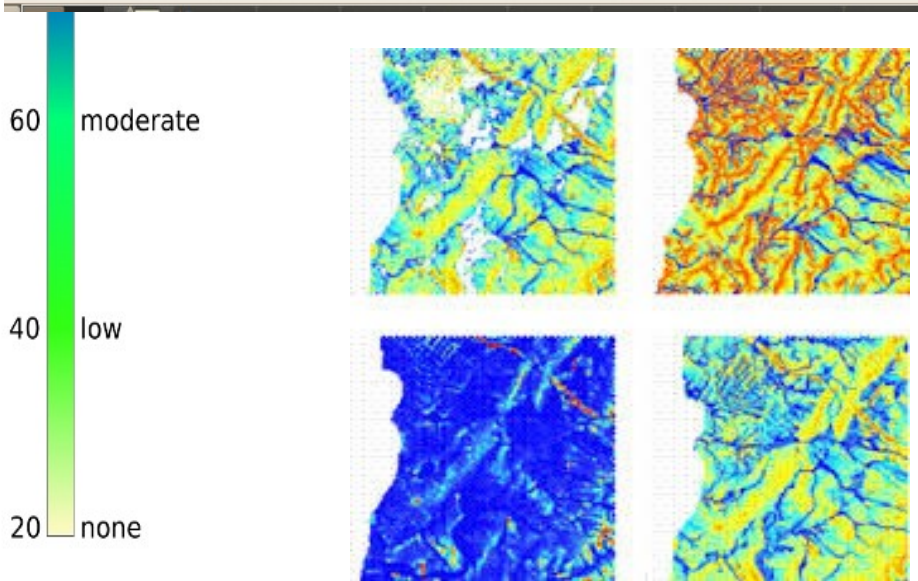
www.ilwis.org

GRASS GIS

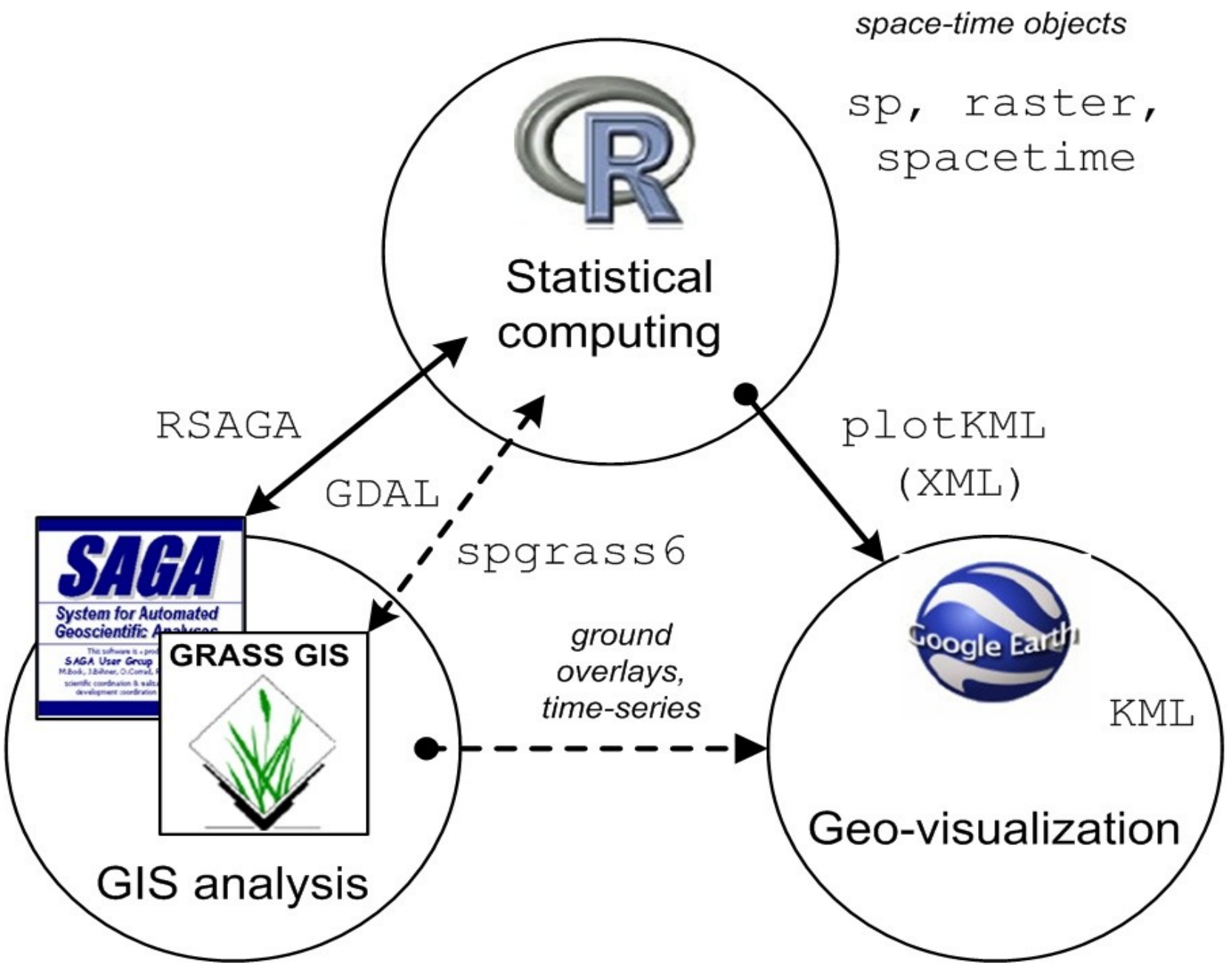




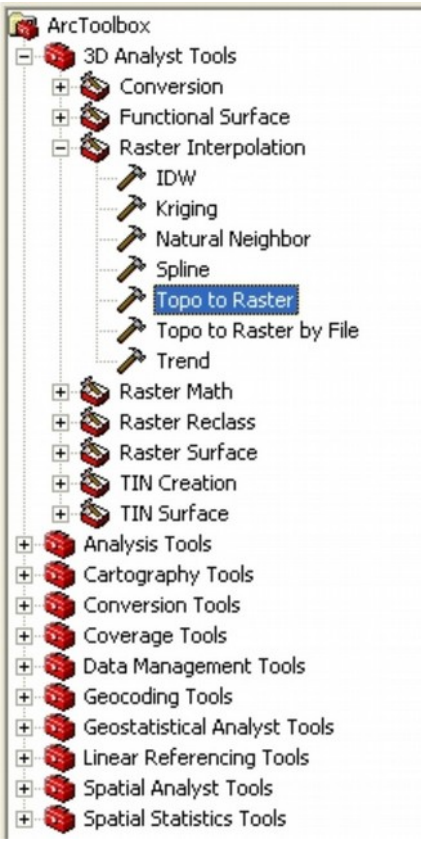




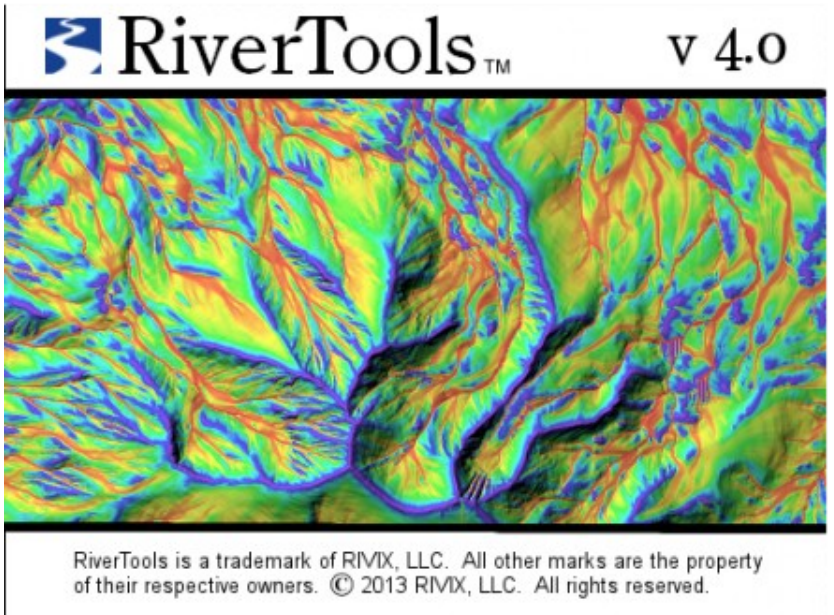
grass.osgeo.org

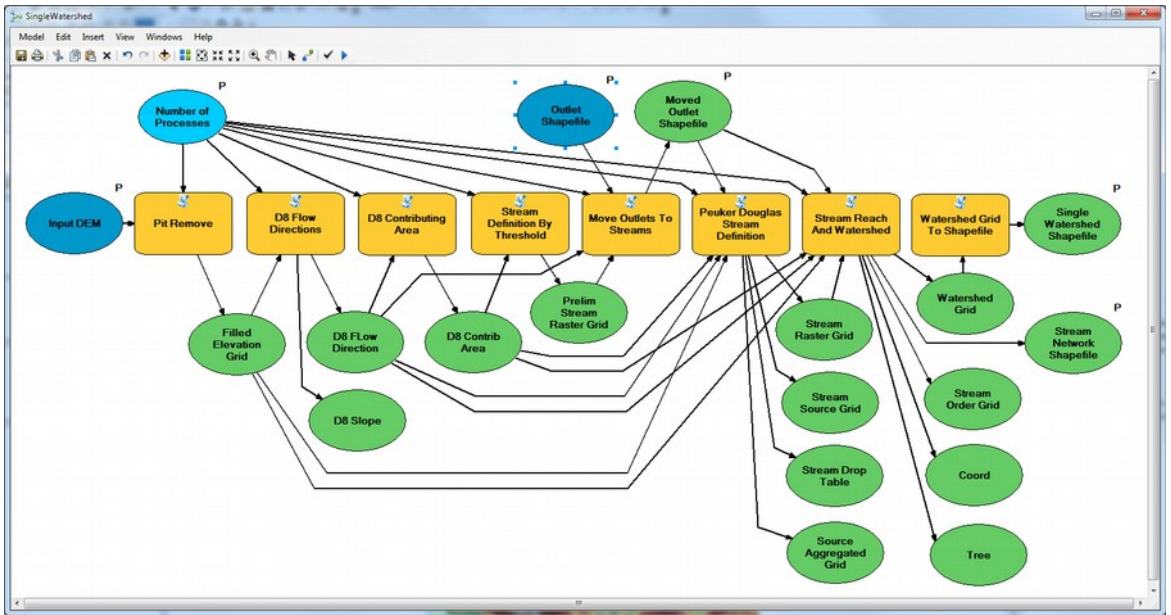

space-time objects
sp, raster,
spacetime
Statistical
computing
RSAGA
GDAL
spgrass6
plotKML
(XML)
SAGA
System for Automated
Geoscientific Analyses
GRASS GIS
ground
overlays,
time-series
Google Earth
KML
GIS analysis
Geo-visualization

Oprogramowanie płatne



- ANUDEM:
  http://fennerschool.anu.edu.au/research/products/anudem-vrsn-53
- RiverTools:
  http://rivix.com
- TAUDEM (Open source, ale wymaga ArcGIS)
  http://hydrology.usu.edu/taudem/taudem5/index.html





Konferencje

Nanjing, Listopad 2006

Zurich, wrzesień 2009

Redlands, wrzesień 2011

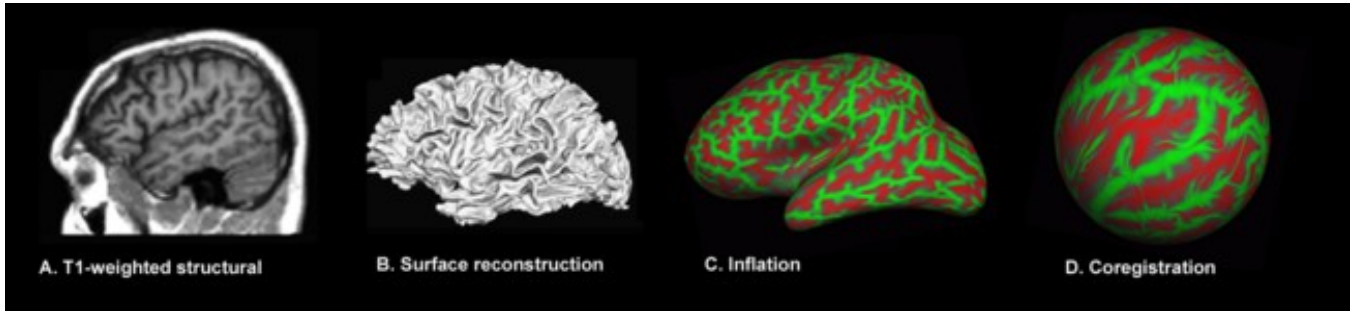
Nanjing, Październik 2013

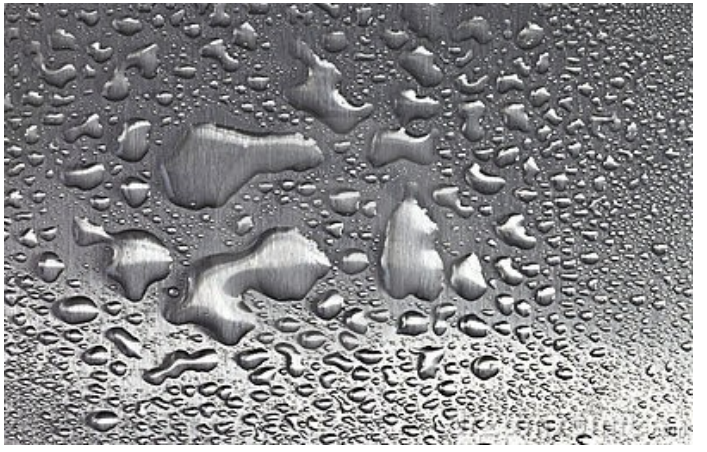
Poznań, Wrzesień 2015

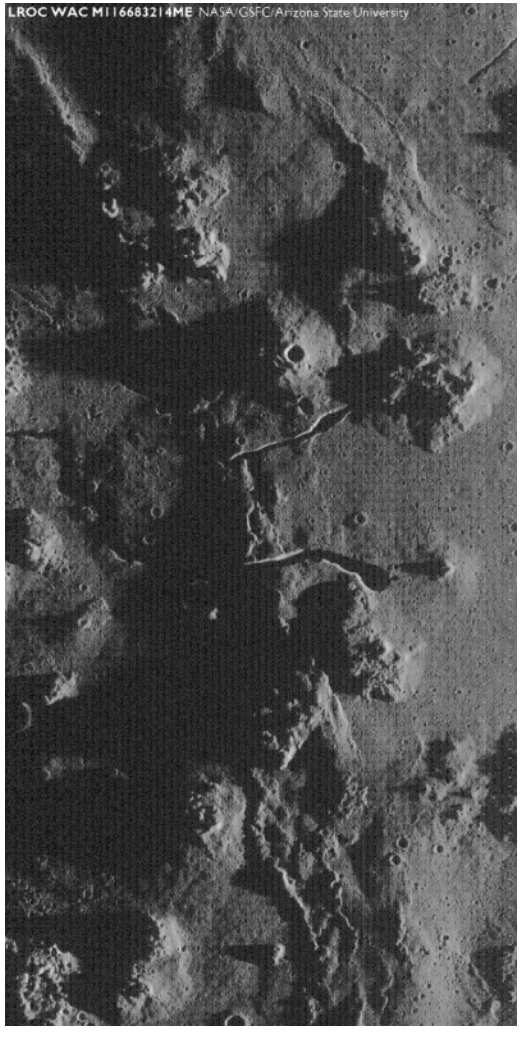
http://www.geomorphometry.org

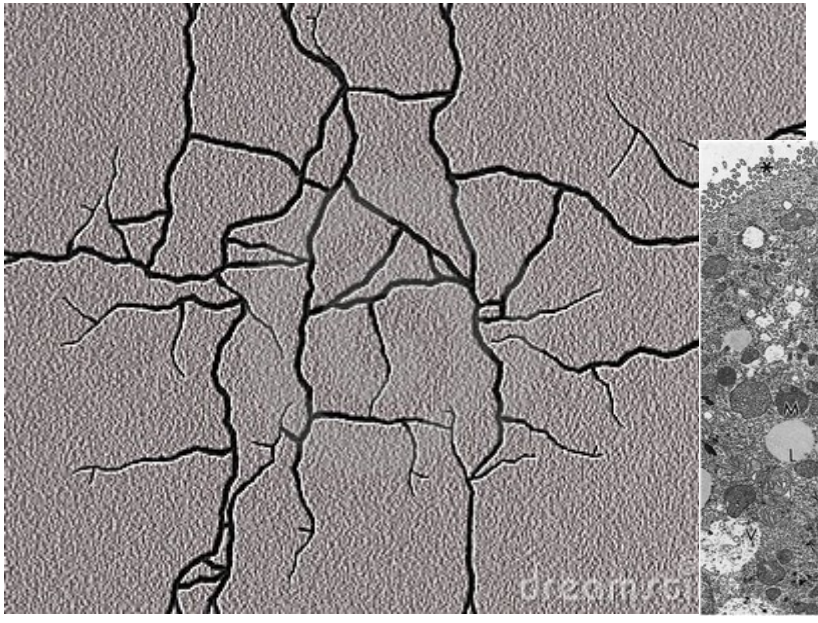

Co to jest powierzchnia?

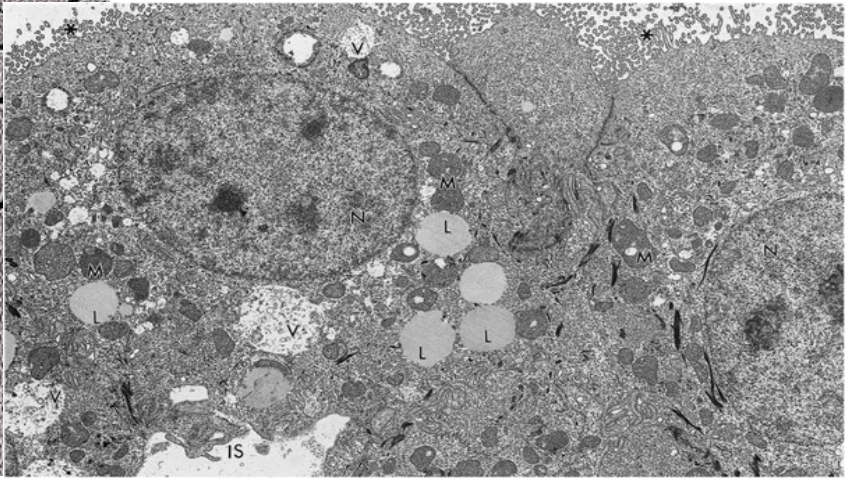
Różne powierzchnie...

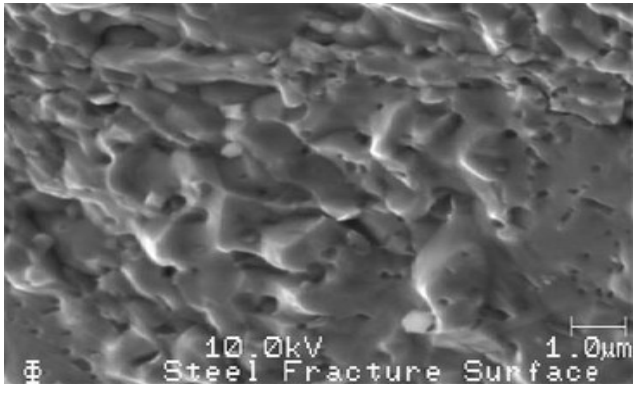


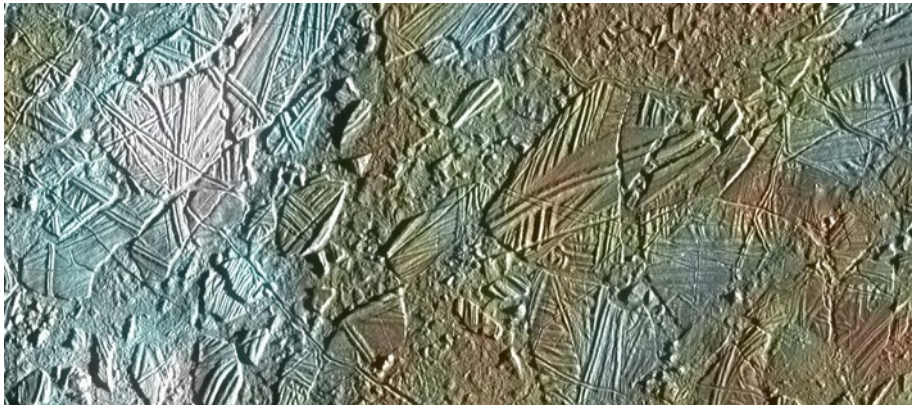




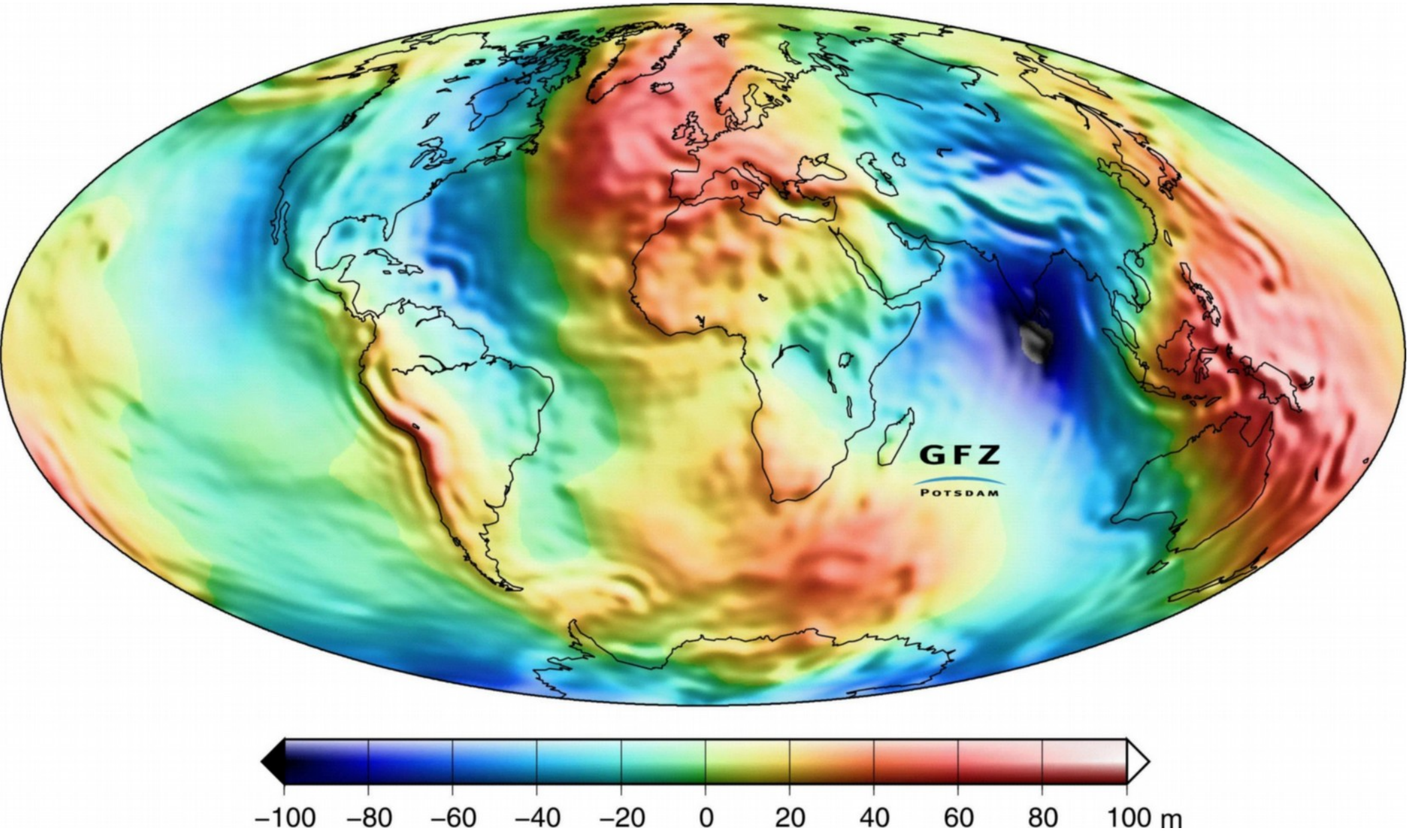




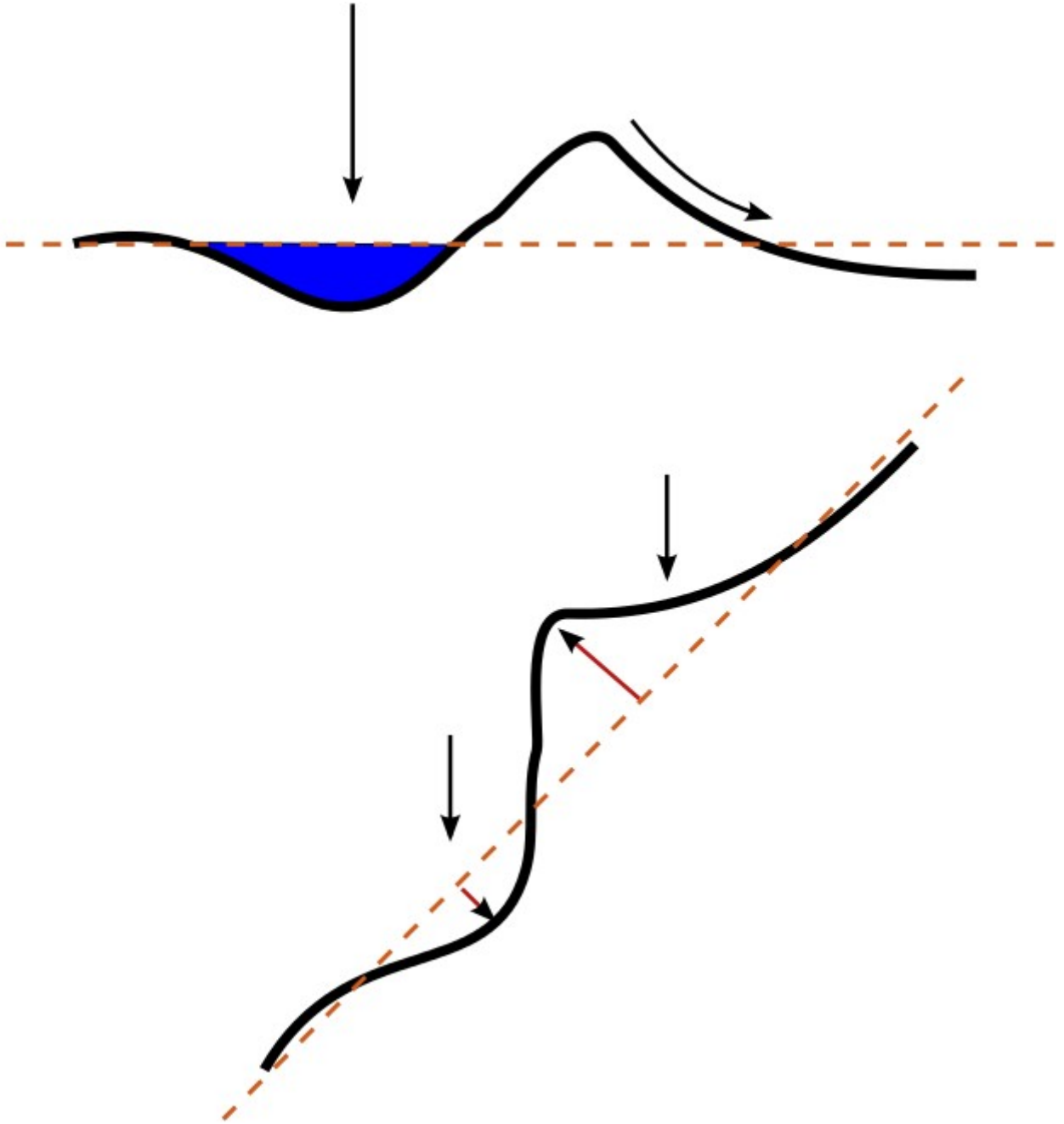




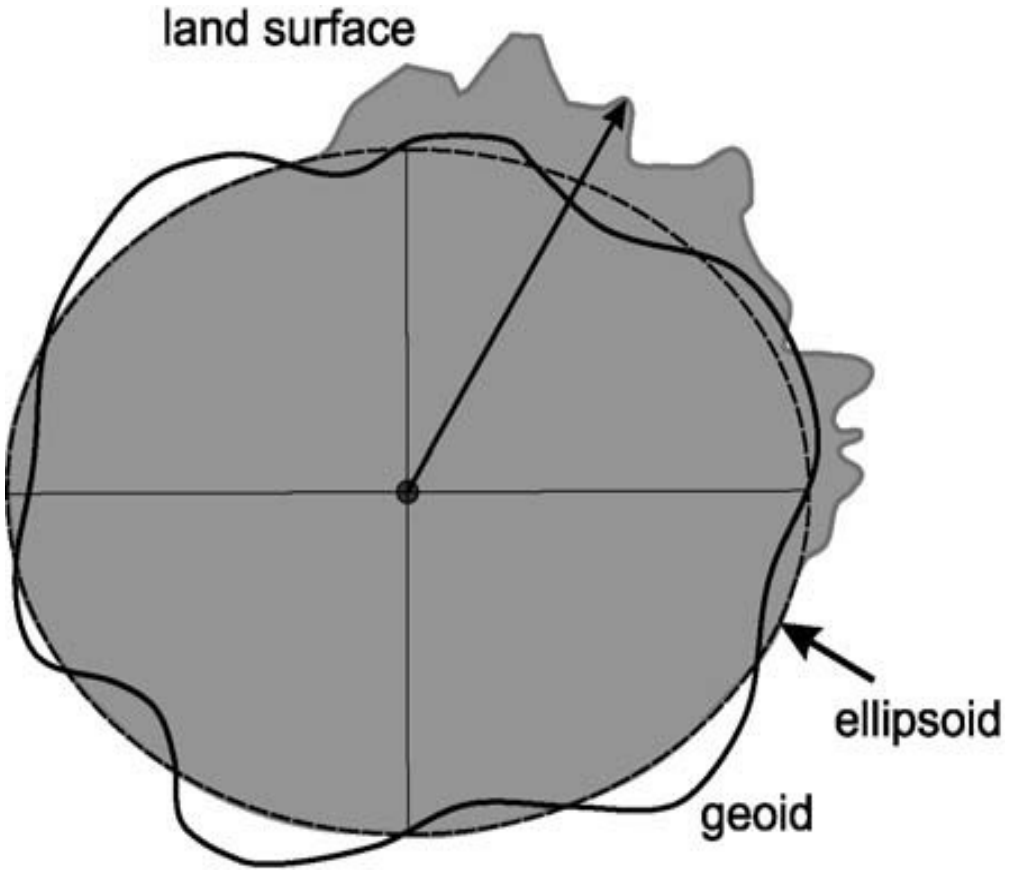
Pole grawitacyjne Ziemi

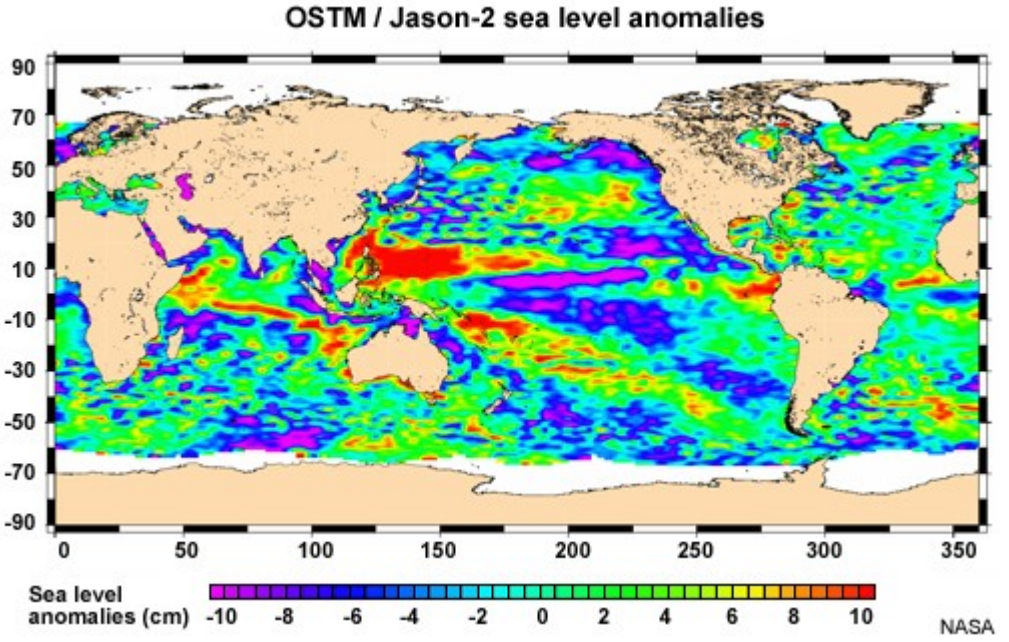


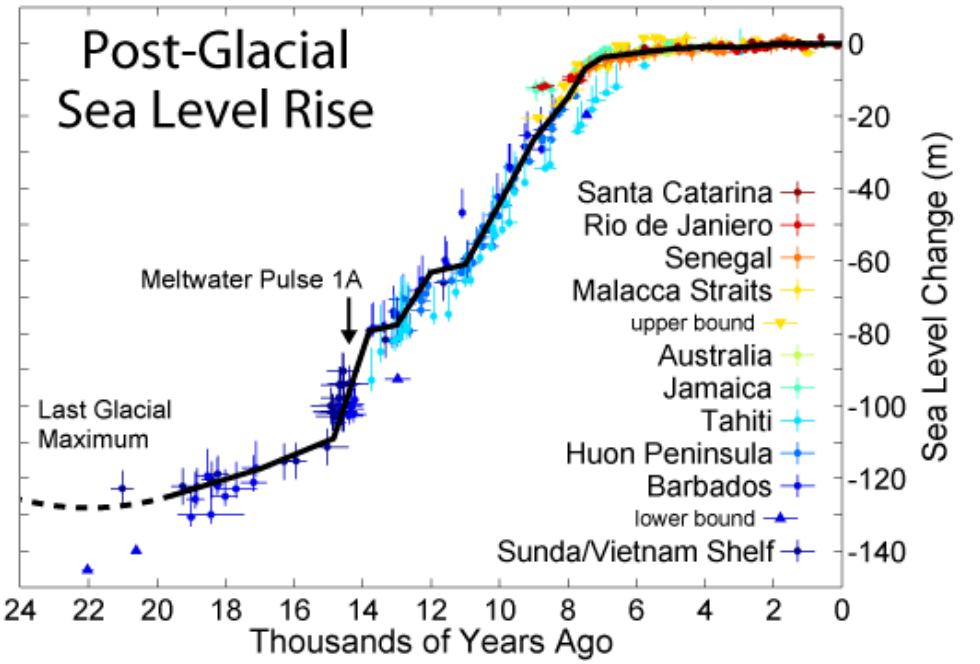
Powierzchnia w polu grawitacyjnym



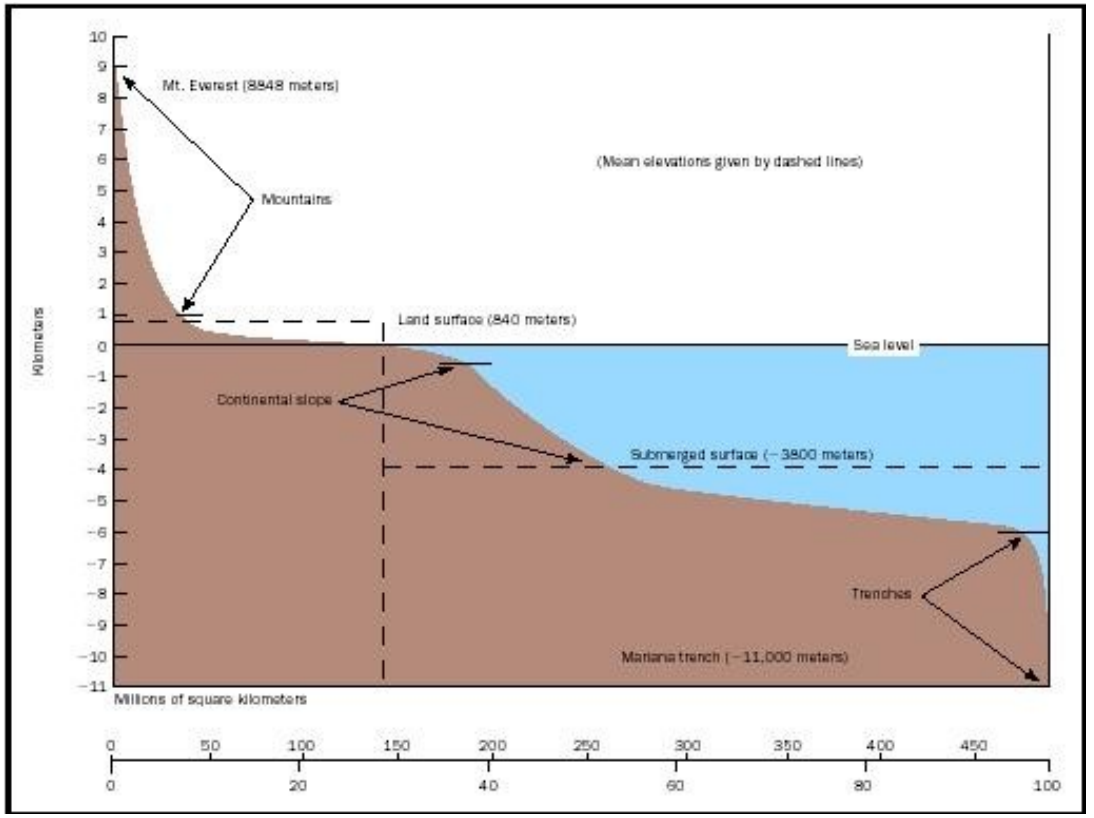
Powierzchnia względem elipsoidy

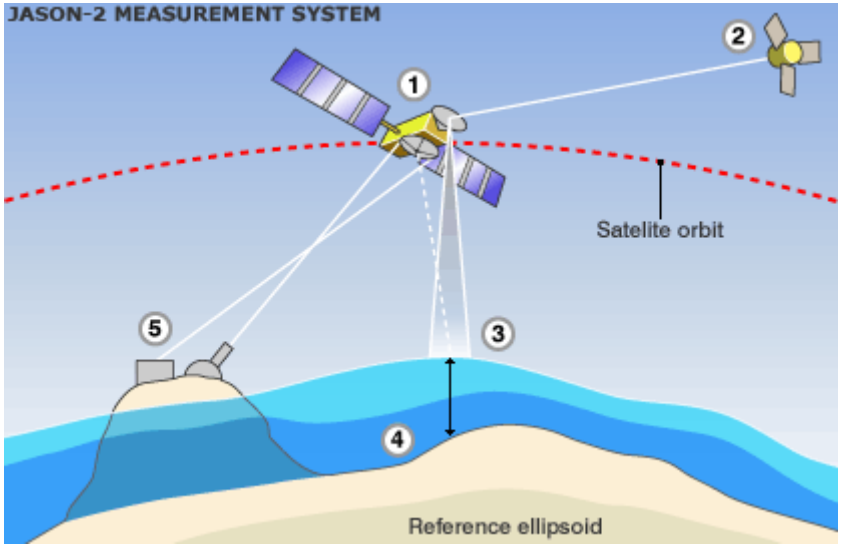


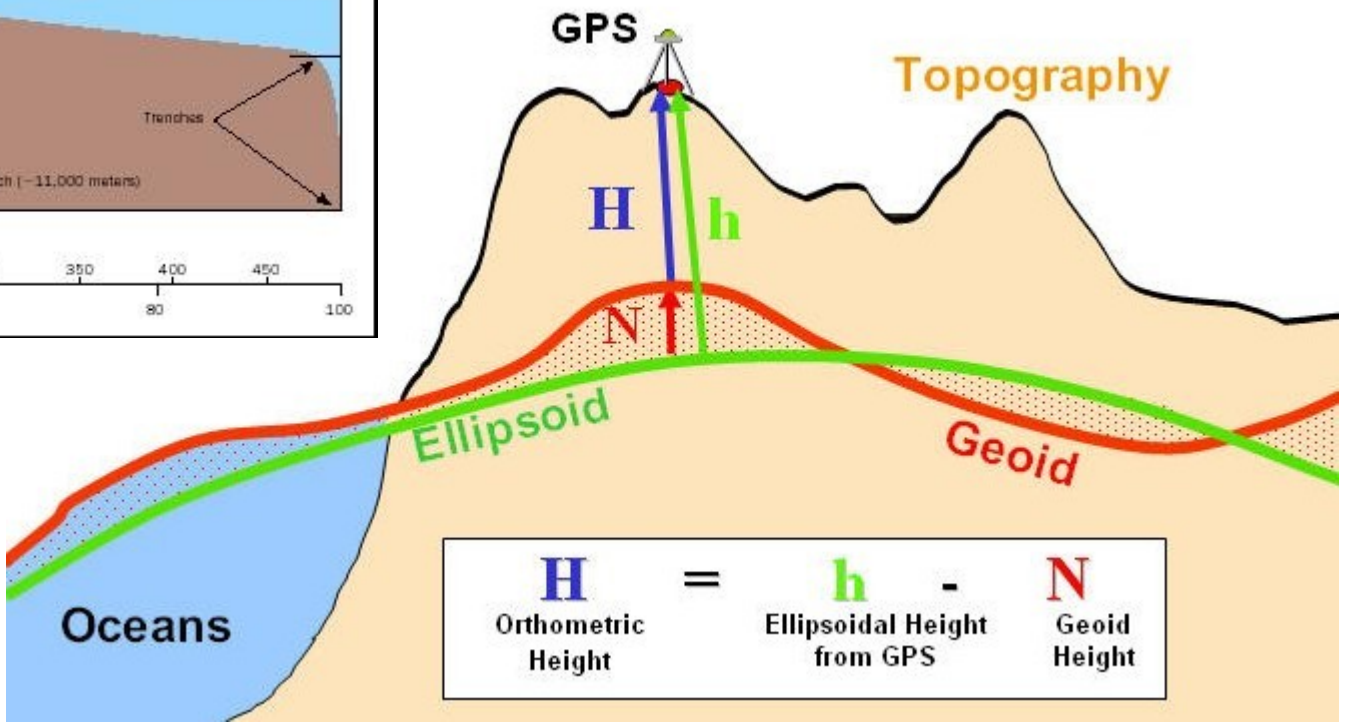


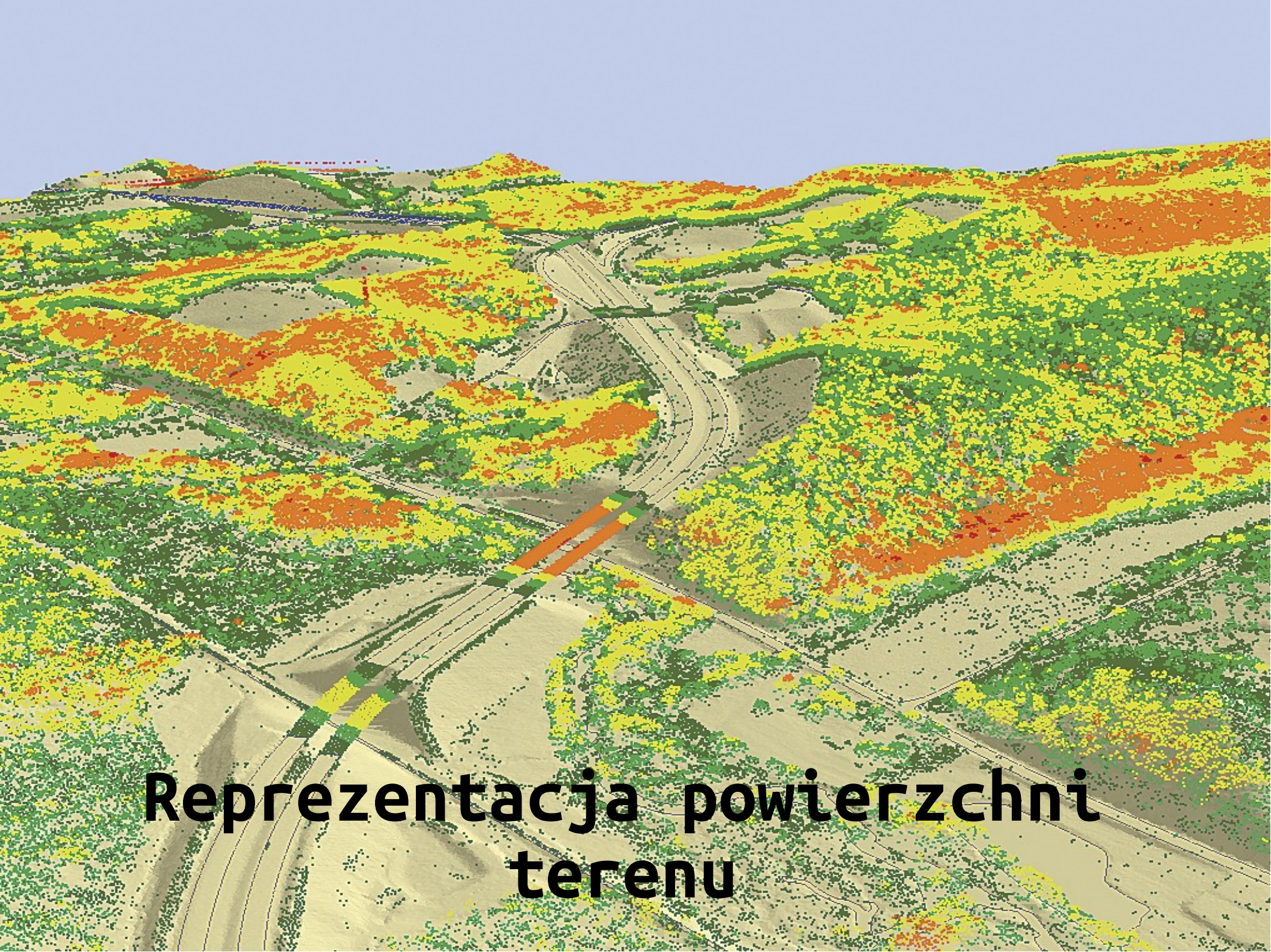


Nad Poziomem Morza....





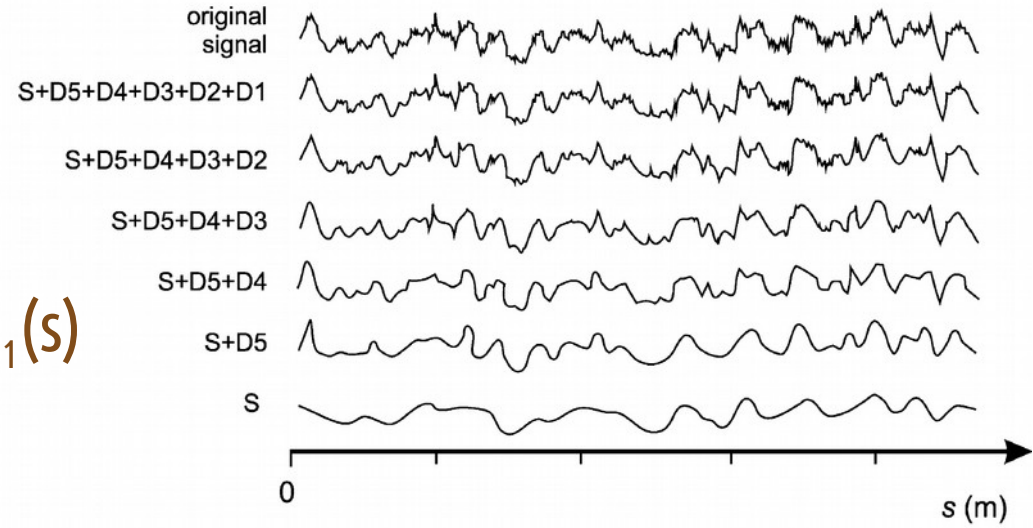


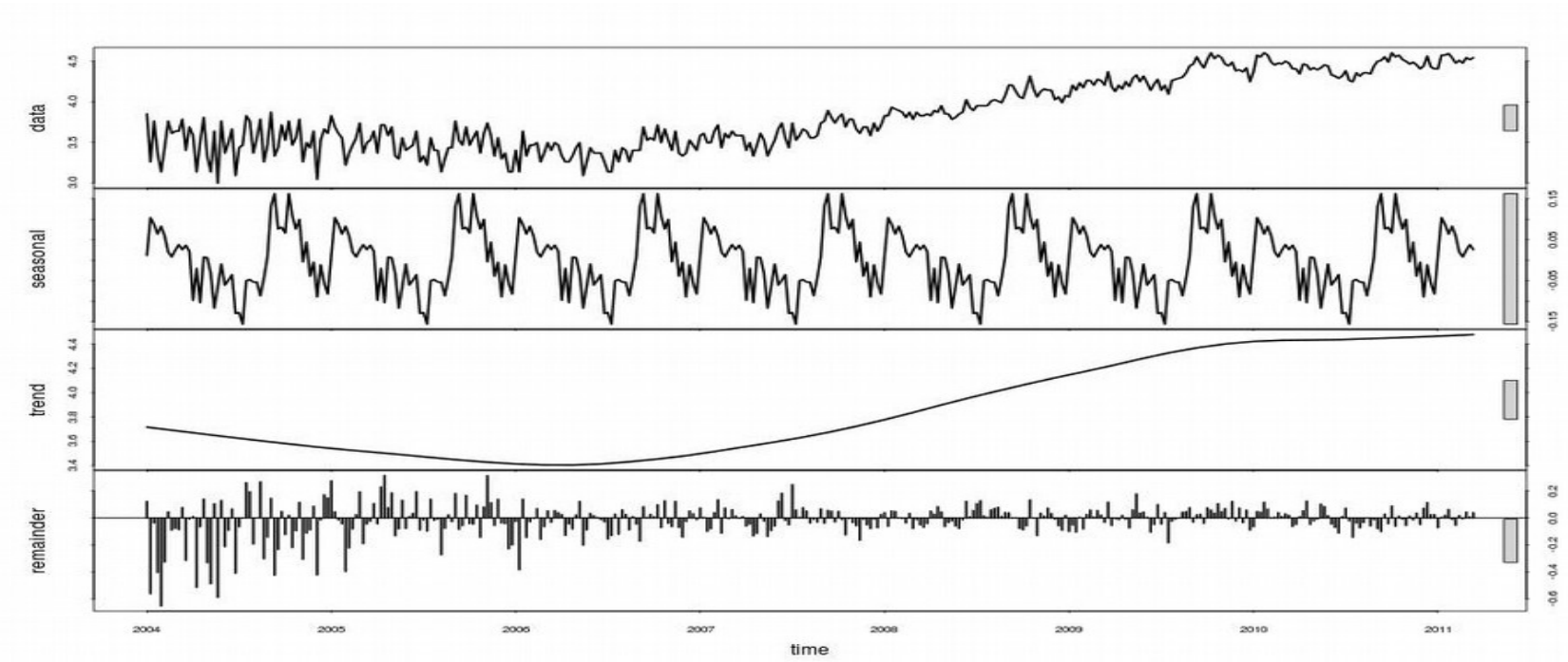


Reprezentacja powierzchni terenu

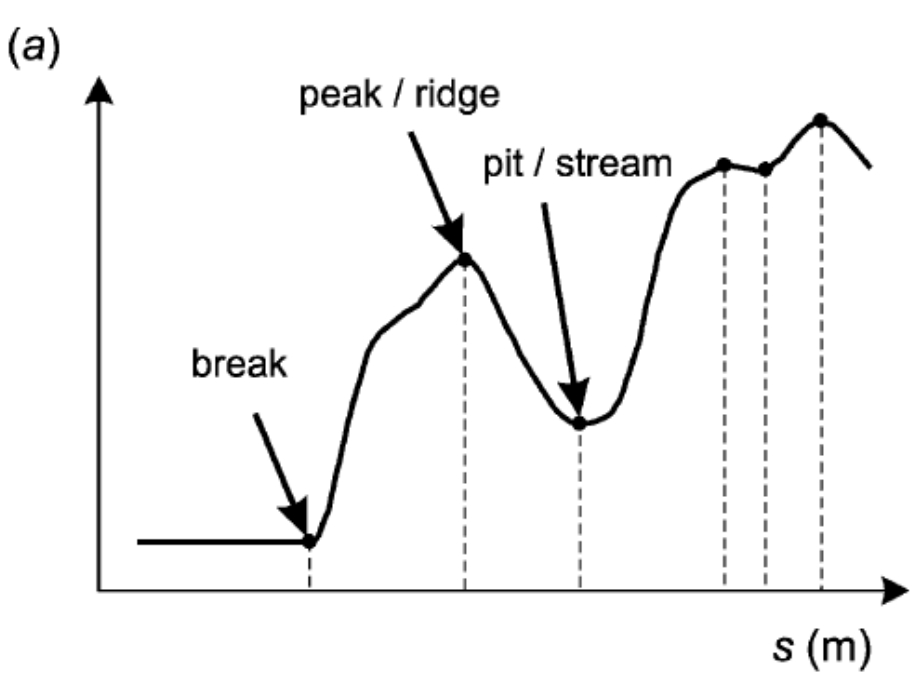
Matematyczny model powierzchni

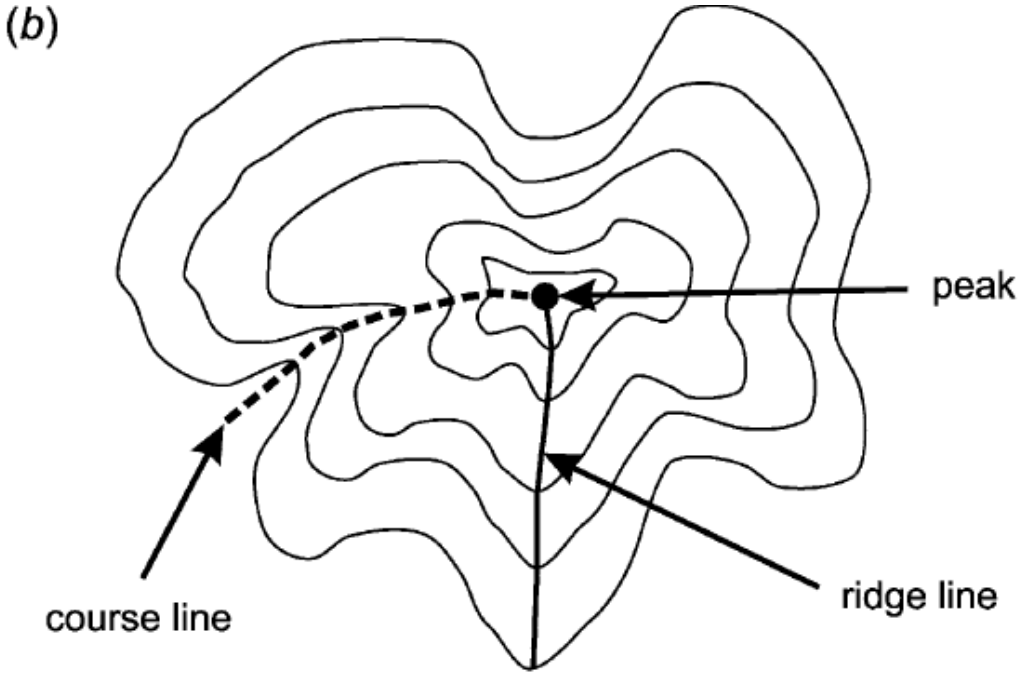
- funkcja współrzędnych:
  $z=f(x,y)$, $z=f(s)$
- wielorozdzielczy (multiresolution):
  $z\ (1.2)\ *(s) = S(s) + D_J(s) + D_{J-1}(s) + \cdots + D_1(s)$
- geostatystyczny:
  $z(s) = z^*(s) + \varepsilon'(s) + \varepsilon''(s)$





Punkty i linie charakterystyczne

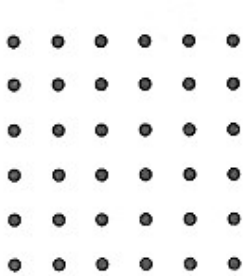




- pits - lokalne minima
- peaks - lokalne maxima
- grzbiety
- cieki
- odcinki
- przełęcze
- załomy
- izolinie
- linie stoków
- równiny

Różne sposoby reprezentacji powierzchni

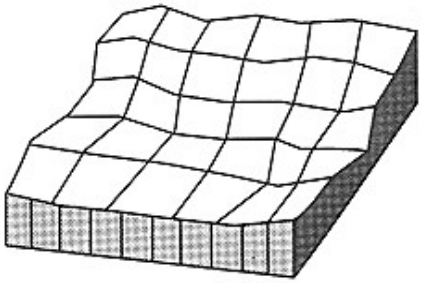
Sampling points/lines



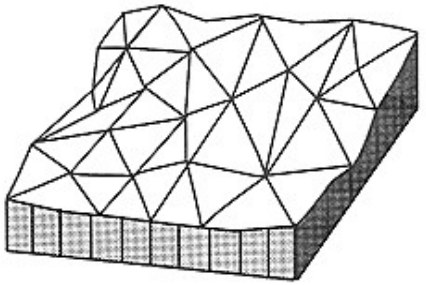
(a) Grid Points

(b) Random Points

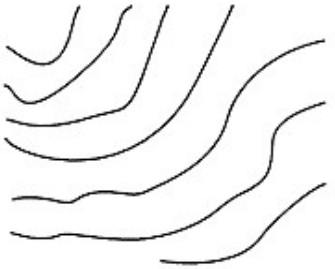
DEM



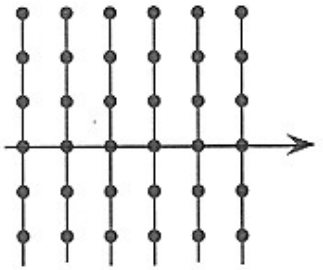
Bi - Linear Model



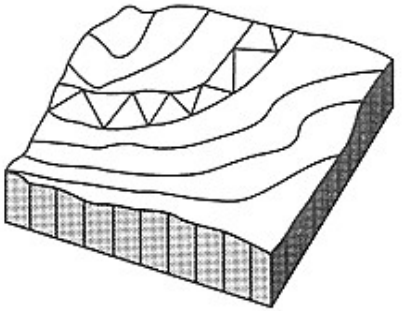
TIN Model



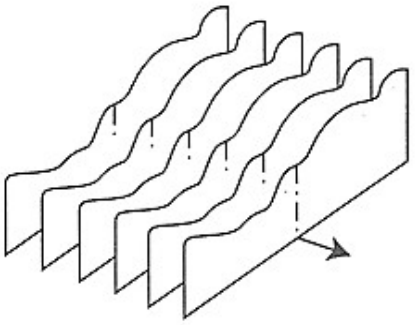
(c) Contour Lines



(d) Profile

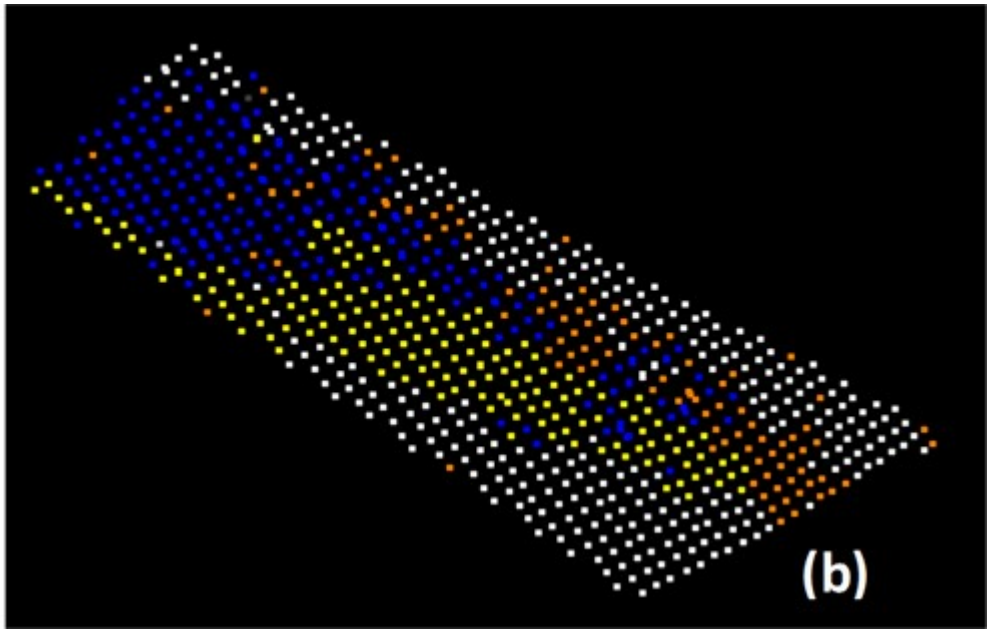


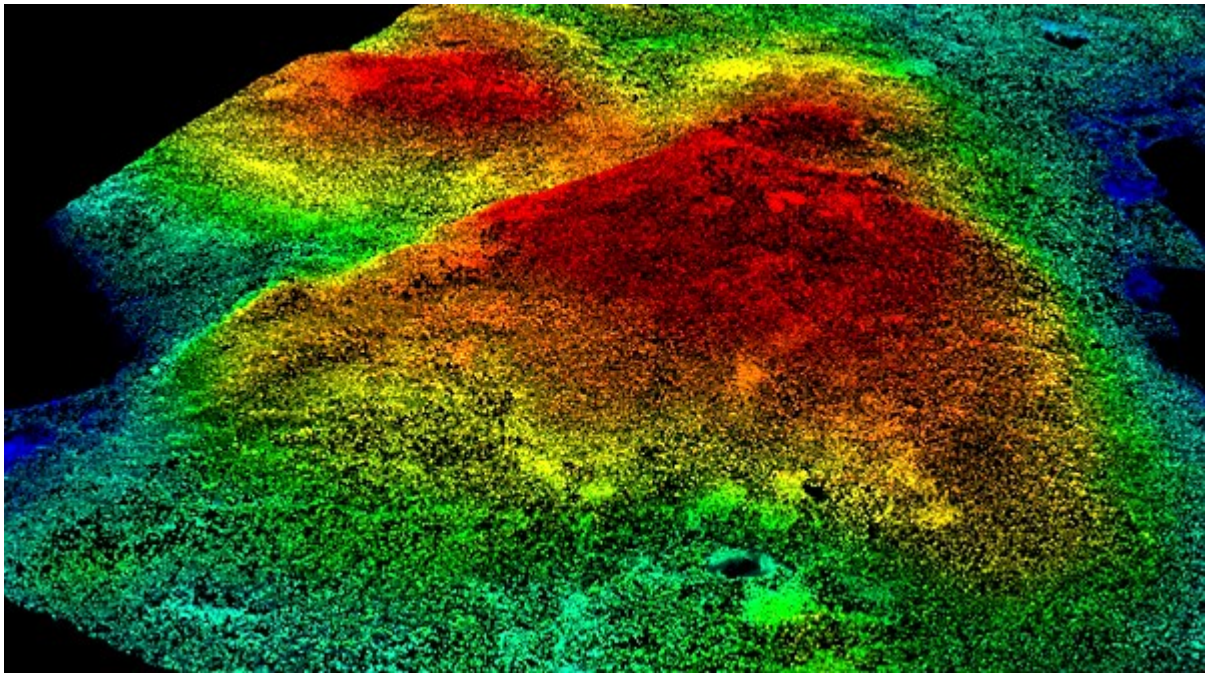
TIN model with Contours



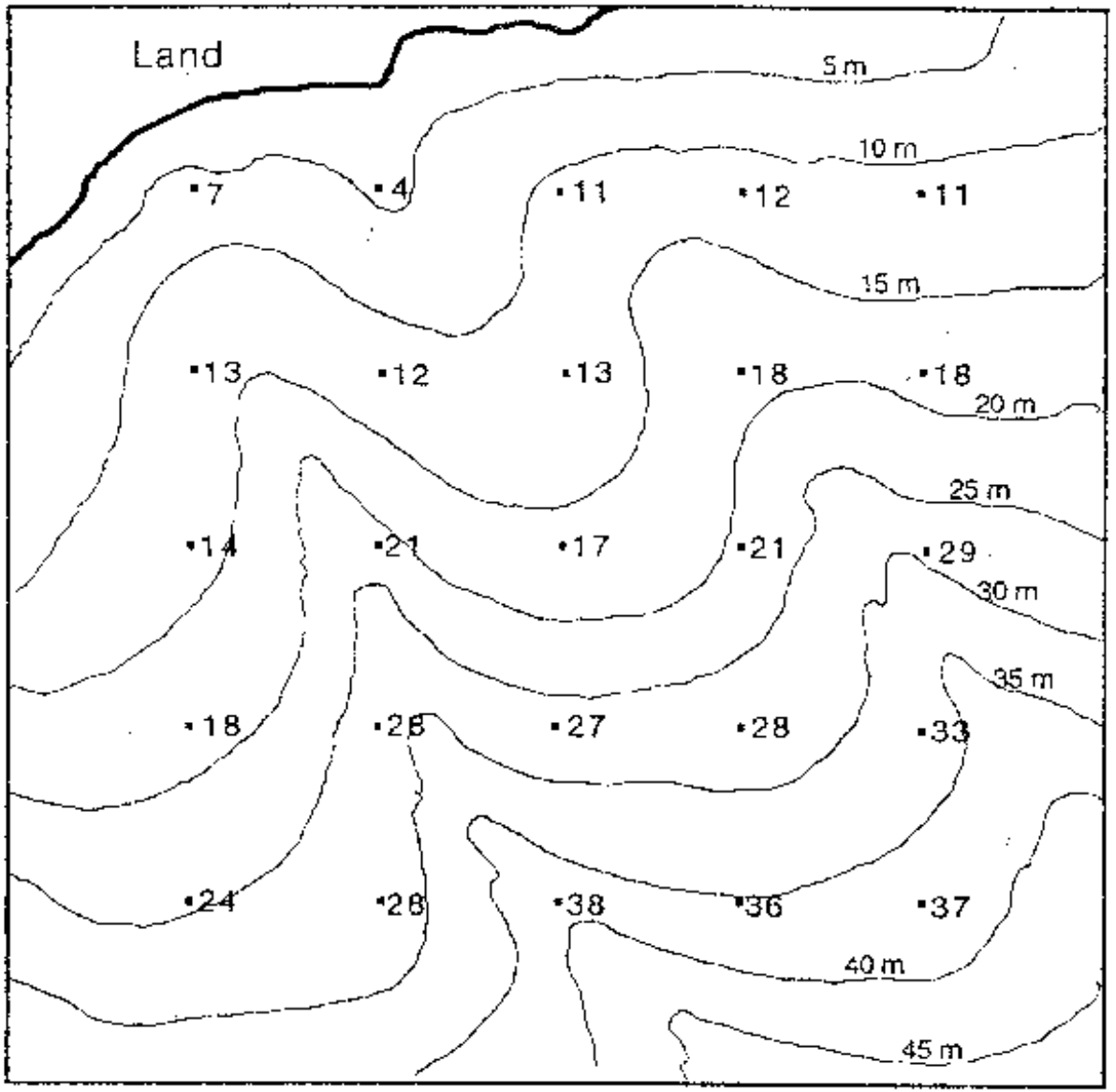
Bi - Linear or TIN Model

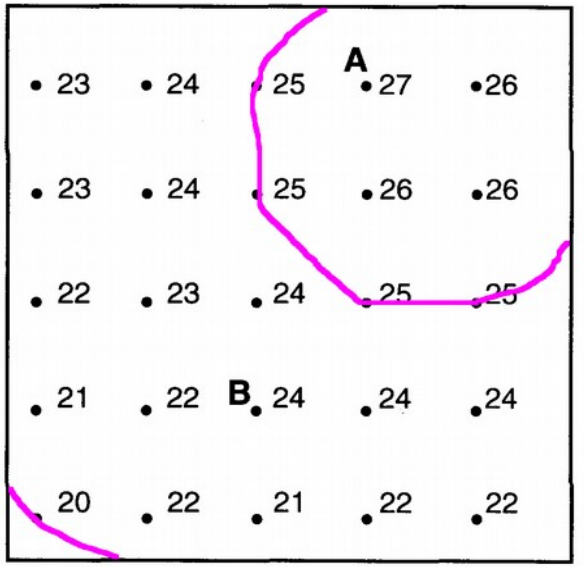
Chmura punktów

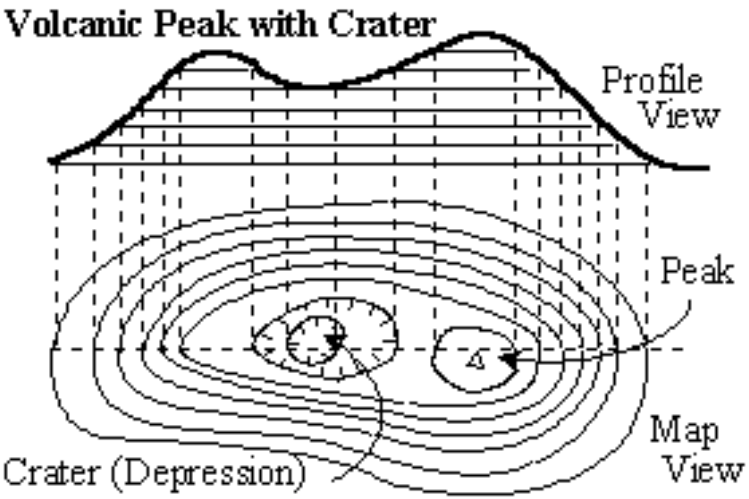




Model poziomicowy (izolinie)

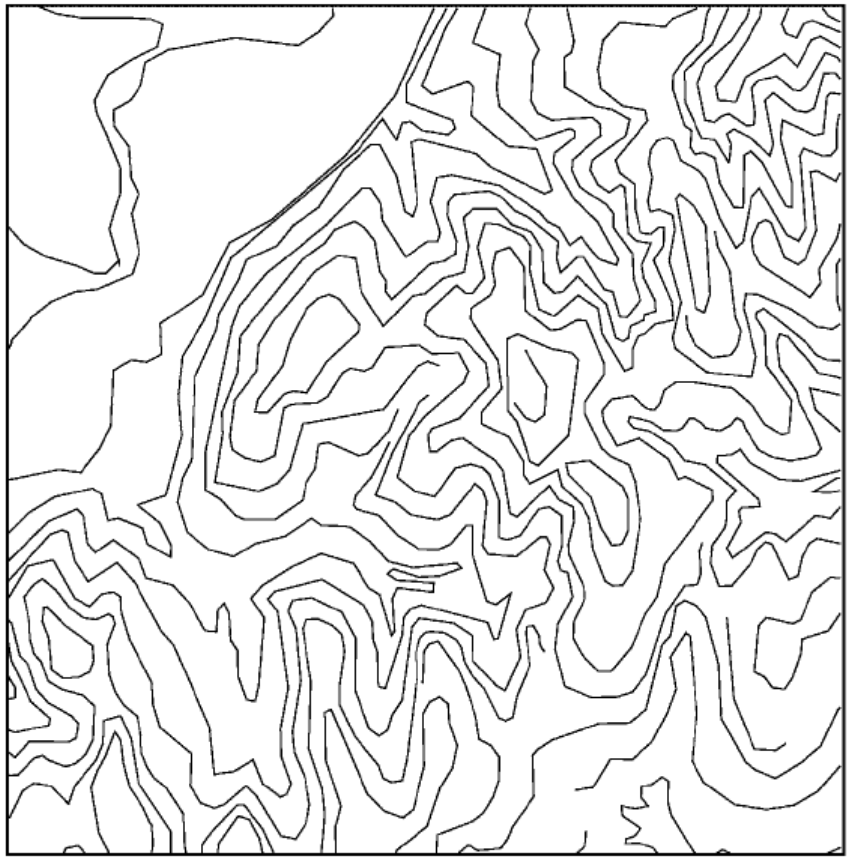




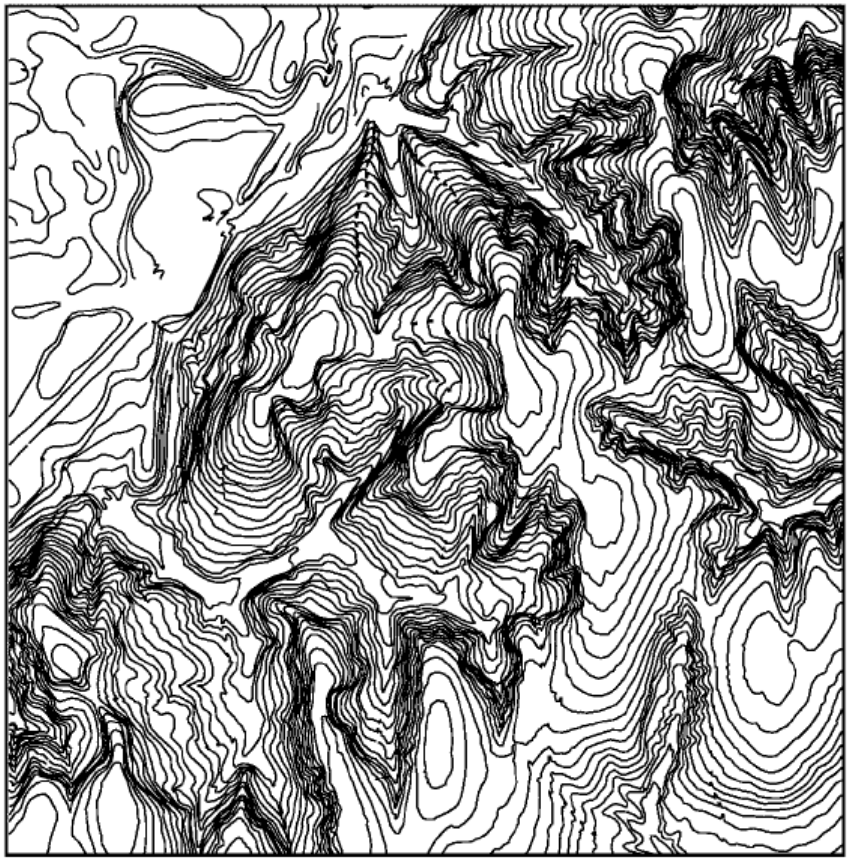


Jakość odwzorowania

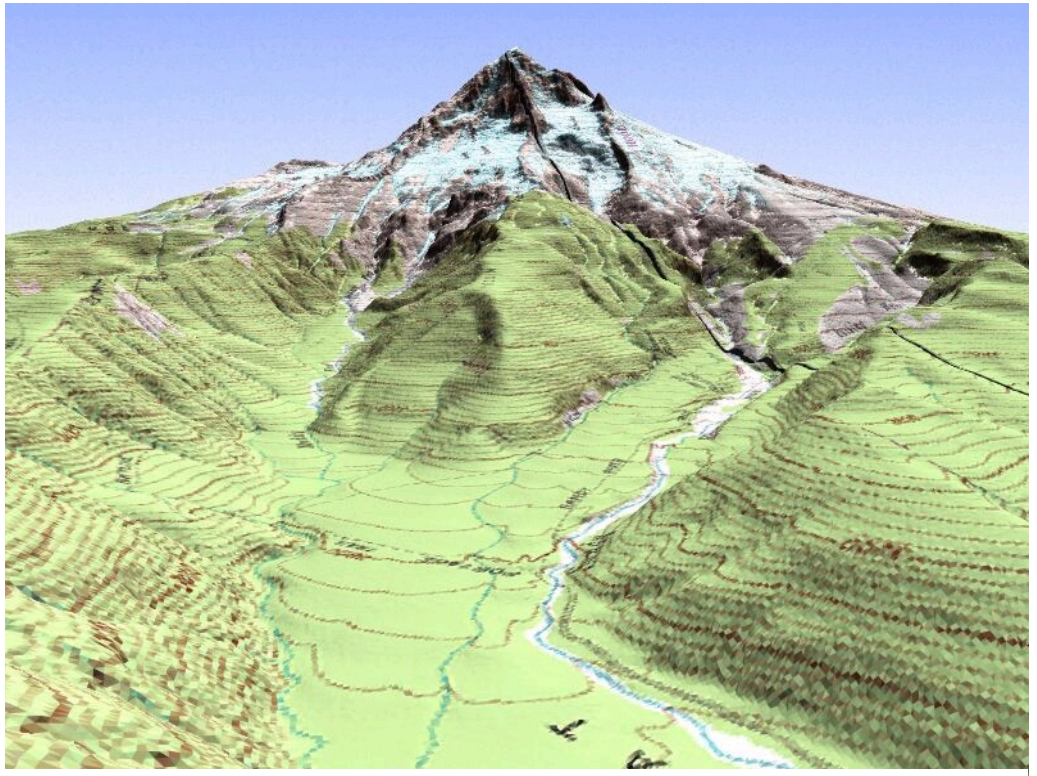
(*a*)

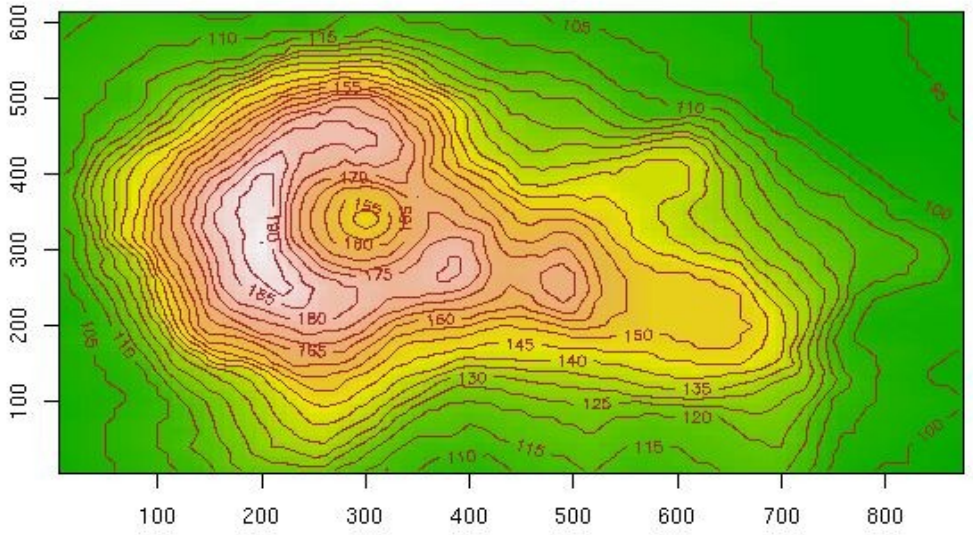


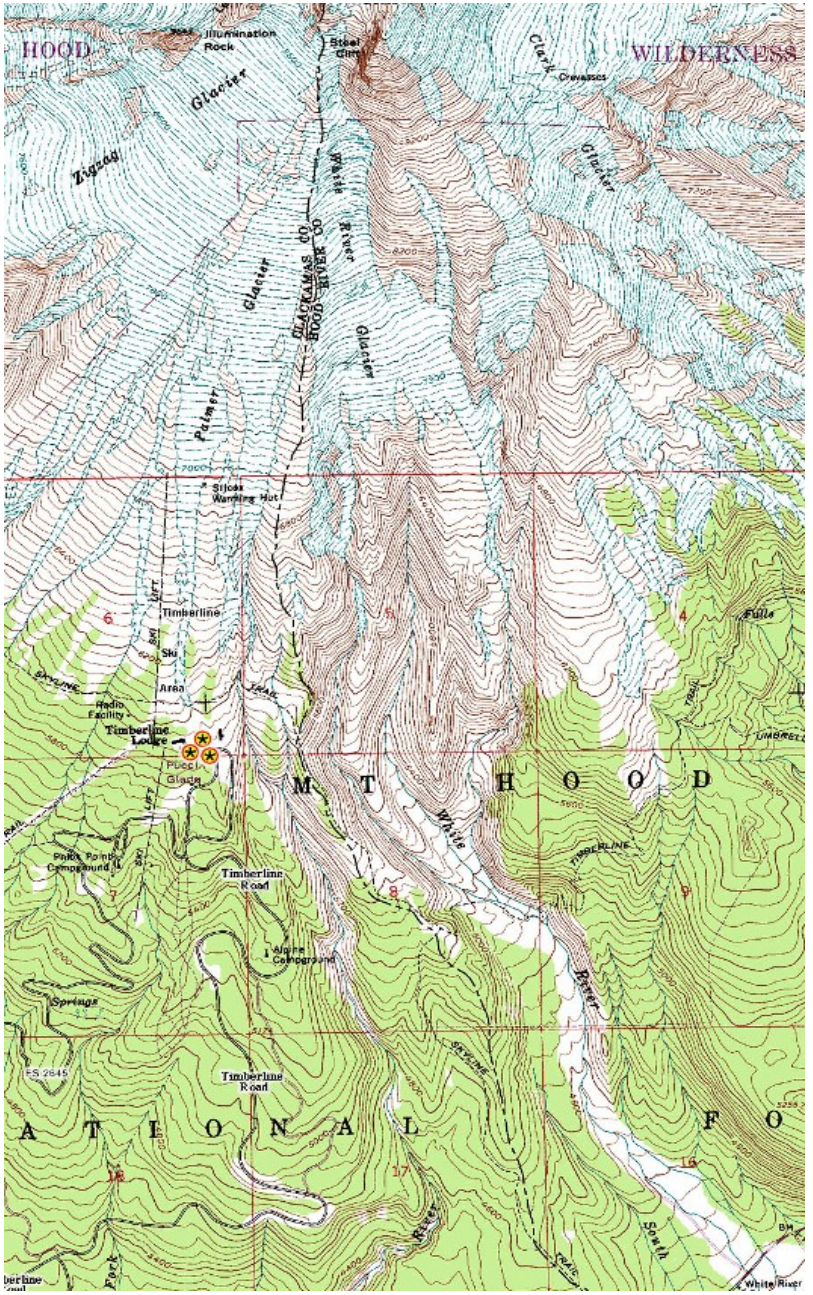
(*b*)



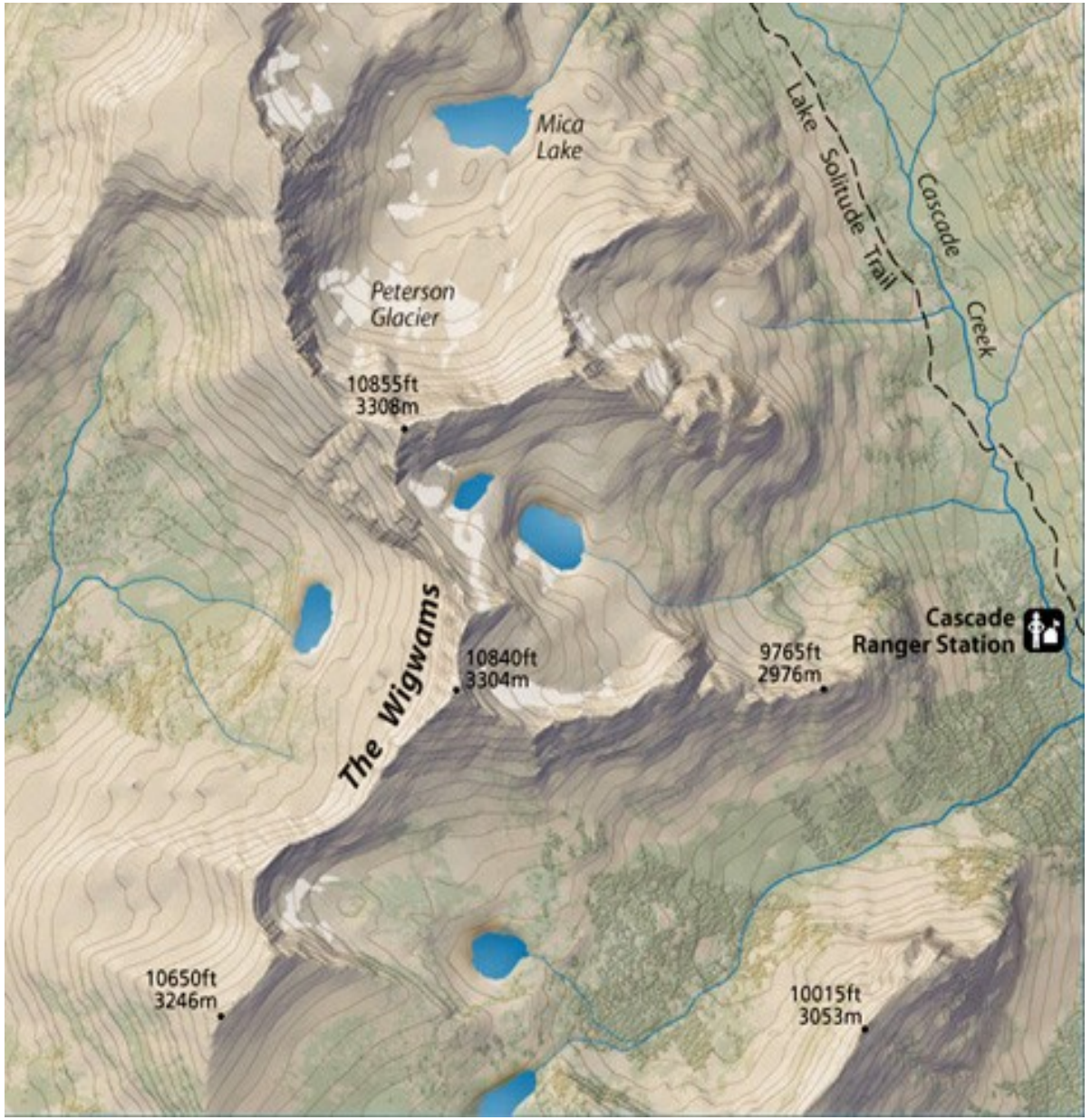
Odwzorowanie powierzchni

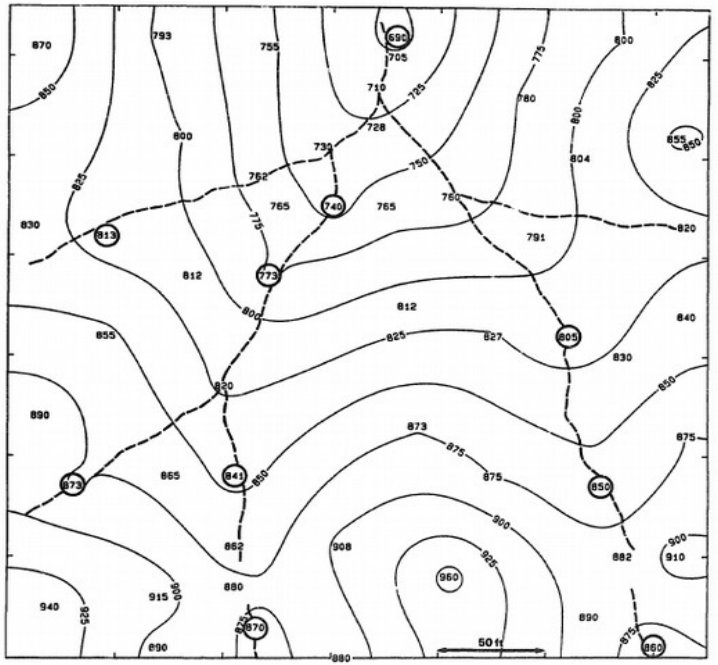


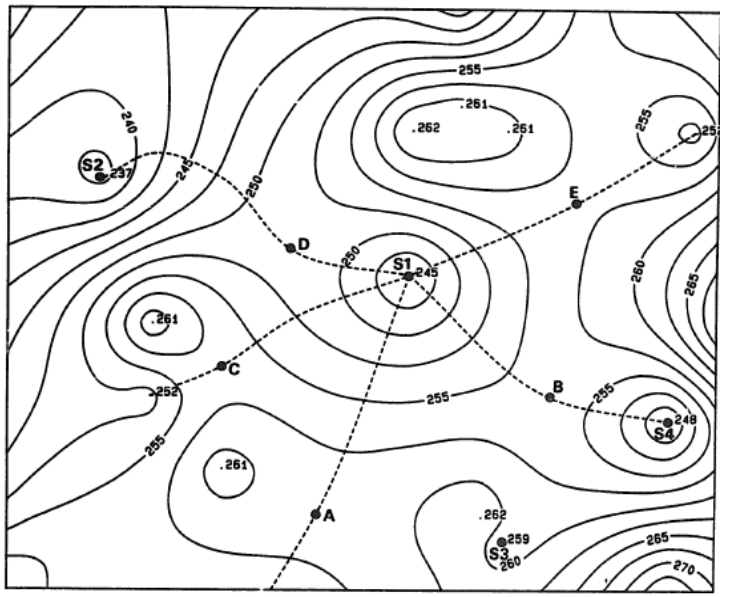




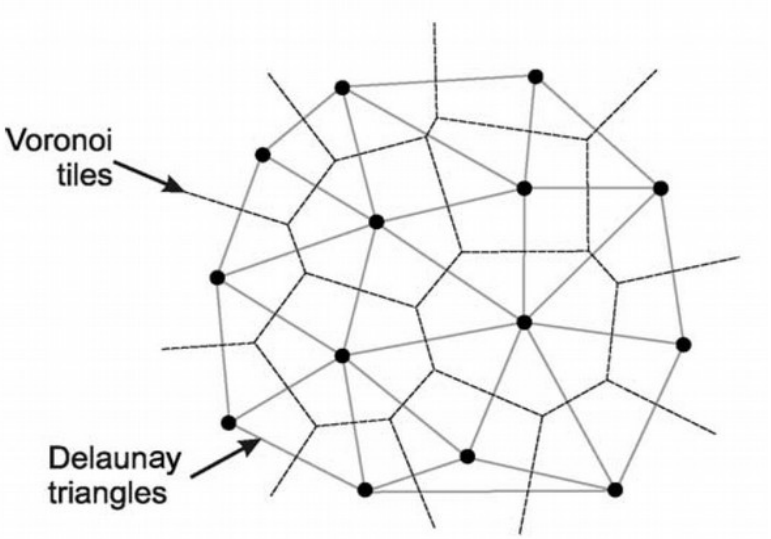
Model poziomicowy z siecią wodną

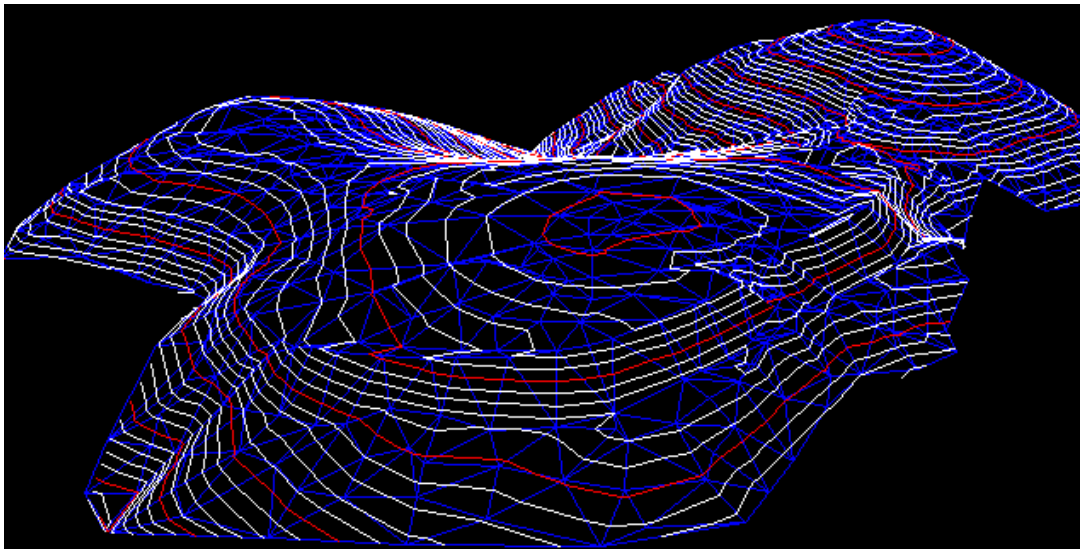


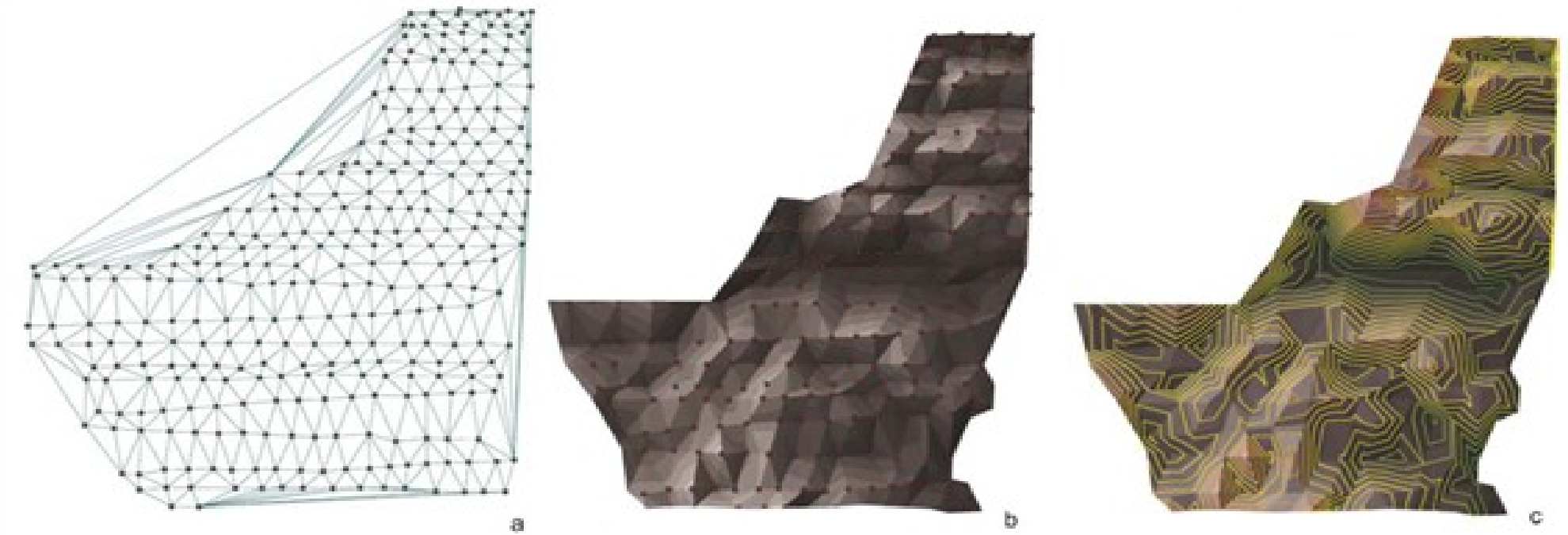




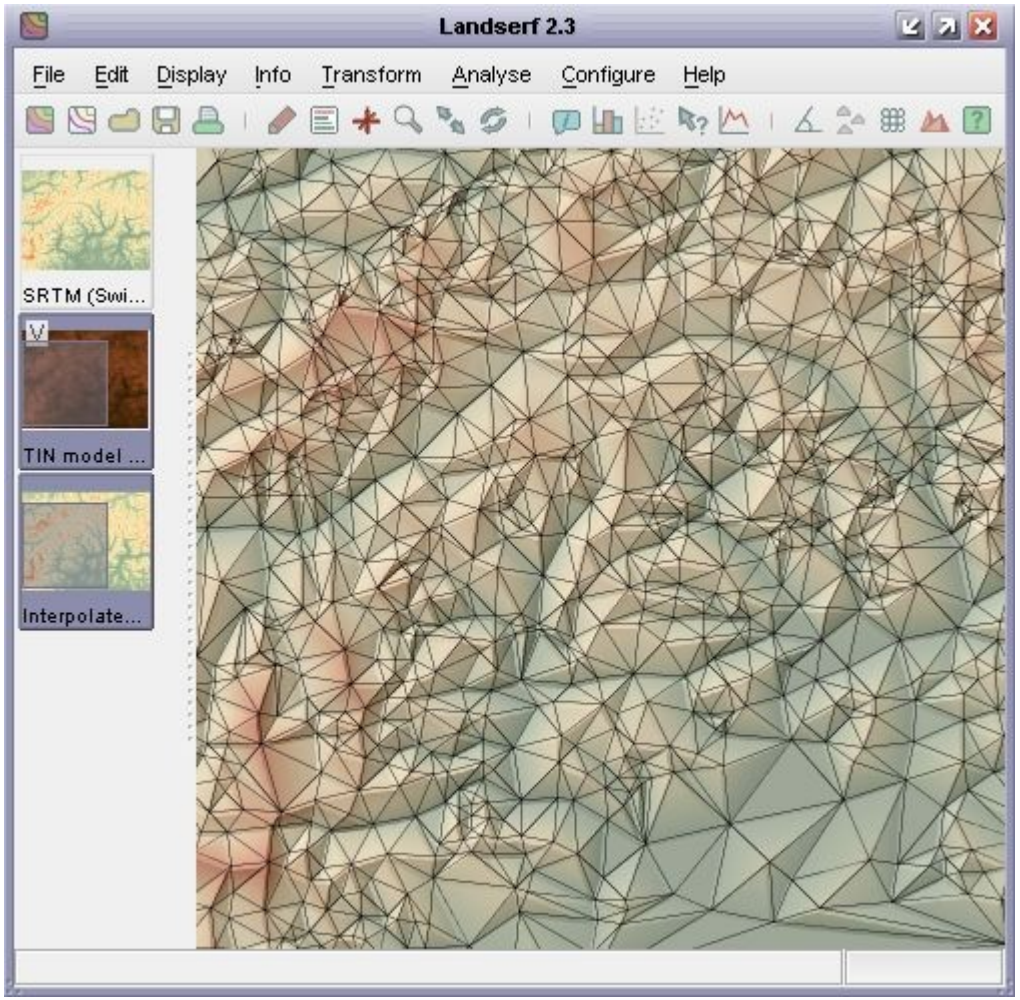
Punkty i model triangulacyjny

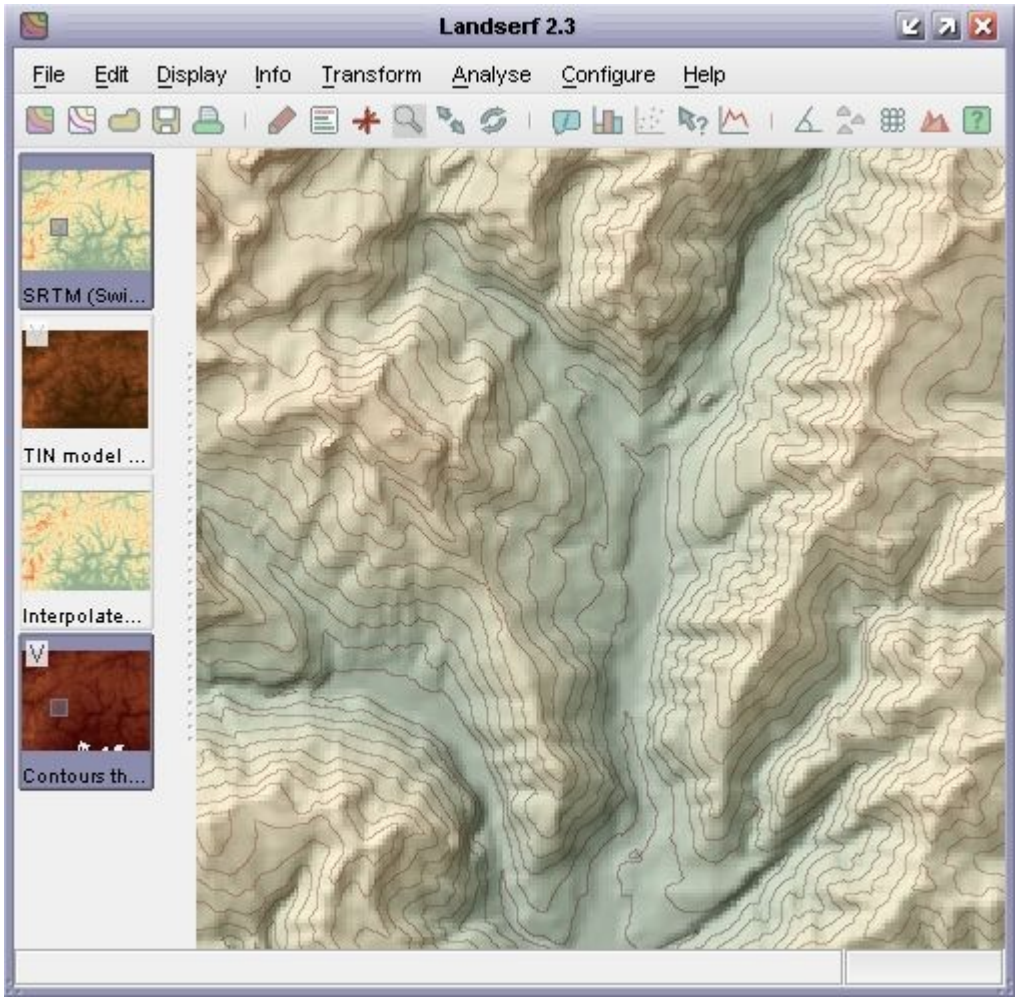






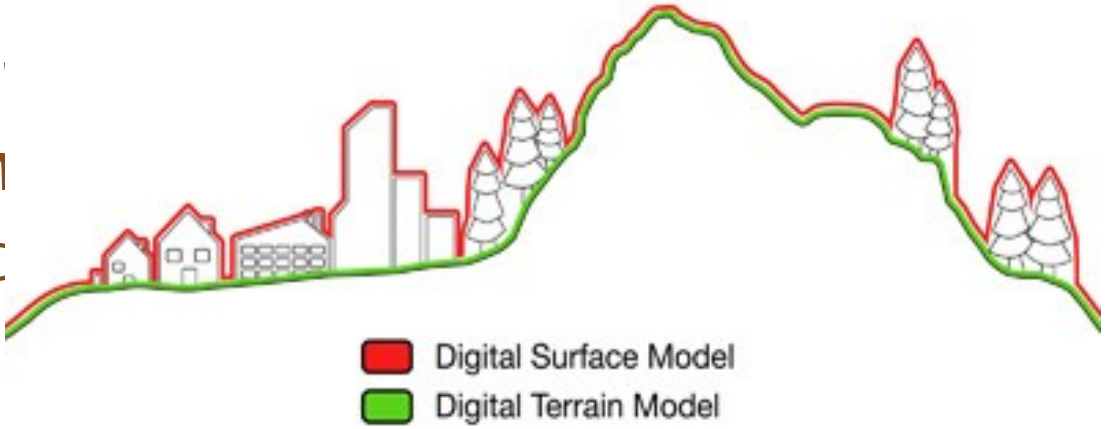
TIN a model poziomicowy

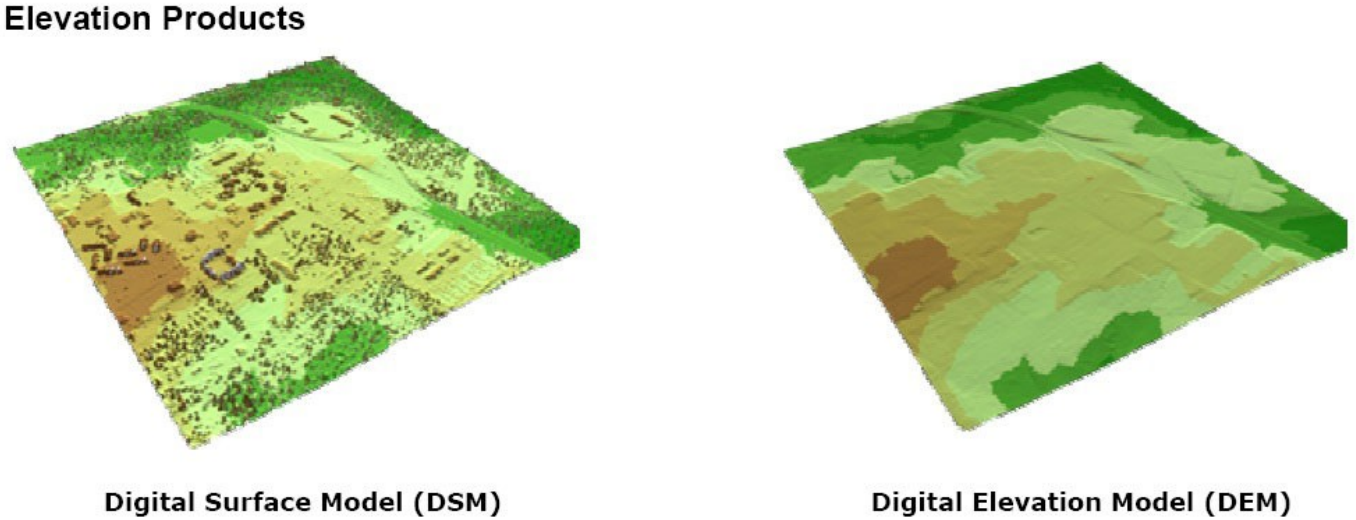




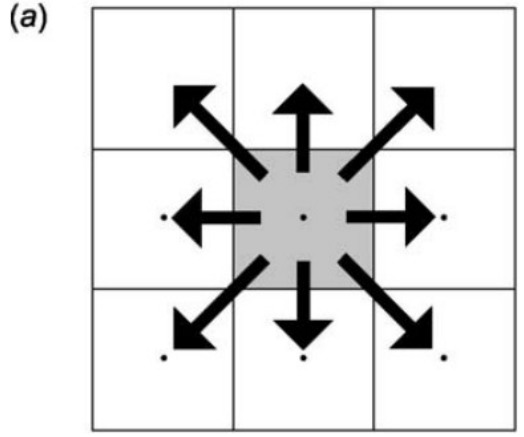
Cyfrowy model....

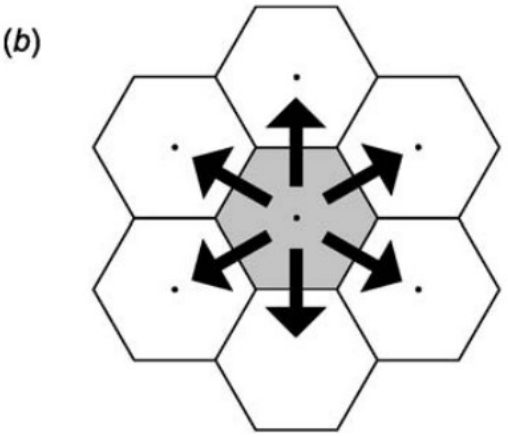
- DTM - Digital Terrain Model (NMT)
- DEM - Digital Elevation Model (NMW)
- DSM - Digital Surface Model (NM
- DHM - Digital Height Model (NM
- DGM - Digital Ground Model (NM
- DTED - Digital Terrain Elevation D

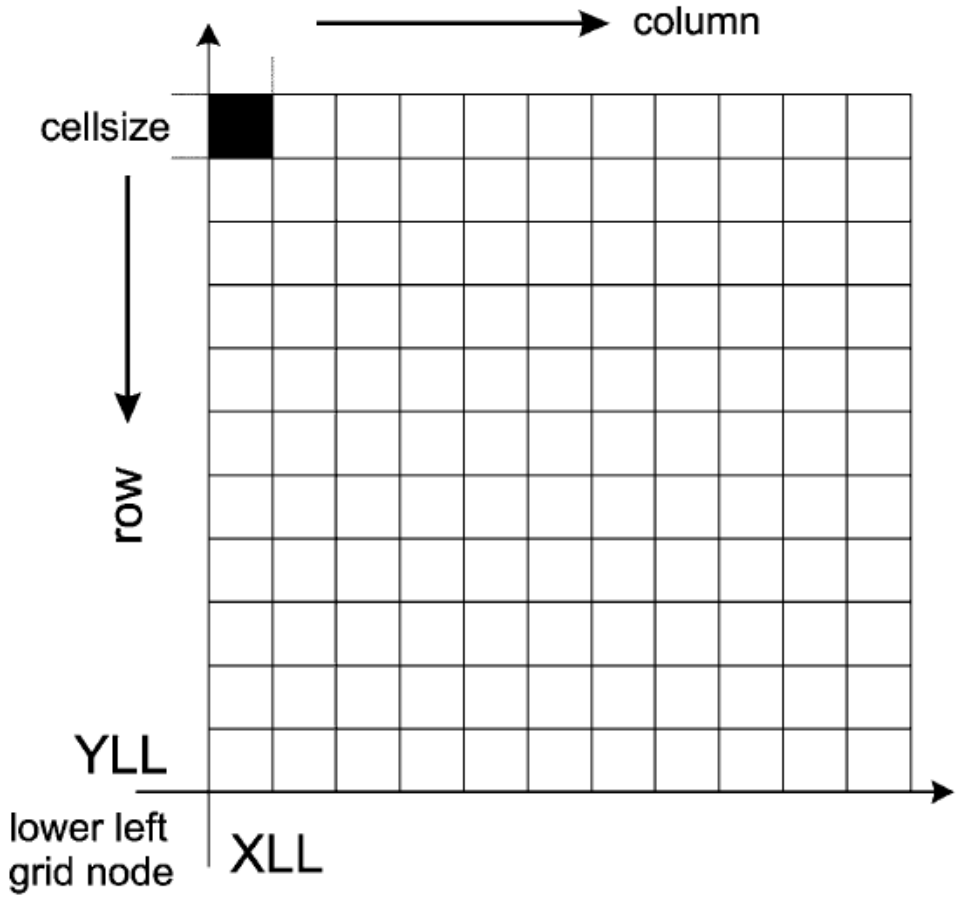




Organizacja danych w postaci siatki





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yllcorner 0
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14 11 18 11 18 19
19 15 13 21 23 25
20 20 19 14 38 45
24 20 20 28 18 49
23 24 34 38 45 51
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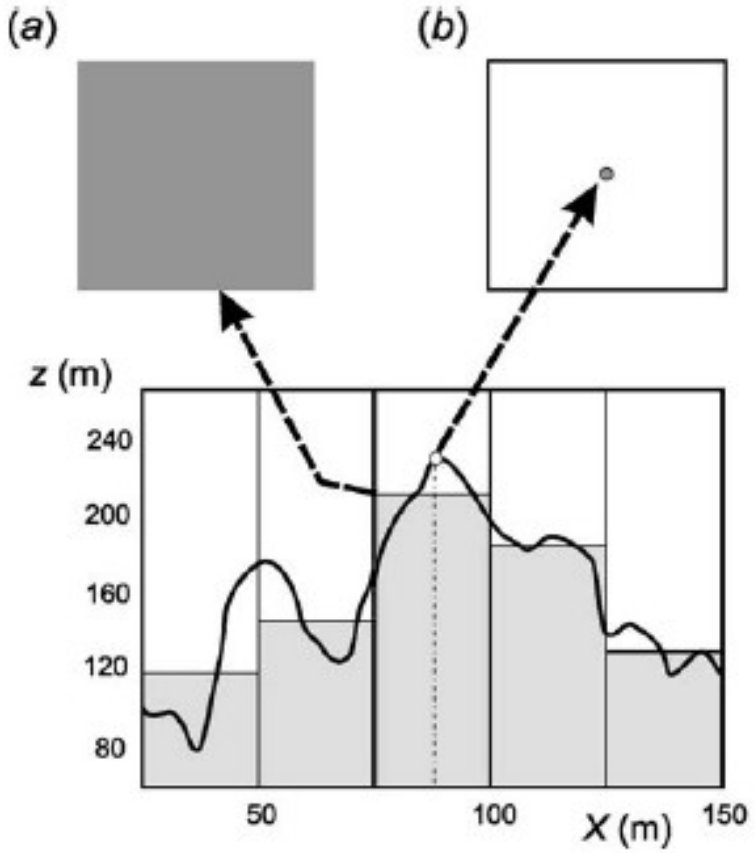
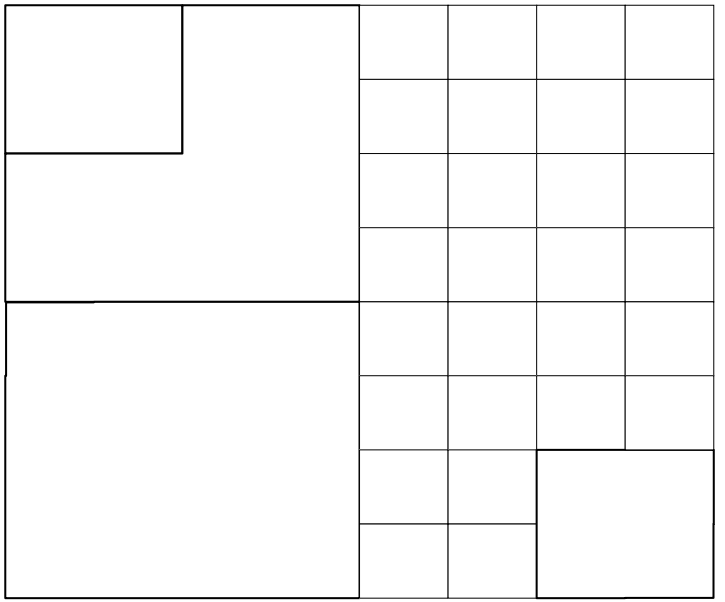
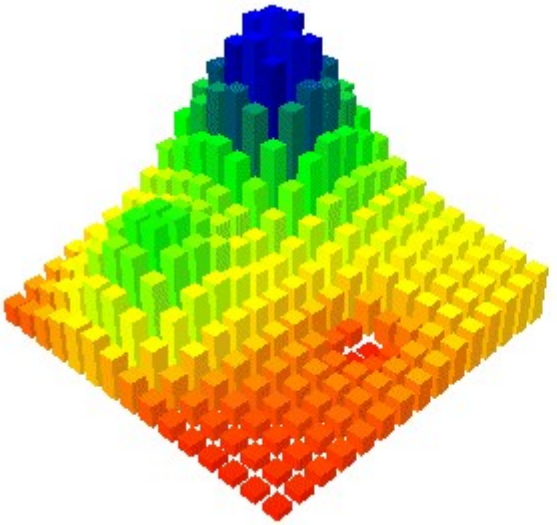
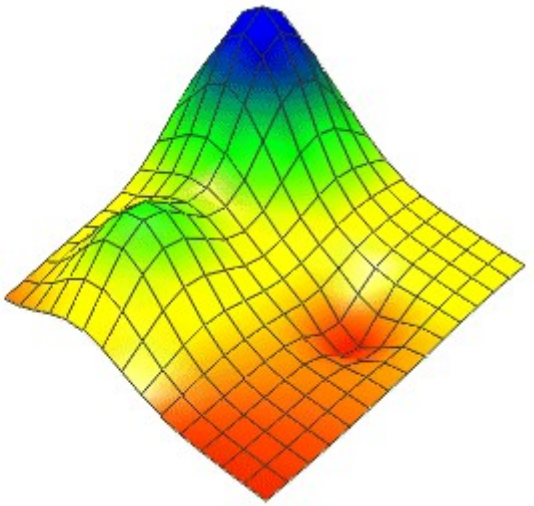
Co reprezentuje komórka?





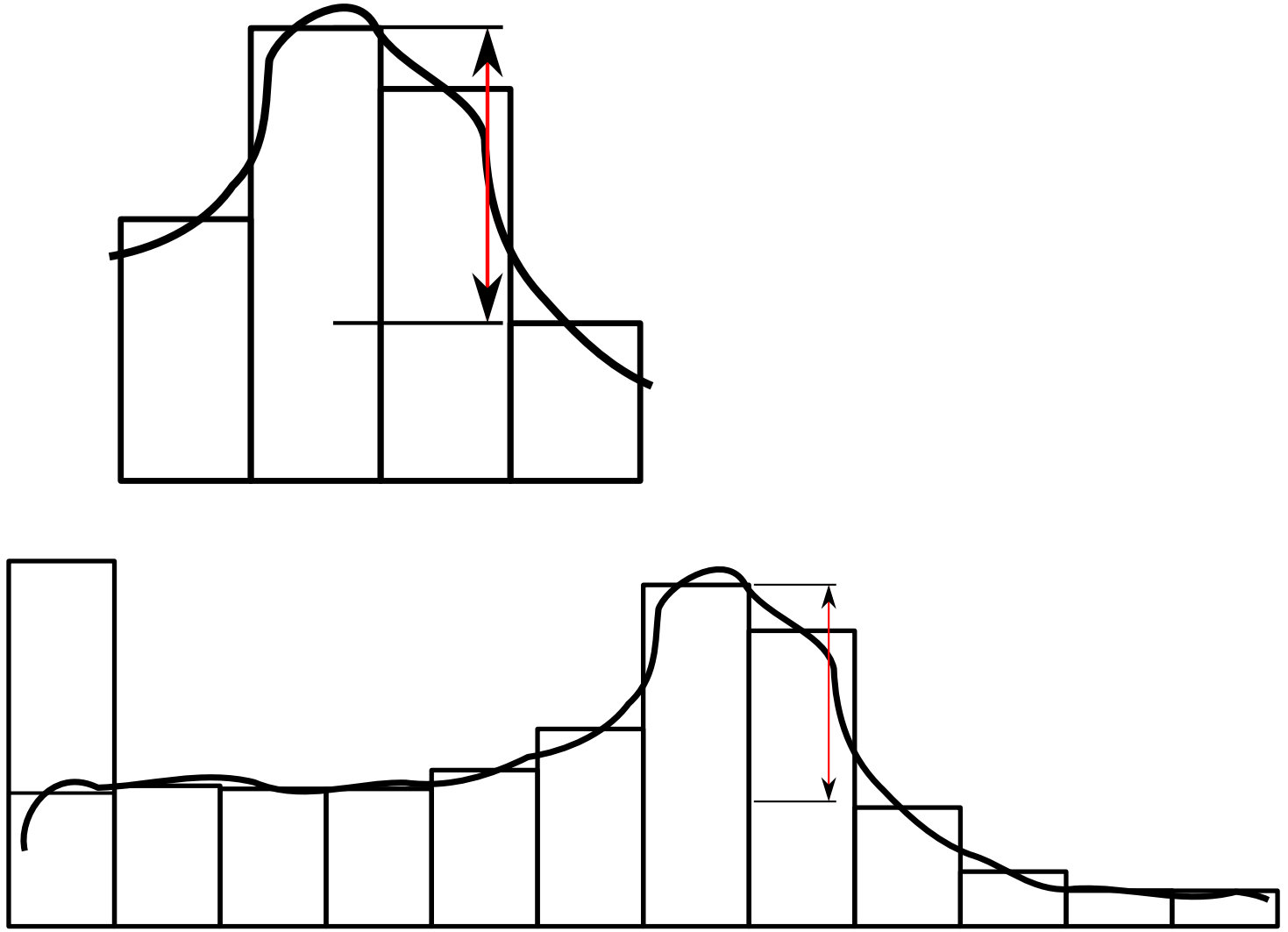




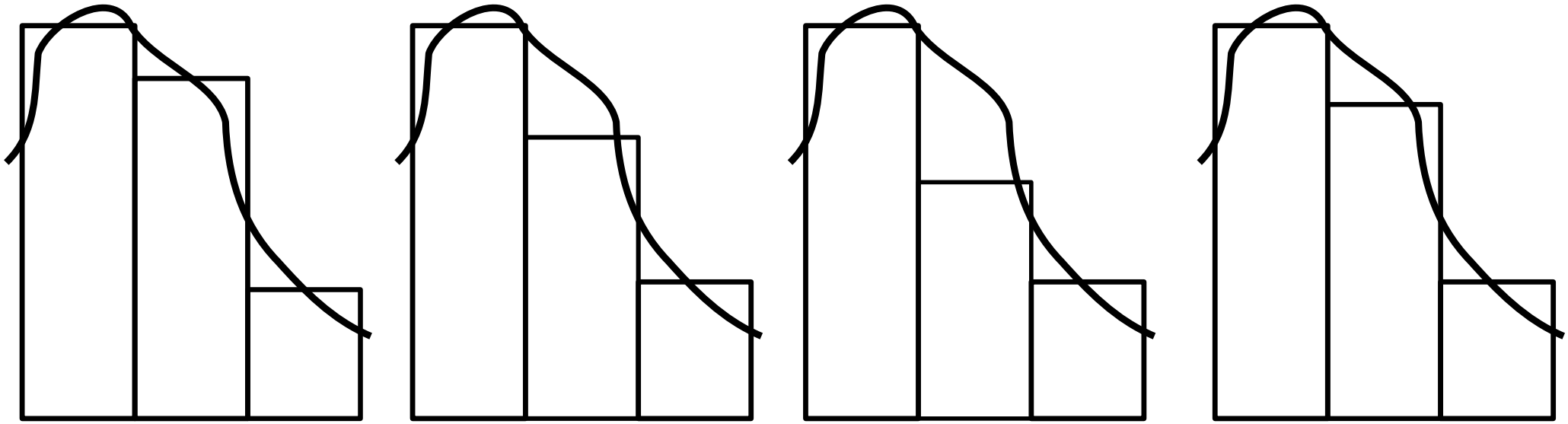
Koncepcja skali. Rozdzielczość

- Opis form terenu w skali „ludzkiej: **2 do 20** metrów na komórkę
- **Rozdzielczość** - określa stopień szczegółowości modelu. Im lepsza rozdzielczość tym bliższe sobie obiekty reprezentowane będą na modelu jako odrębne jednostki
- **Precyzja**- określa sposób zapisu wartości wysokości. Stosuje się: kategorie (klasy wysokości) liczby całkowite (precyzja 1 m) i zmiennoprzecinkowe (precyzja poniżej 1 cm)
- **Dokładność** – stopień zgodności z jakim pionowe i poziome położenie obiektu w rzeczywistości reprezentowana jest w modelu

Rozdzielczość pionowa



Jaką wartość reprezentuje komórka?



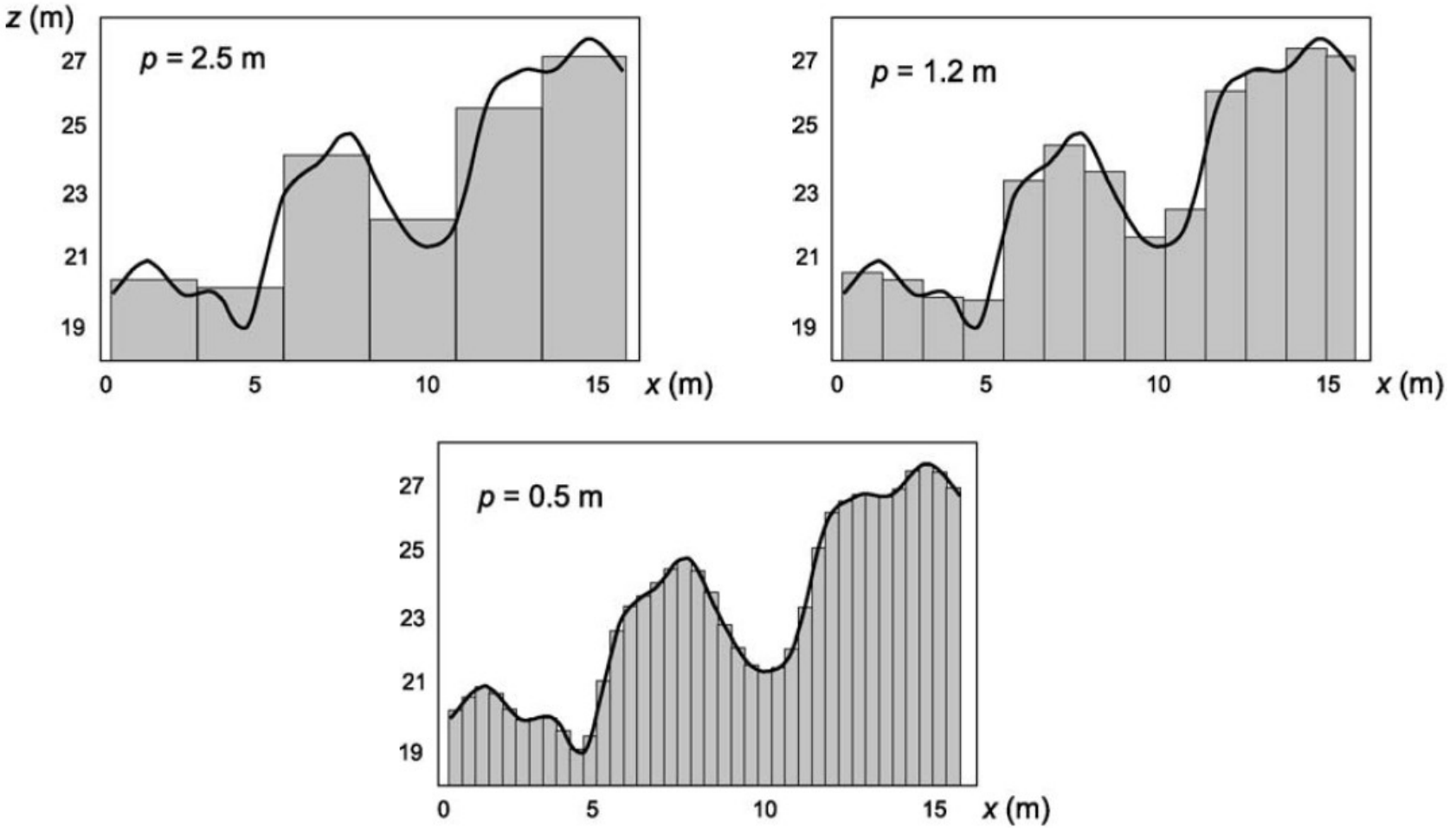
Centralna

Średnia

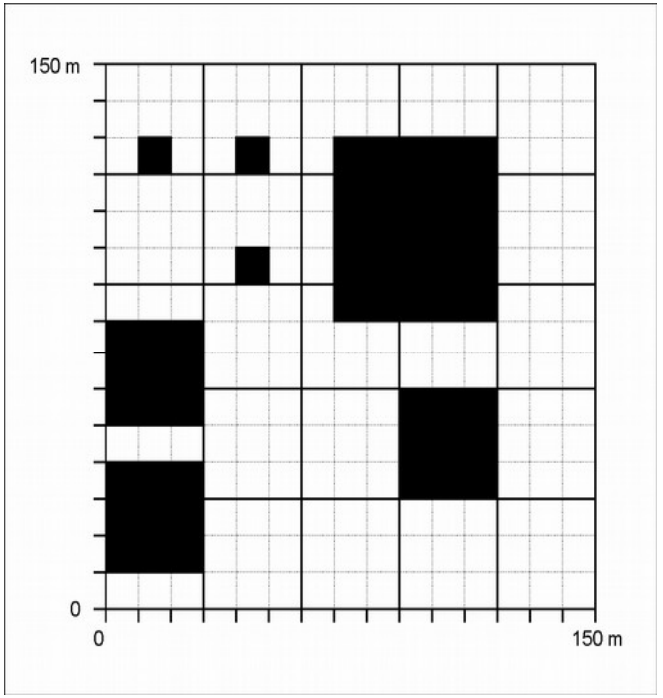
Optymalizowana

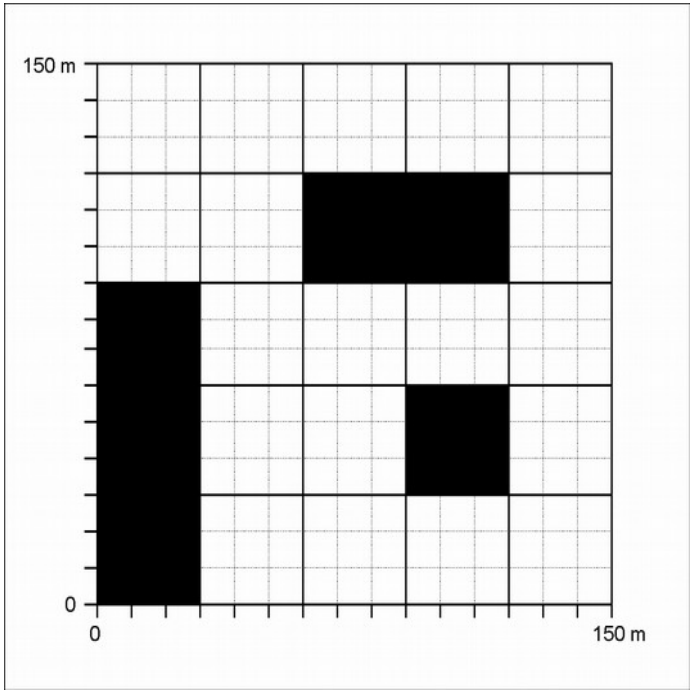
Mediana

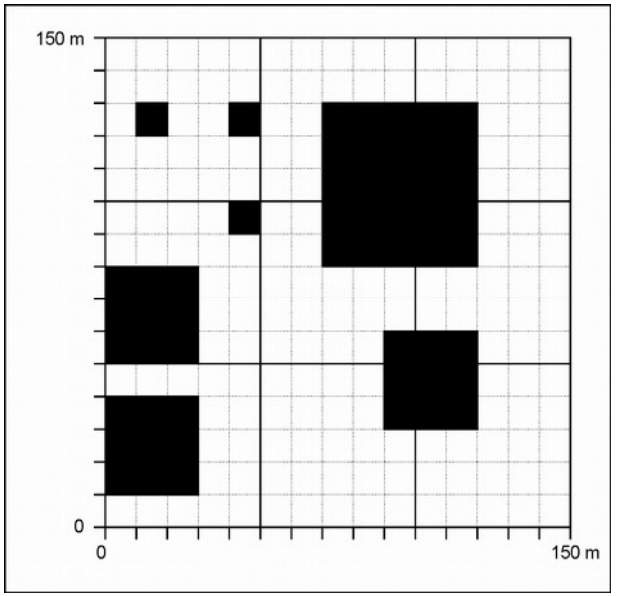
Rozdzielczość pozioma

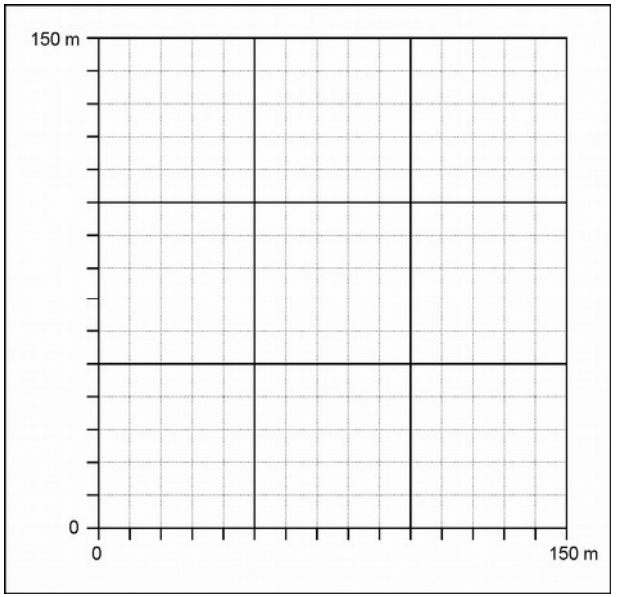


Wpływ rozdzielczości na zachowanie obiektów

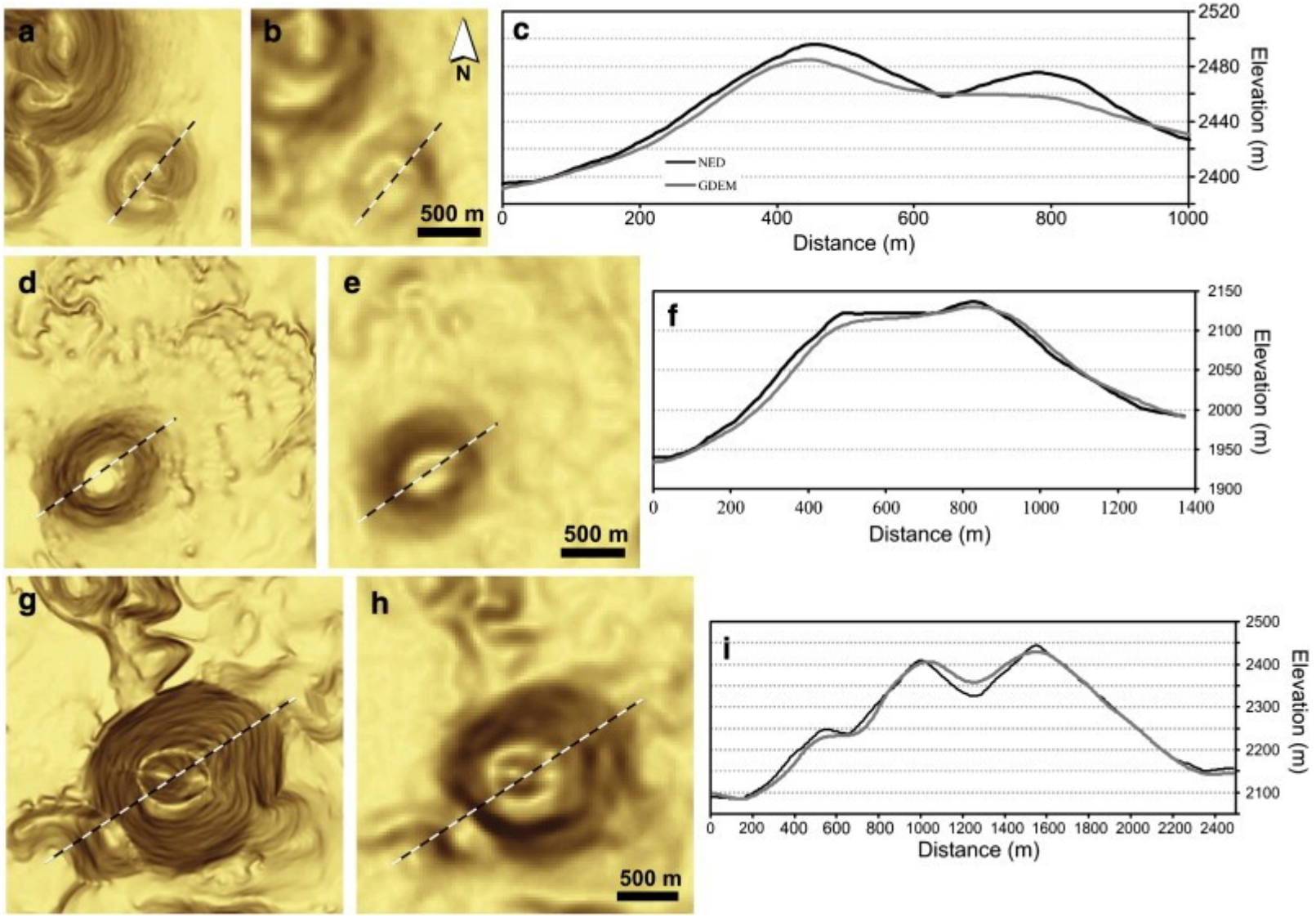




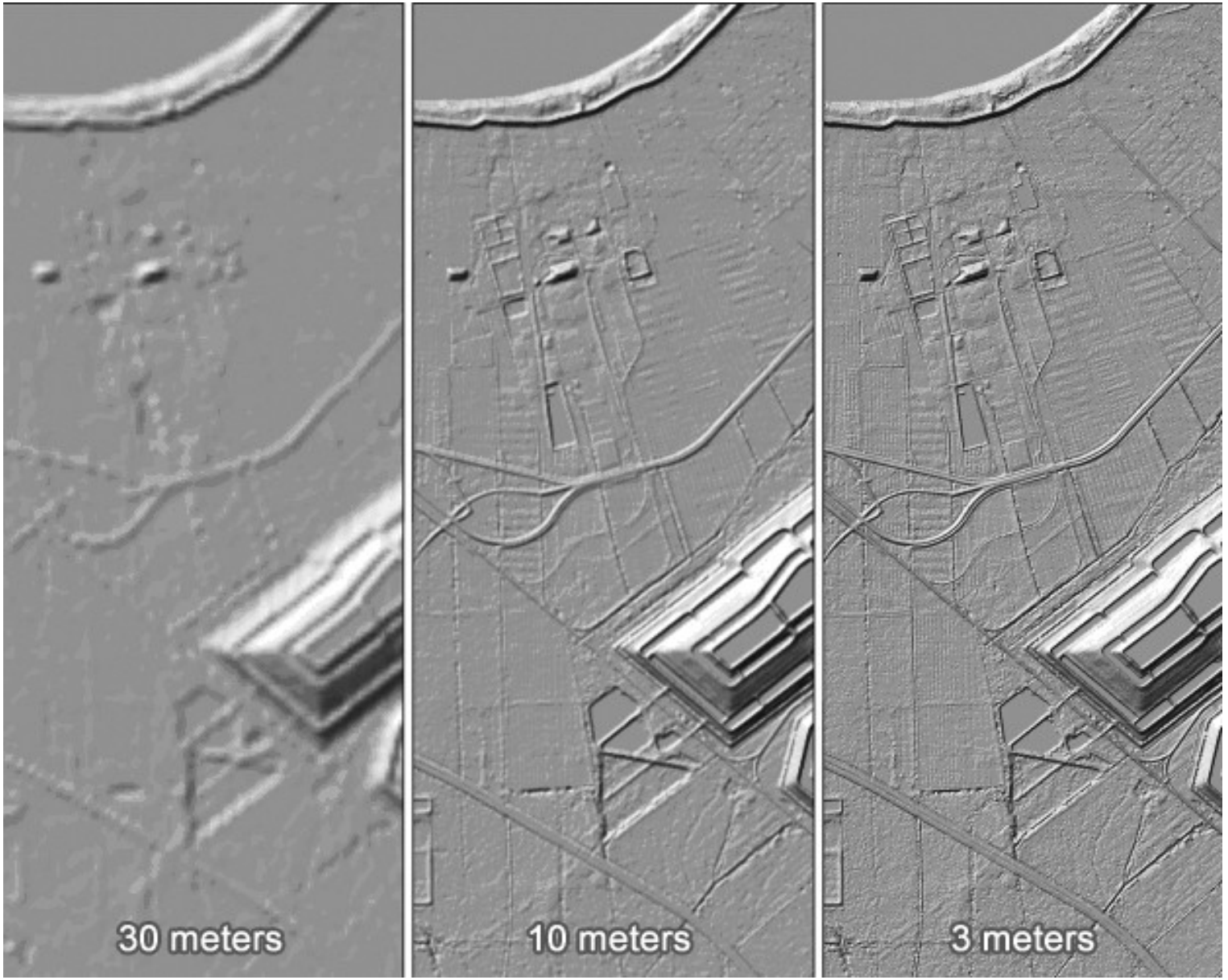




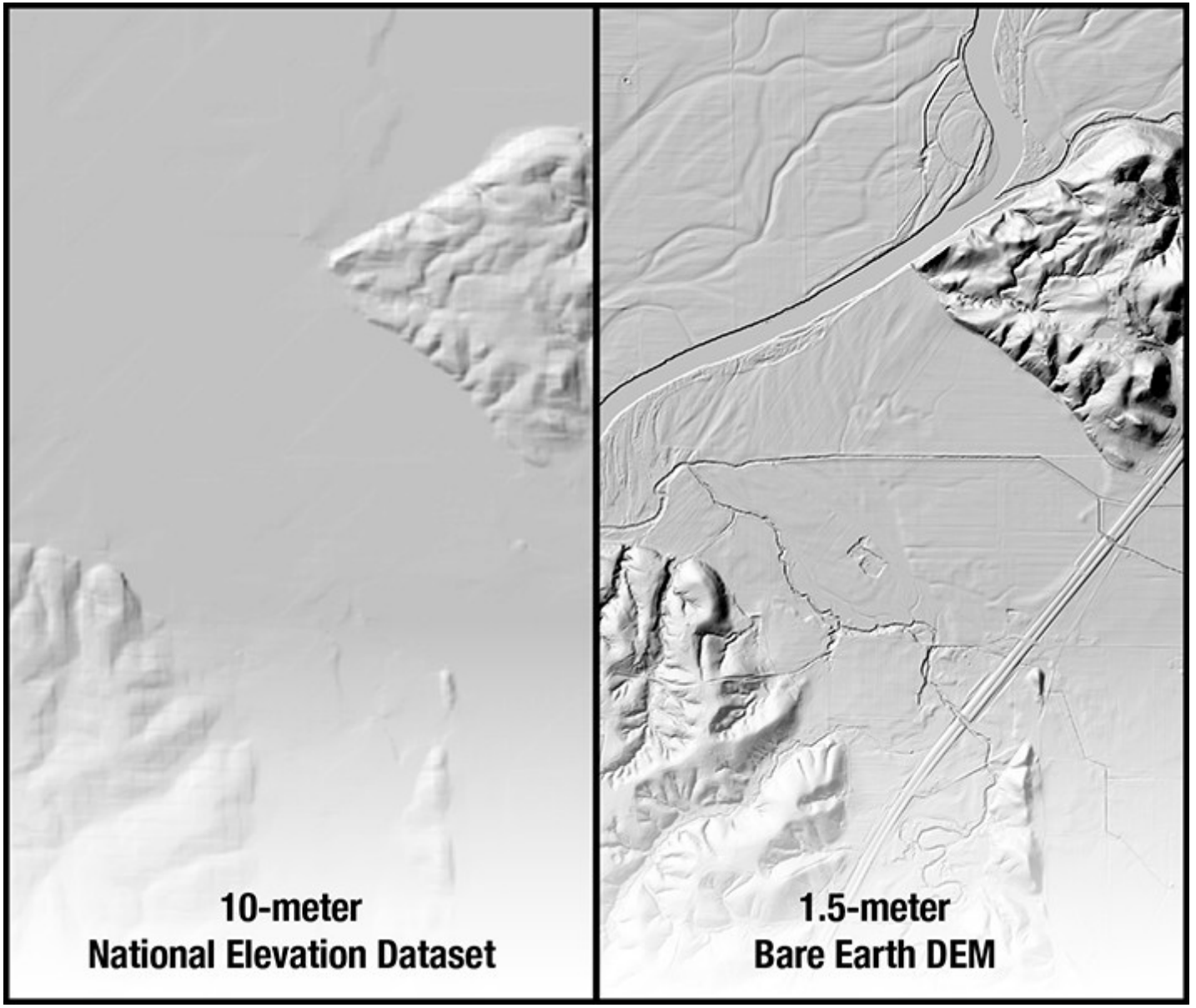
Wpływ rozdzielczości na rozpoznawanie form



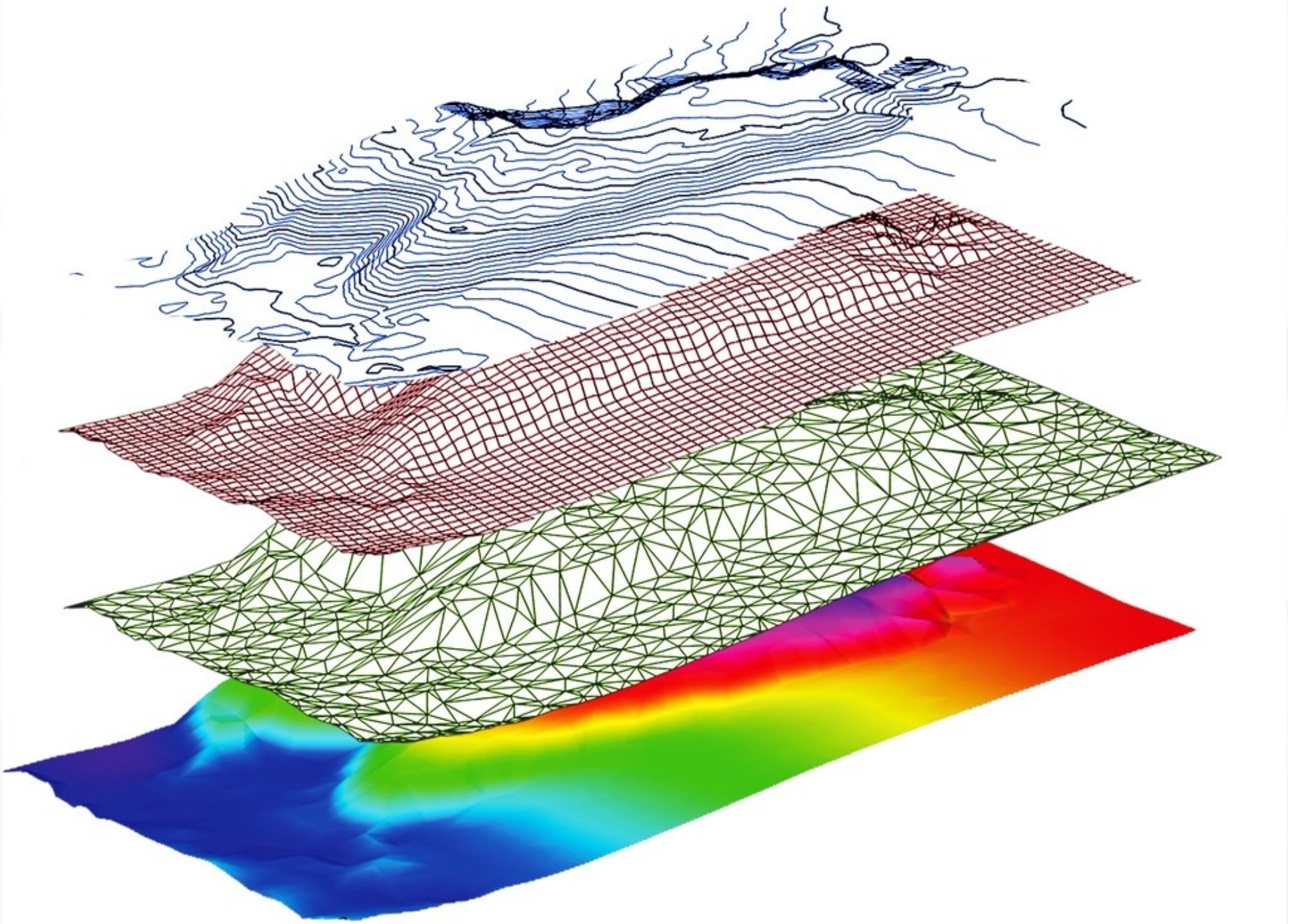
Wpływ rozdzielczości na postrzeganie



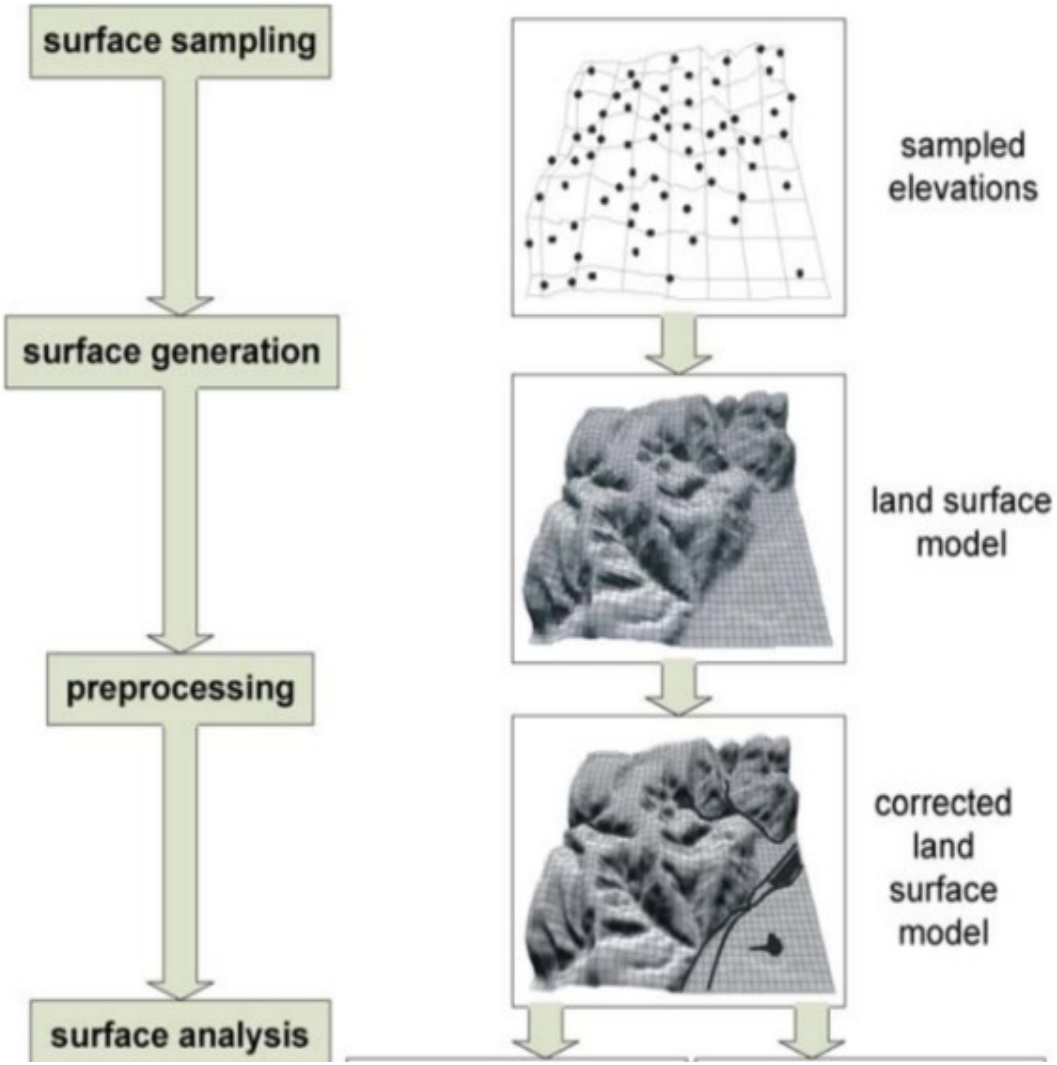
Wpływ rozdzielczości na zachowanie obiektów



Podsumowanie: Trzy metody zapisu powierzchni



Podsumowanie: Tworzenie modelu terenu



ANALIZY TERENU