

Image Processing and Analysis of Change Detection in the Land Cover Types of the Sudetes by Idrisi GIS



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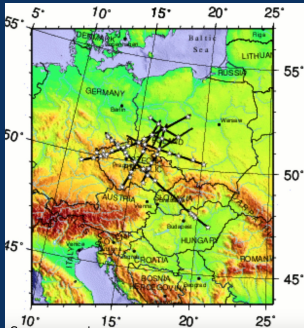
Literature

Thanks

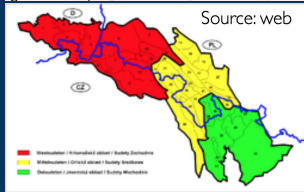
Bibliography



Geographic Location of the Sudetes



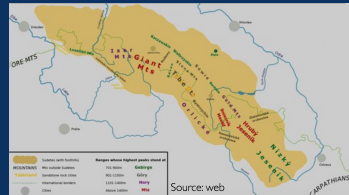
Source: web



The name Sudetes has been derived from Sudeti montes. Sudetes consist of 3 parts:

1. Western Sudetes,
2. Central Sudetes,
3. Eastern Sudetes

Study area is Western Sudetes: Karkonosze Mountains and Iżera Mountains. Karkonosze National Park (Karkonoski Park Narodowy, KPN), created in 1959. Area: 55.8 km^2 .



Source: web



Characteristics of the Study Area

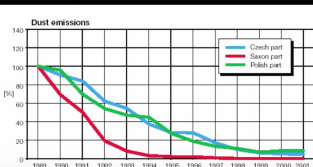
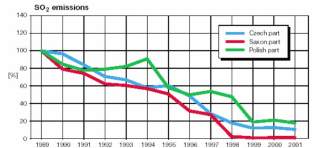
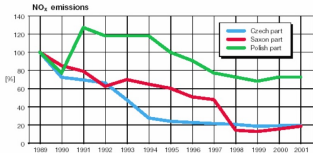
The city of Karpacz - one of the most notable towns located long the border of the Czech Republic and Poland, extending ca. 300 km between the Elbe and Oder rivers, Erzgebirge and Carpathians. KNP encompasses sensitive higher parts of the mountain range (altitude > 900-1000m) and special nature reserves below this zone.

- Geology: Granite, schist, shale and calcite
- Tectonics: Caledonian, Varescan
- Period: Neoproterozoic, Palaeozoic :
- Vegetation:
 - Alpine vegetation zone - 1,400 m: large rocky deserts
 - Subalpine zone above the timber line - 1,250 to 1,350 m: knee timber, mountain mat-grass meadows and subarctic highmoor, alpine grasslands
 - Spruce, mixed forest



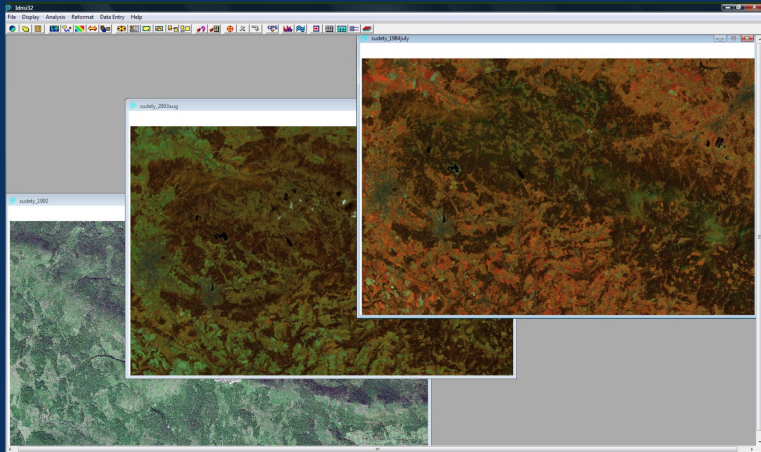
Environmental Problems

- Acid Rain: Between 1981-1987
- Sources: NO_x, SO₂ and dust from 3 Lignite mines (Turoszow field, Lusatian field and North-Czech field) and 7 power plants
- Impacts: 11,000 ha of spruce forest was destroyed in Sudety mountains and 15,000 hectares in North West Czech Republic and Saxony



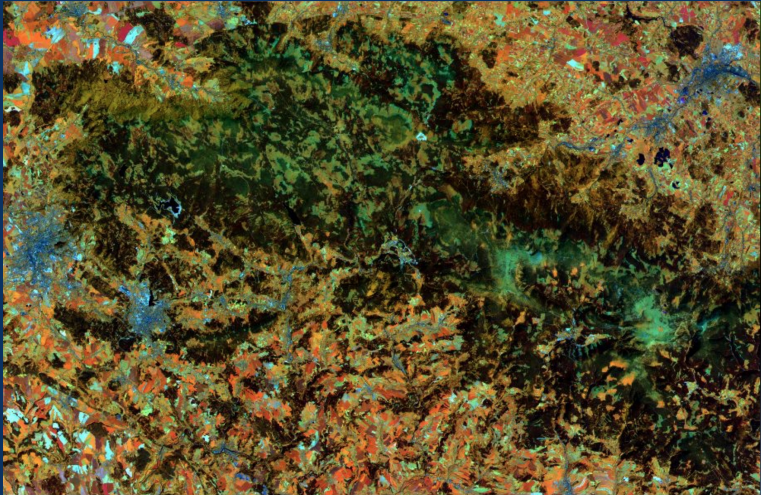
Data

Idrisi GIS: visualizing raster images. 3 Raster images cover period of ca. 20 years (1984, 11 July, 1992 and 2003, 17 August).



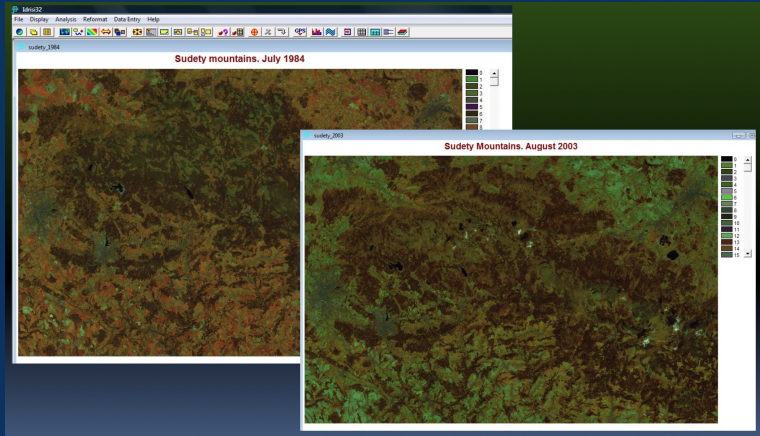
Raster Map of Karkonosze Mts

Raster map of the Karkonosze Mts



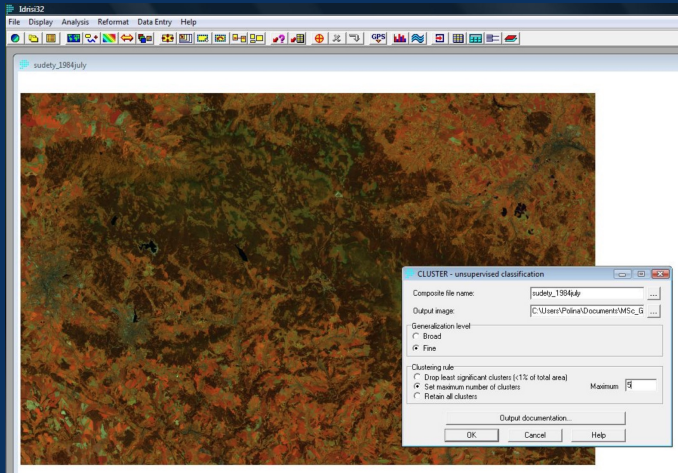
Raster Images of Sudetes

Raster Images of Sudetes Mts: 1984 and 2003



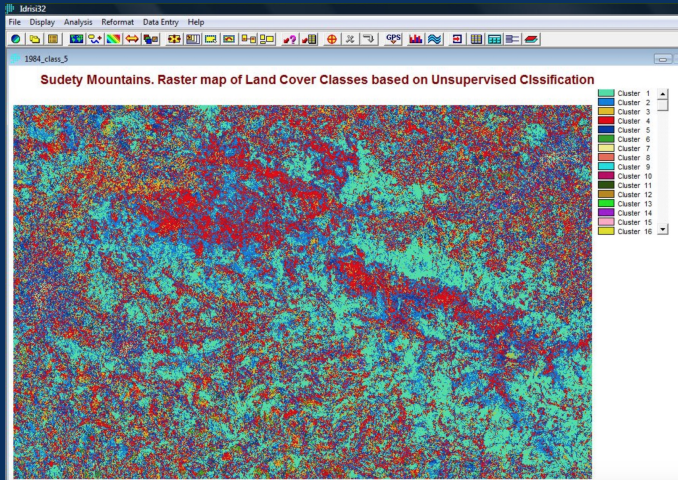
Unsupervised Classification by CLUSTER

Methods of this research are based on using IDRISI GIS. Unsupervised image classification was done using CLUSTER function



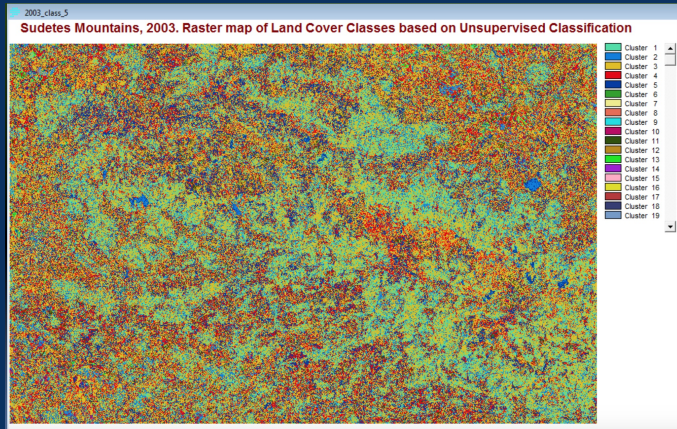
1984

Map of Land Cover Classes. Results of the Unsupervised Classification: July 1984.



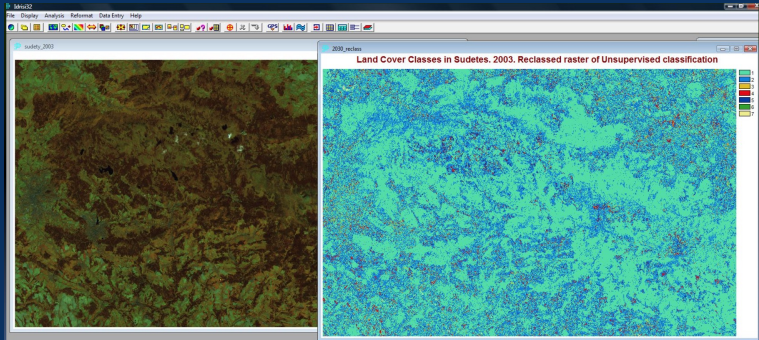
2003

Map of Land Cover Classes. Results of the Unsupervised Classification. August 2003.



Reclassification

Land Cover classes in Sudetes, 2003. Re-classed raster of Unsupervised Classification. After reclassification we can distinguish more clearly main land cover classes: Light blue - coniferous; dark blue - deciduous, red - fresh vegetation; orange - fields, light yellow - urban areas.



IDRISI GIS: Supervised Classification

Supervised Classification of IDRISI GIS has 2 approaches.

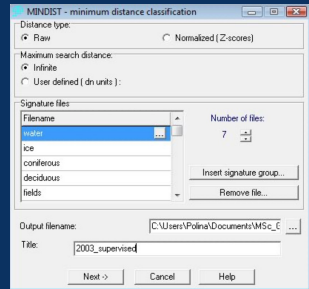
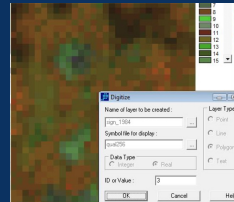
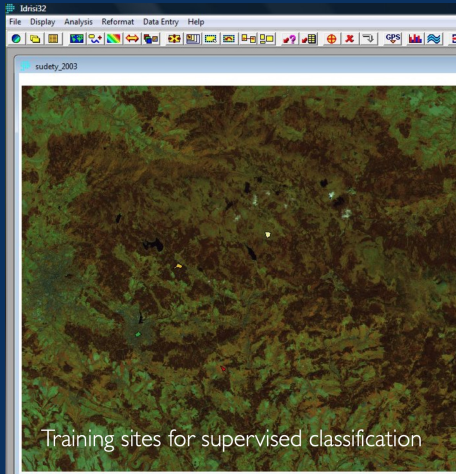
Minimal Distance (MINDIST) Method

This is the the simplest and fastest method of all classifiers. However, prone to incorrect classifications.

Maximal Likelihood (MAXLIKE) Method

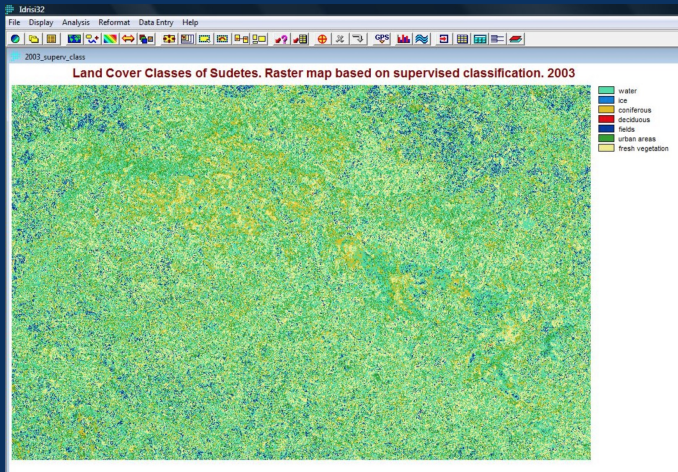
Evaluates the standard deviation of the reflectance values above the mean. The slowest technique but more accurate classification (provided the training sites are good).

Supervised Classification: MINDIST Algorithm



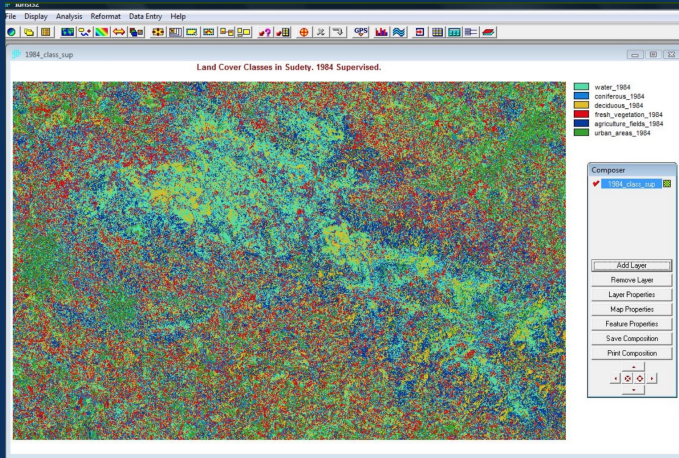
Raster Map 2003 by MINDIST

Raster map of Land Cover Classes, 2003 (Supervised Classification, MINDIST)



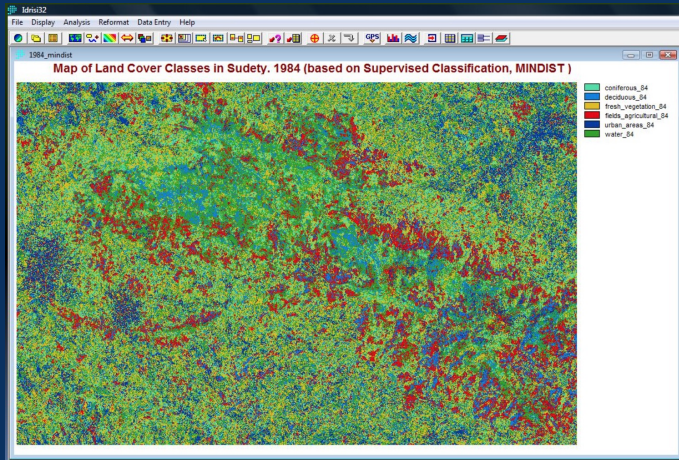
Raster Map 1984 by MINDIST

Raster map of Land Cover Classes. 1984 (Supervised Classification, MINDIST)



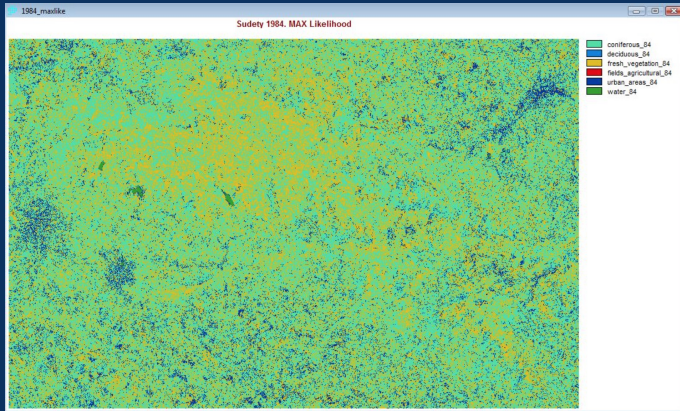
Supervised Classification by MINDIST, 1984

Raster map of Land Cover Classes. 1984.



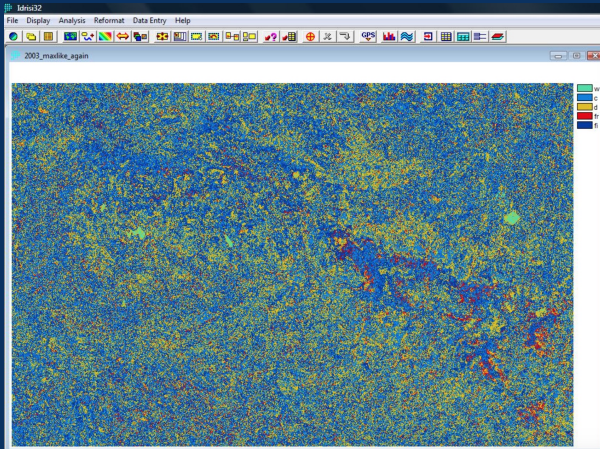
Supervised Classification by MAXLIKE

Supervised Classification: Maximal Likelihood (MAXLIKE) algorithm of IDRISI GIS. Land Cover Classes, 1984. MAXLIKE approach.



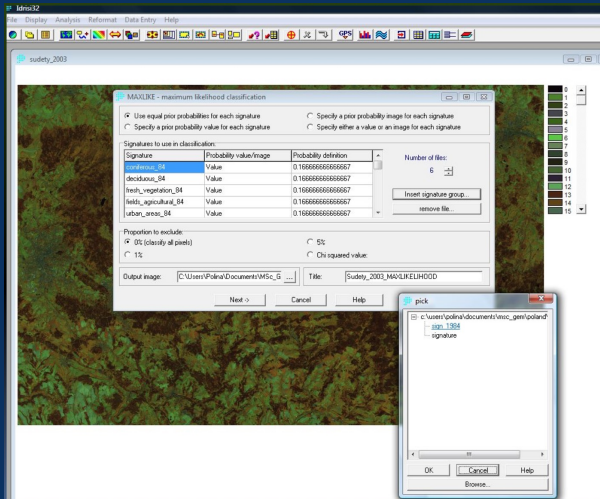
Land Cover Classes: MAXLIKE approach

Supervised Classification: Maximal Likelihood function of IDRISI.
Land Cover Classes, 2003. MAXLIKE approach.



Supervised Classification: MAXLIKE

Supervised Classification: Maximal Likelihood function



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Thanks

Thank you for attention !



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