Presentation of the GEM students:
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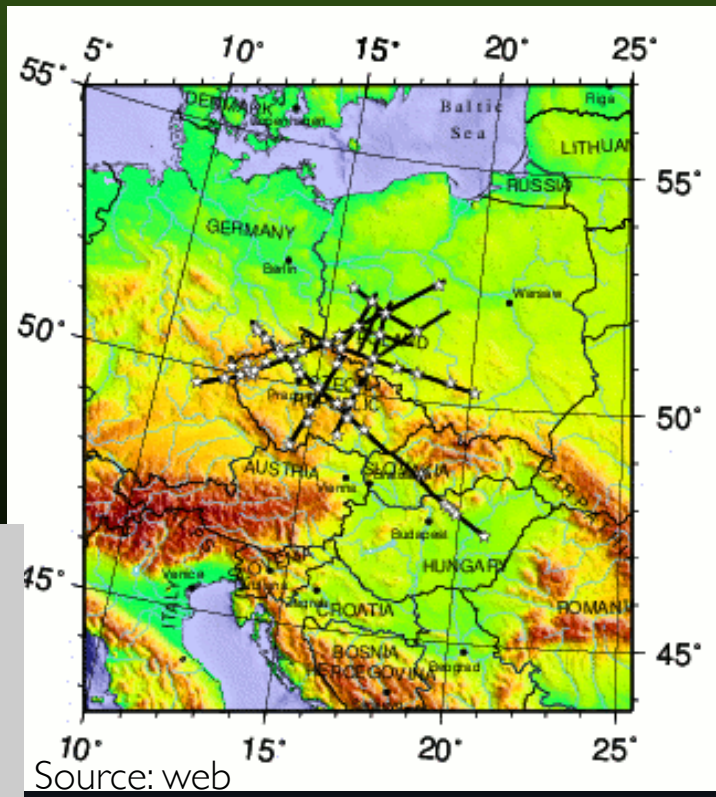
IMAGE PROCESSING AND ANALYSIS OF CHANGE DETECTION IN THE LAND COVER OF THE SUDETES

Geographic location of the Sudetes

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

- Western Sudetes, Central Sudetes, Eastern Sudetes

The research area lies in Western Sudetes,
Karkonosze Mountains and *Izera Mountains*.
The city of *Karpacz* - one of the most notable towns.
along the border of the Czech Republic and Poland,
extending c.185 mi (300 km) between the Elbe and
Oder rivers, Erzgebirge and Carpathians



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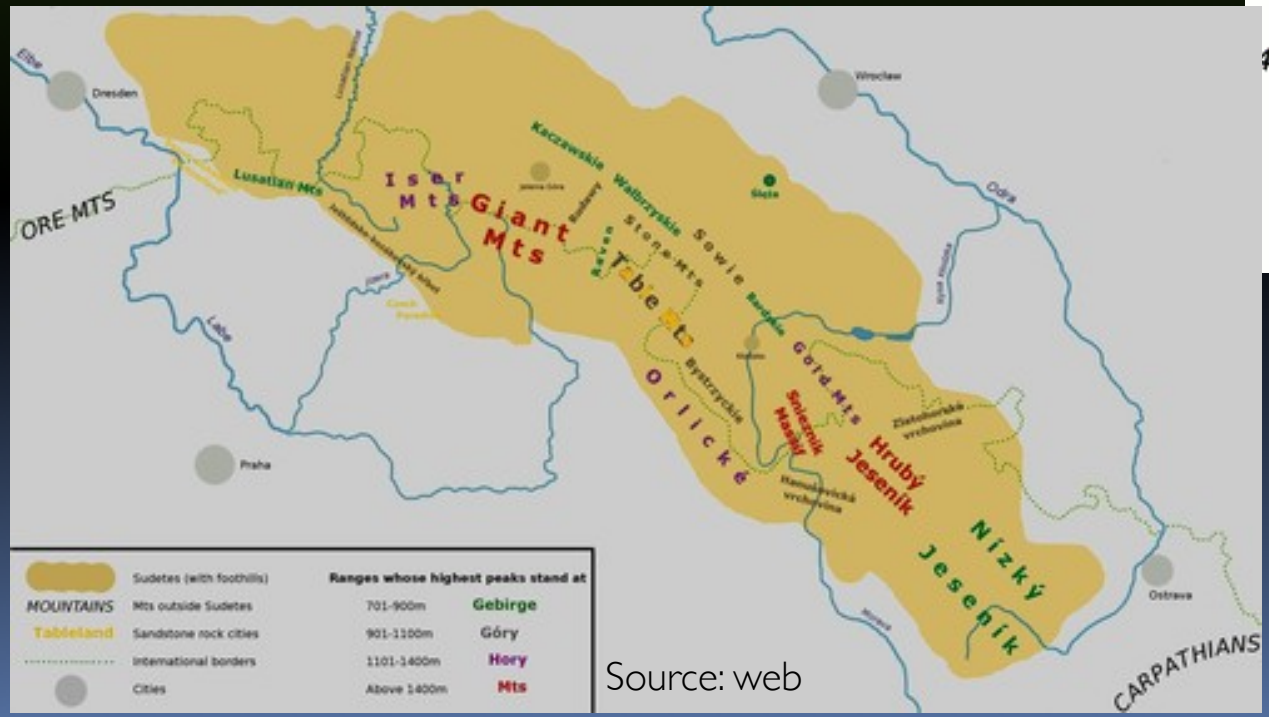

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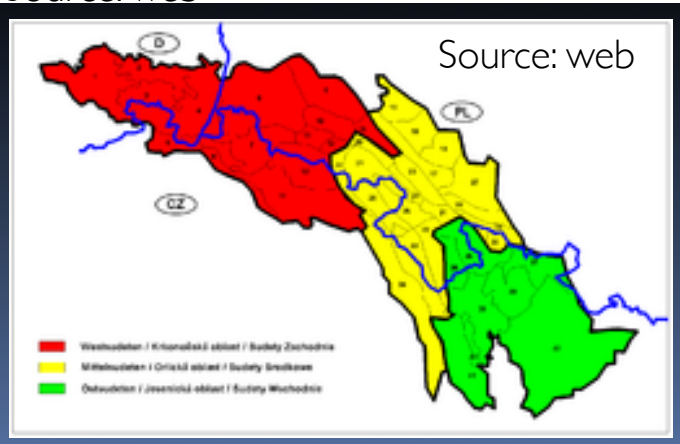

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Characteristics of the research area and problem definition

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,

Krkonose mountains. Aerial view

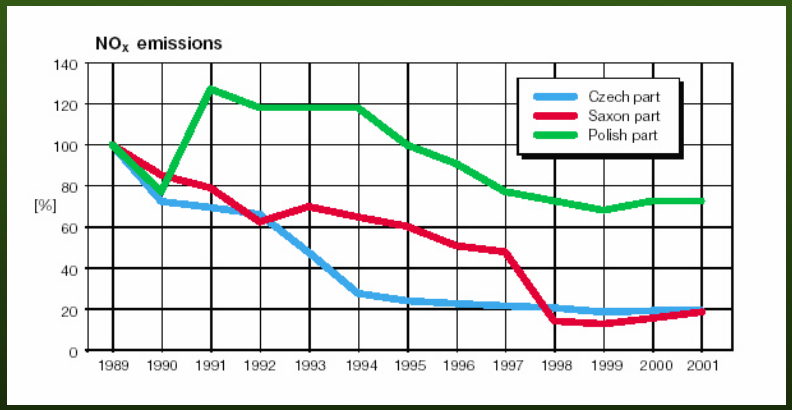
Nature protection:

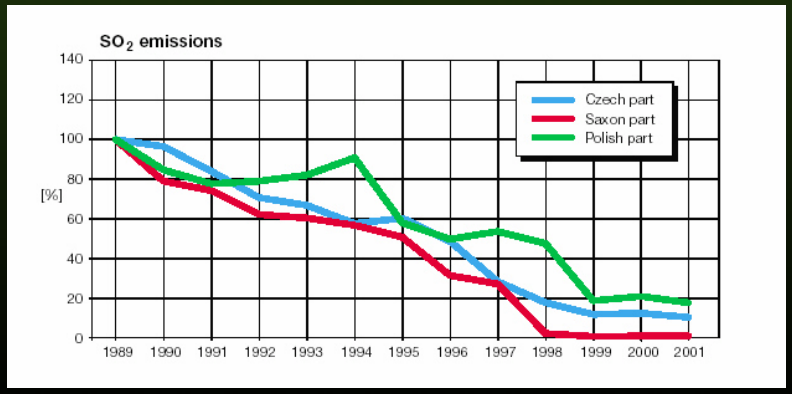
Karkonosze National Park

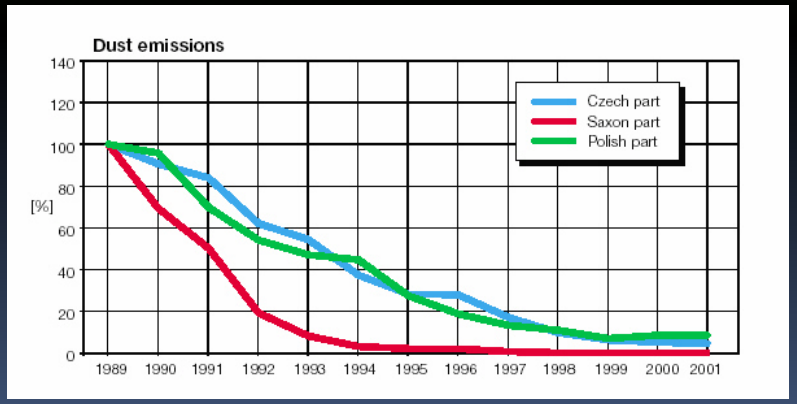
(Karkonoski Park Narodowy, KPN),
created in 1959; covers an area of 55.8 km 2.
It covers the highly sensitive higher parts
of the mountain range (altitude of 900–1000m)
and some special nature reserves
below this zone.

Ecological Disaster in Sudety Mountains

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



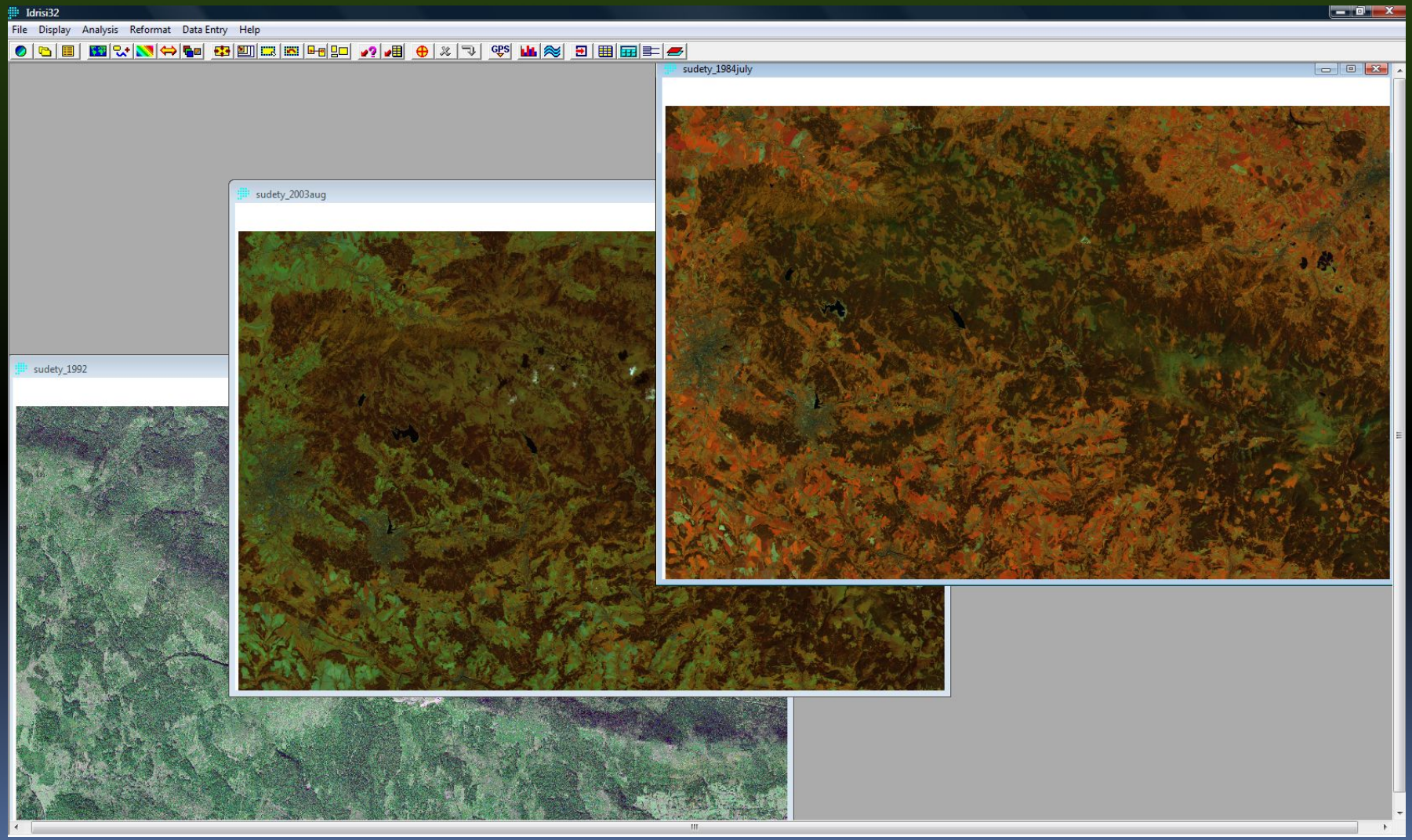




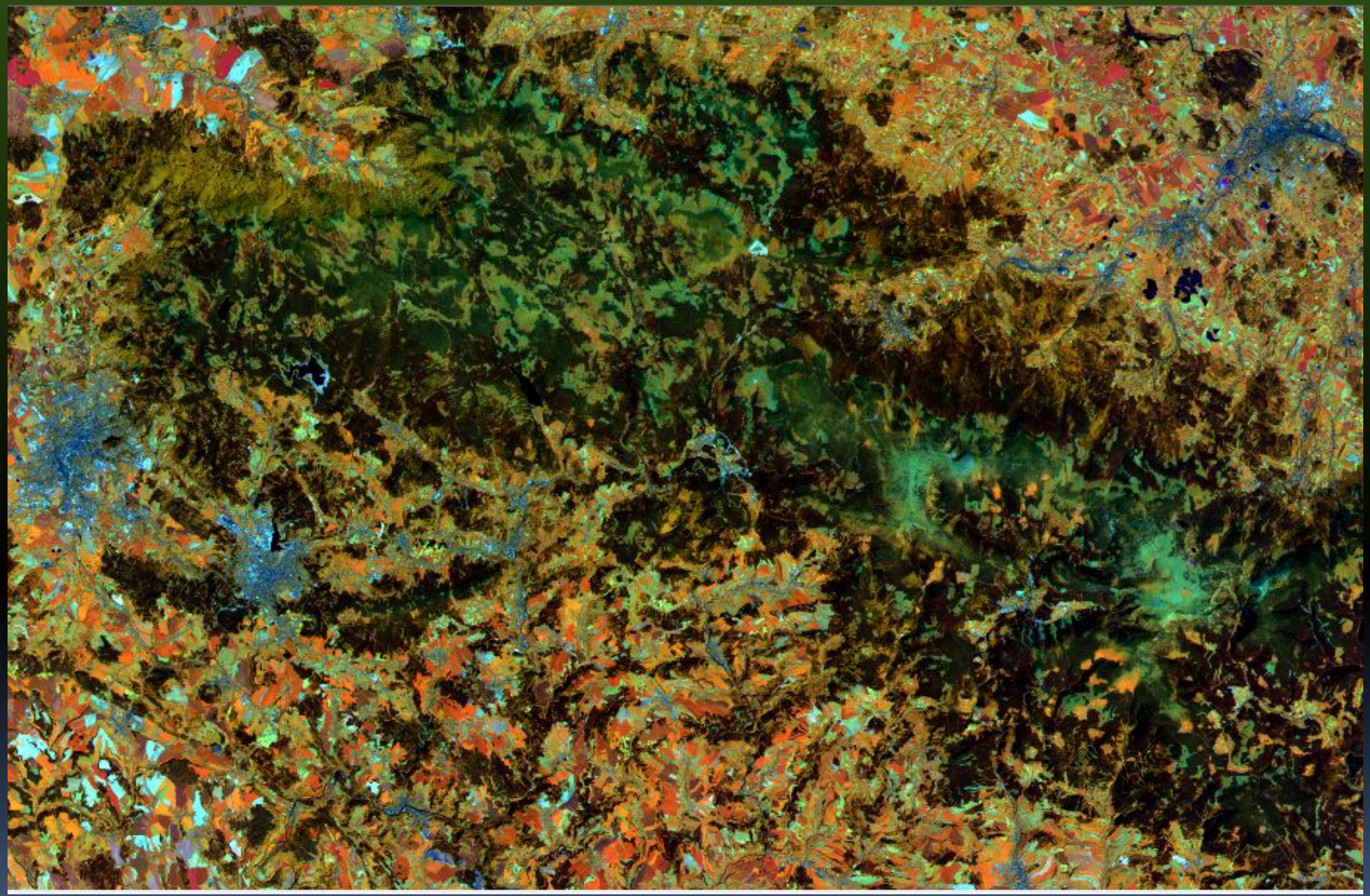
Raster images. Visualisation in Idrisi

The raster images cover period of 20 years (84-03)

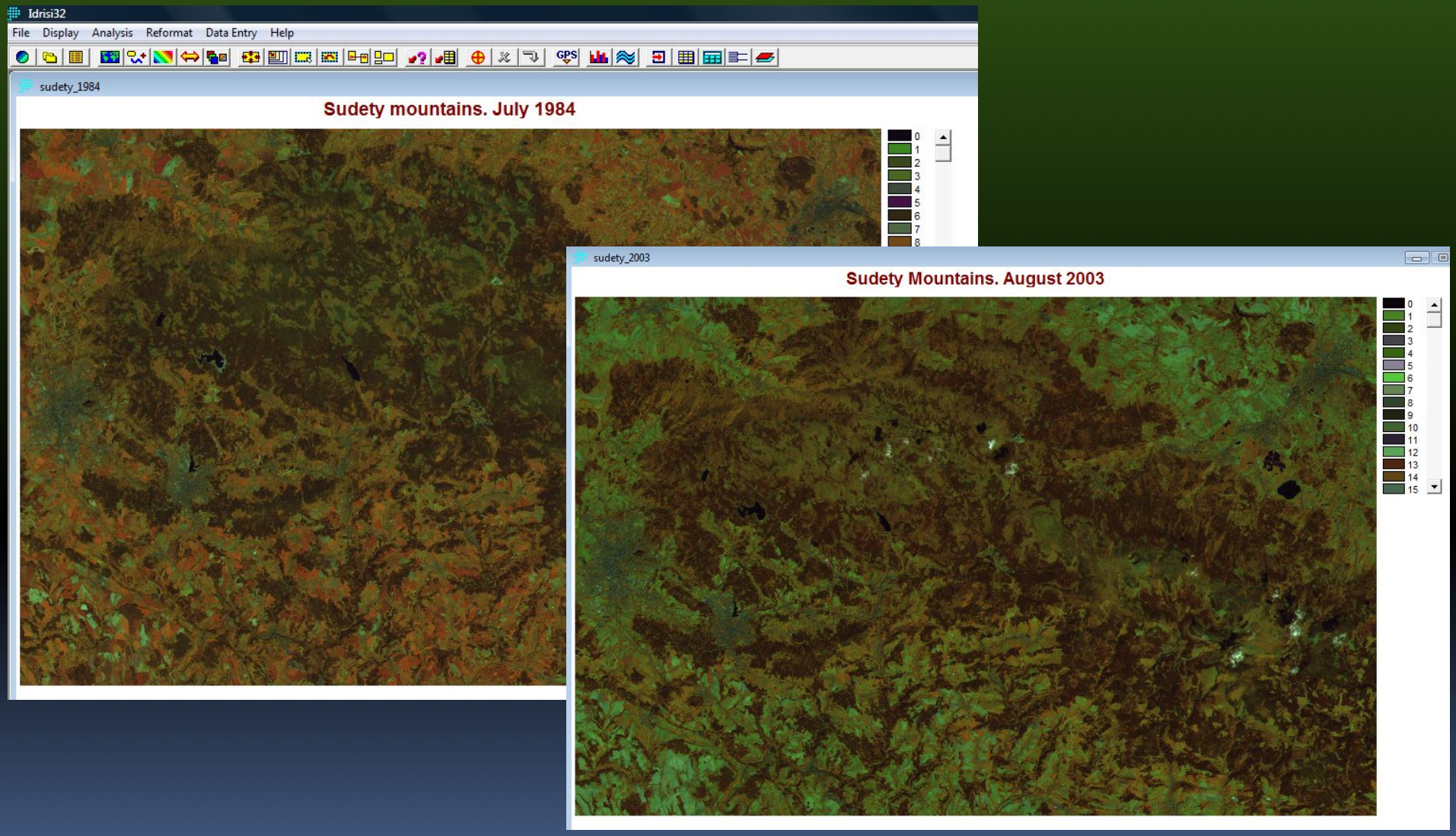
- 1984, 11 July
- 1992
- 2003, 17 August



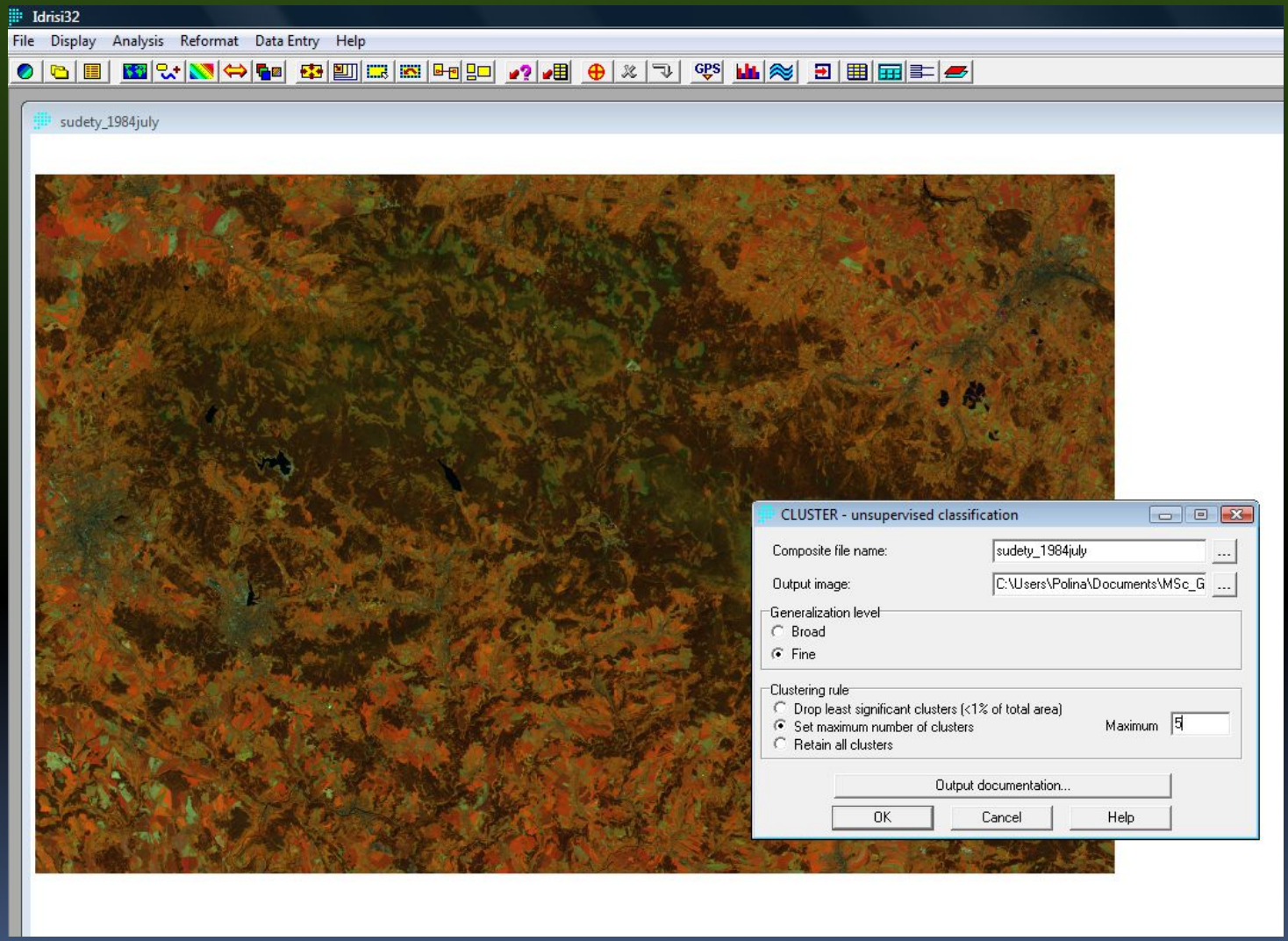
Raster map of the Karkonosze mountains



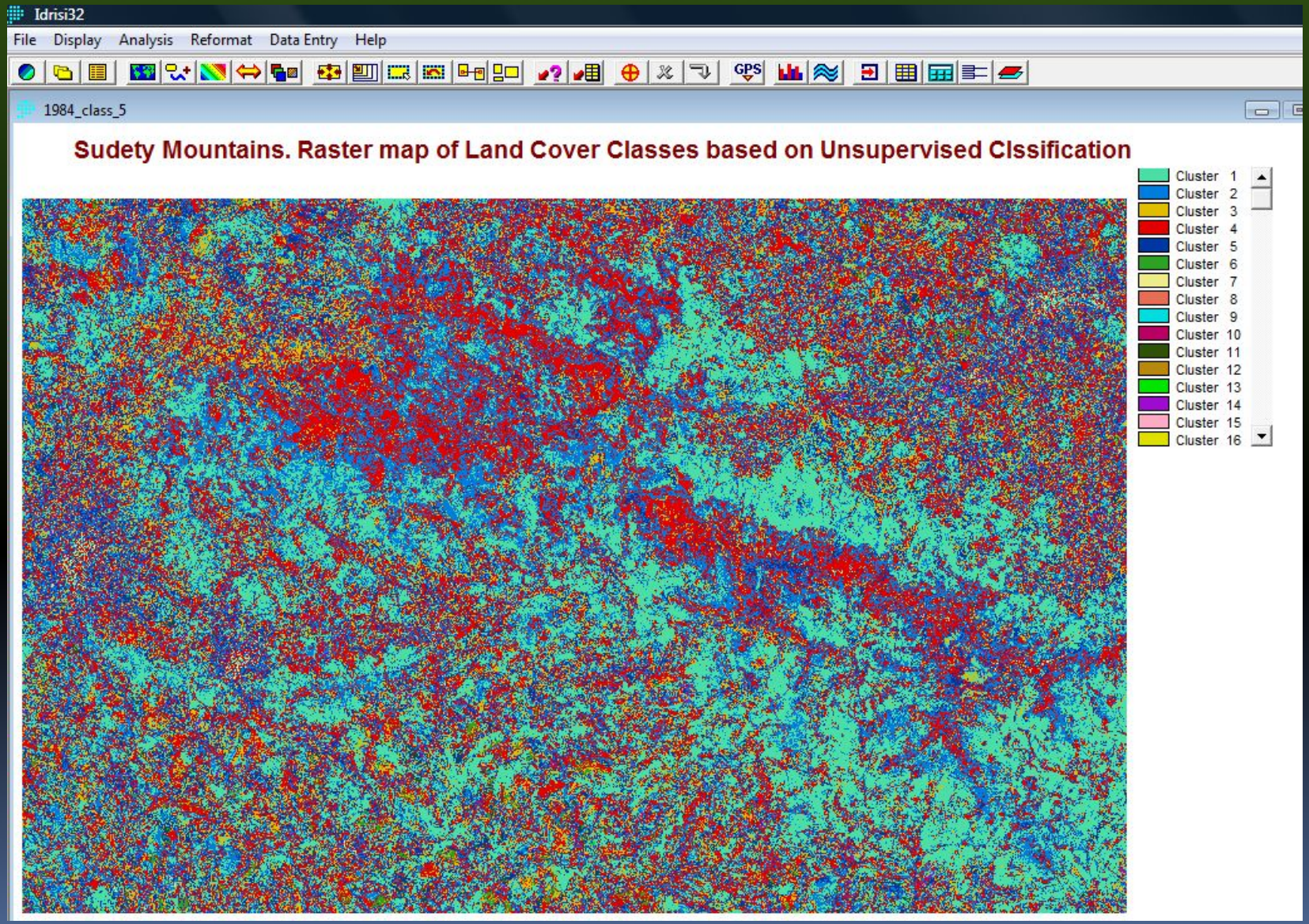
Images of Sudetes: 1984 and 2003



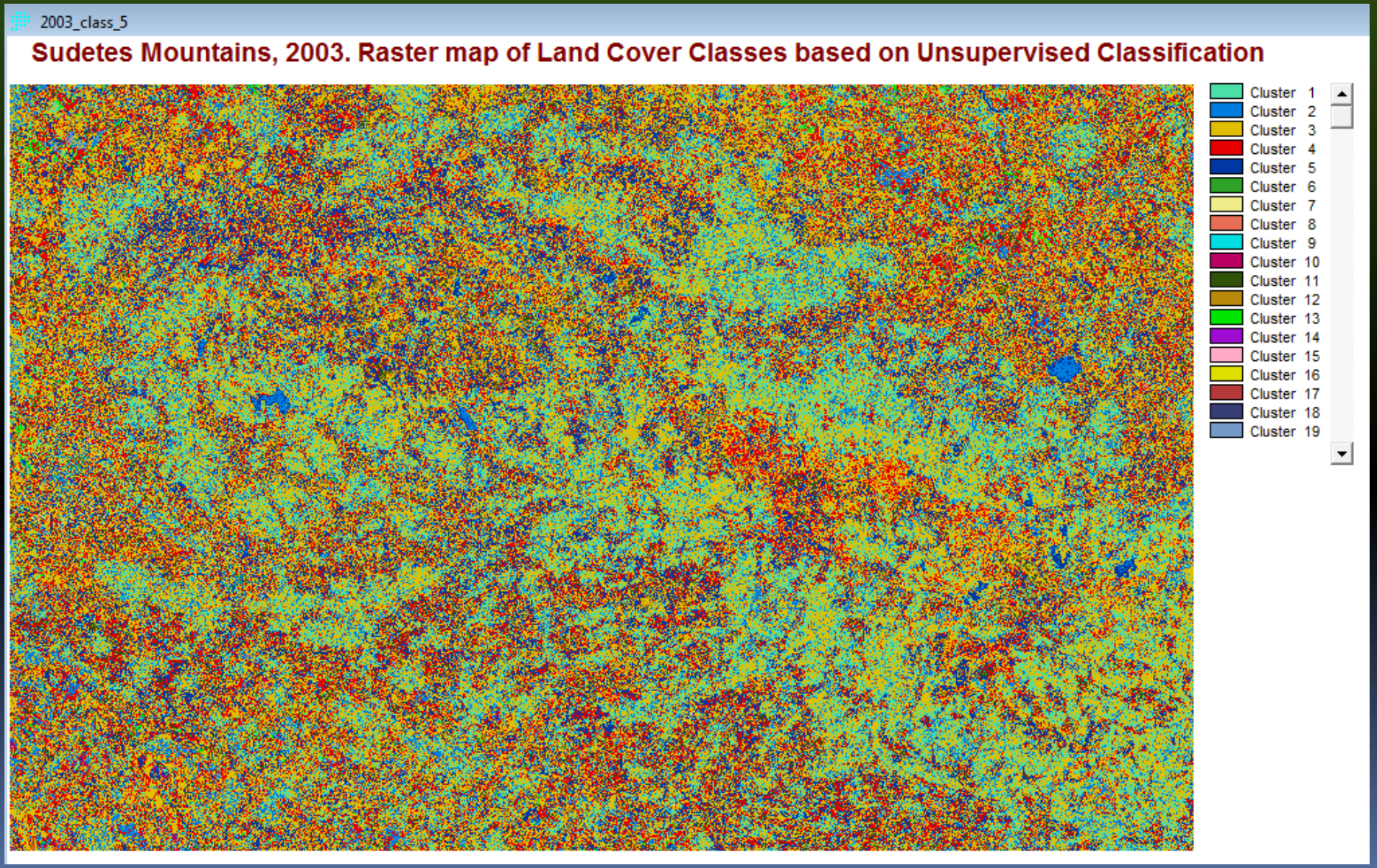
I. Unsupervised Classification: *CLUSTER* function of IDRISI



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

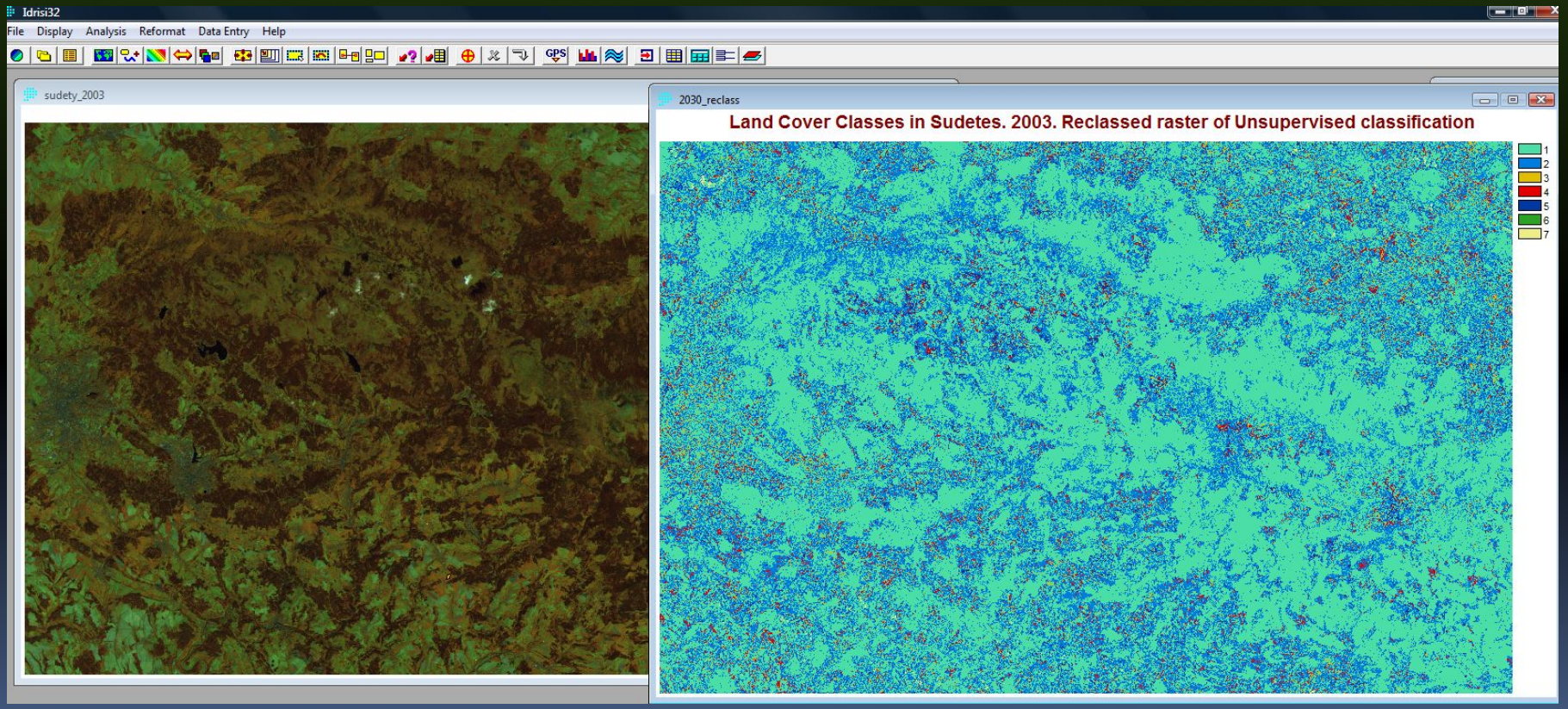


Map of Land Cover Classes of the Sudetes. Results of Unsupervised Classification.
August 2003.



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



II. Supervised classification: 2 approaches

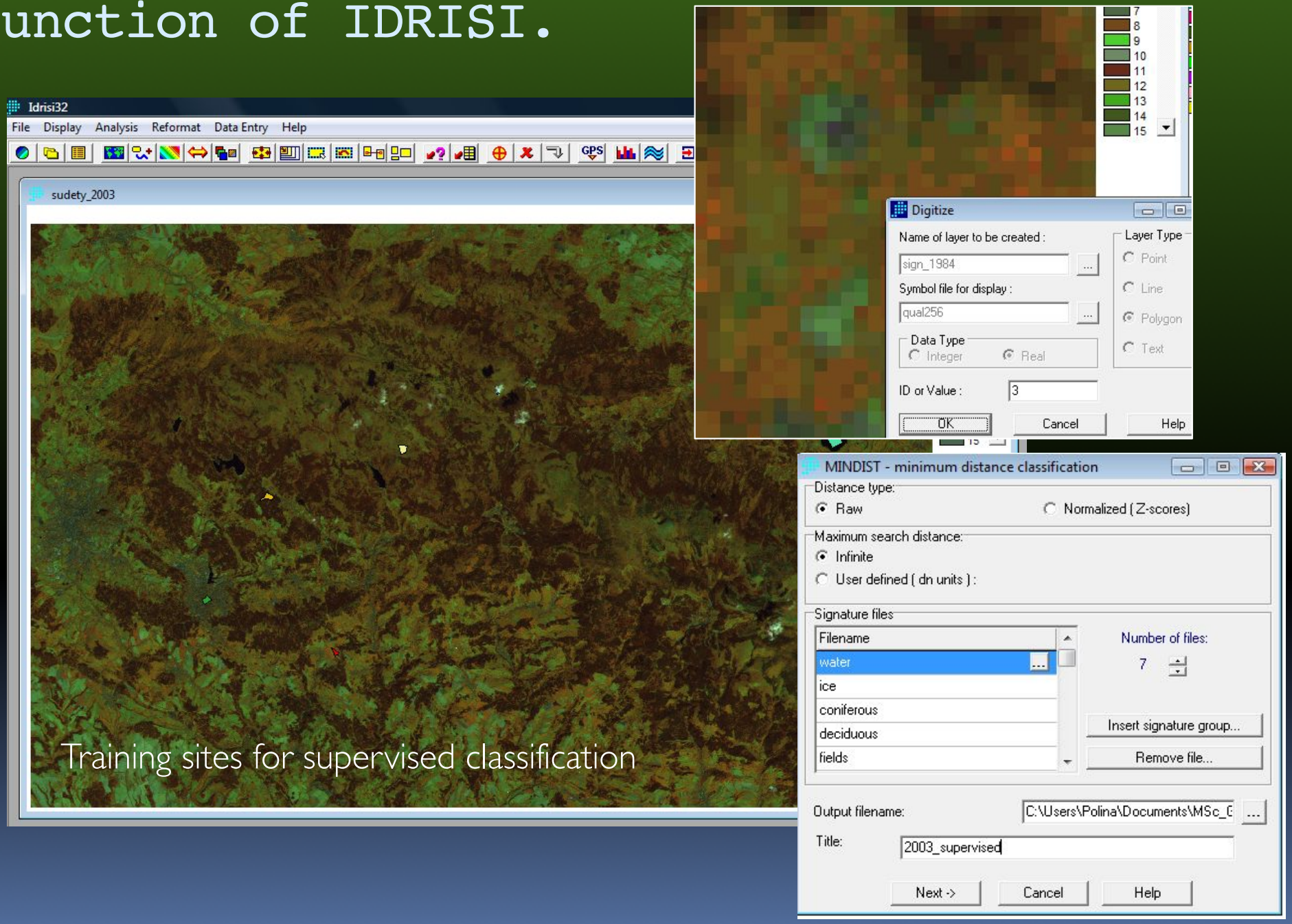
- "Minimal Distance" (MINDIST) method

- The simplest & fastest of all classifiers
- However, prone to incorrect classifications

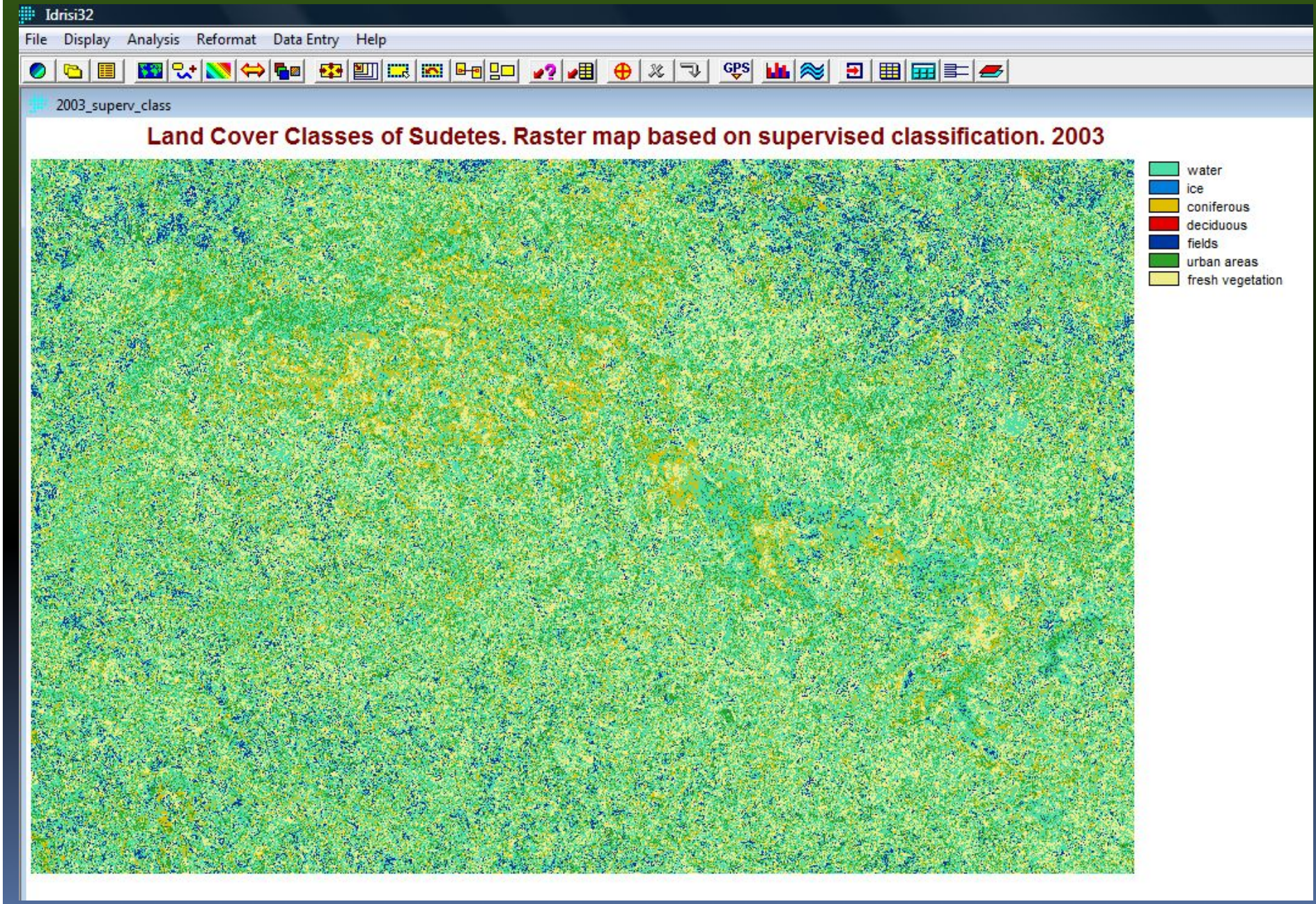
- "Maximal Likelihood" (MAXLIKE) method

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

II a). Supervised Classification: MINDIST function of IDRISI.



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



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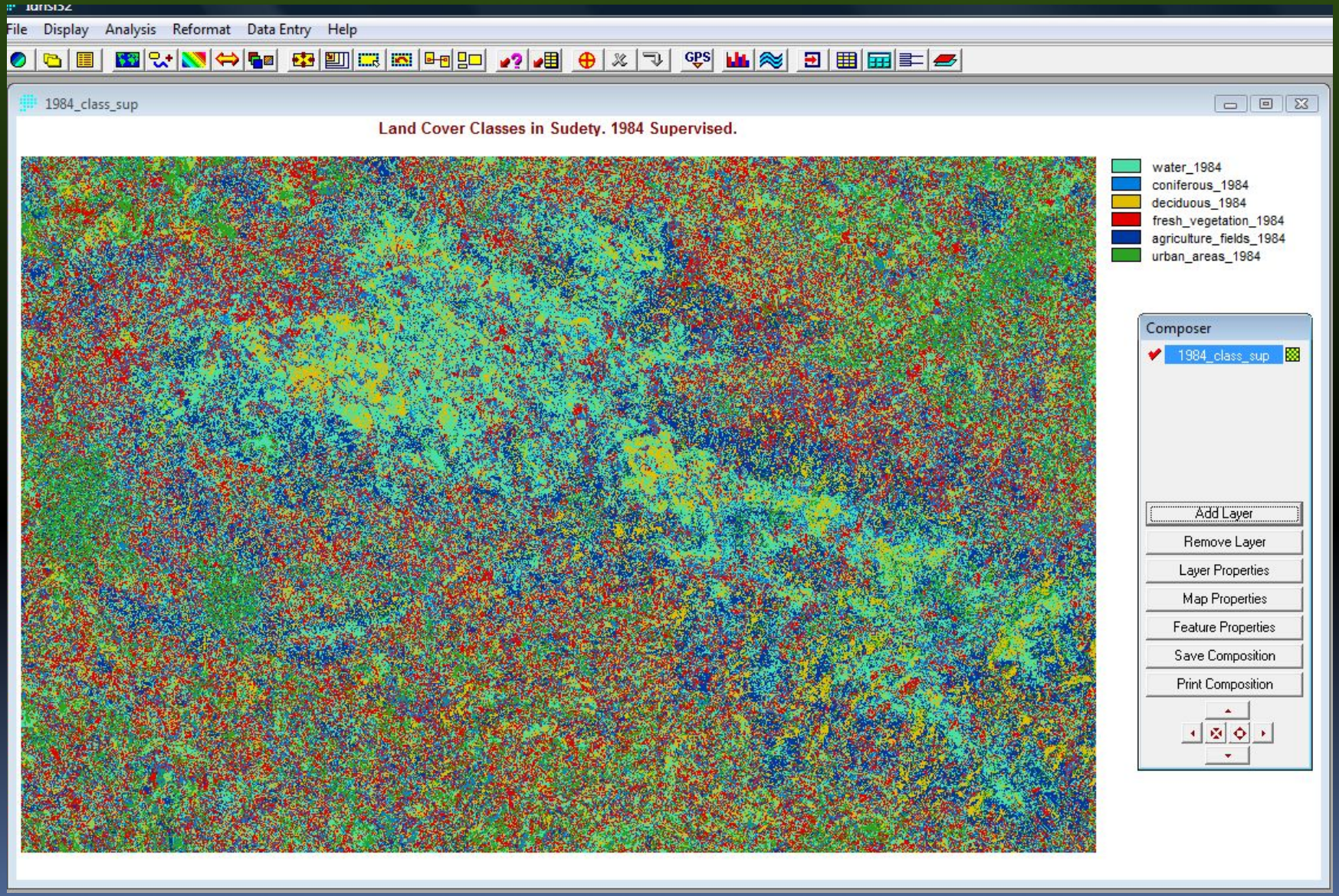

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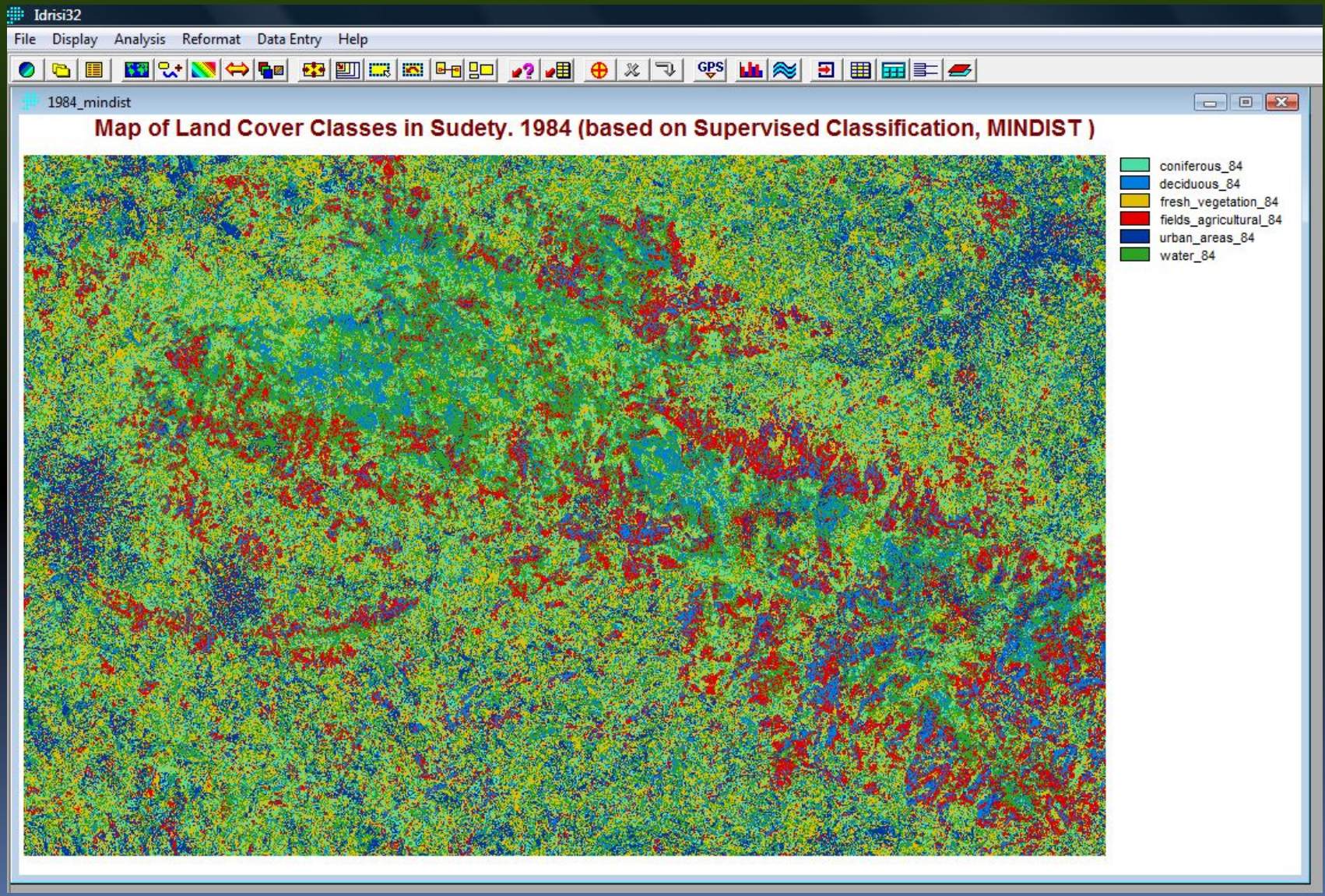
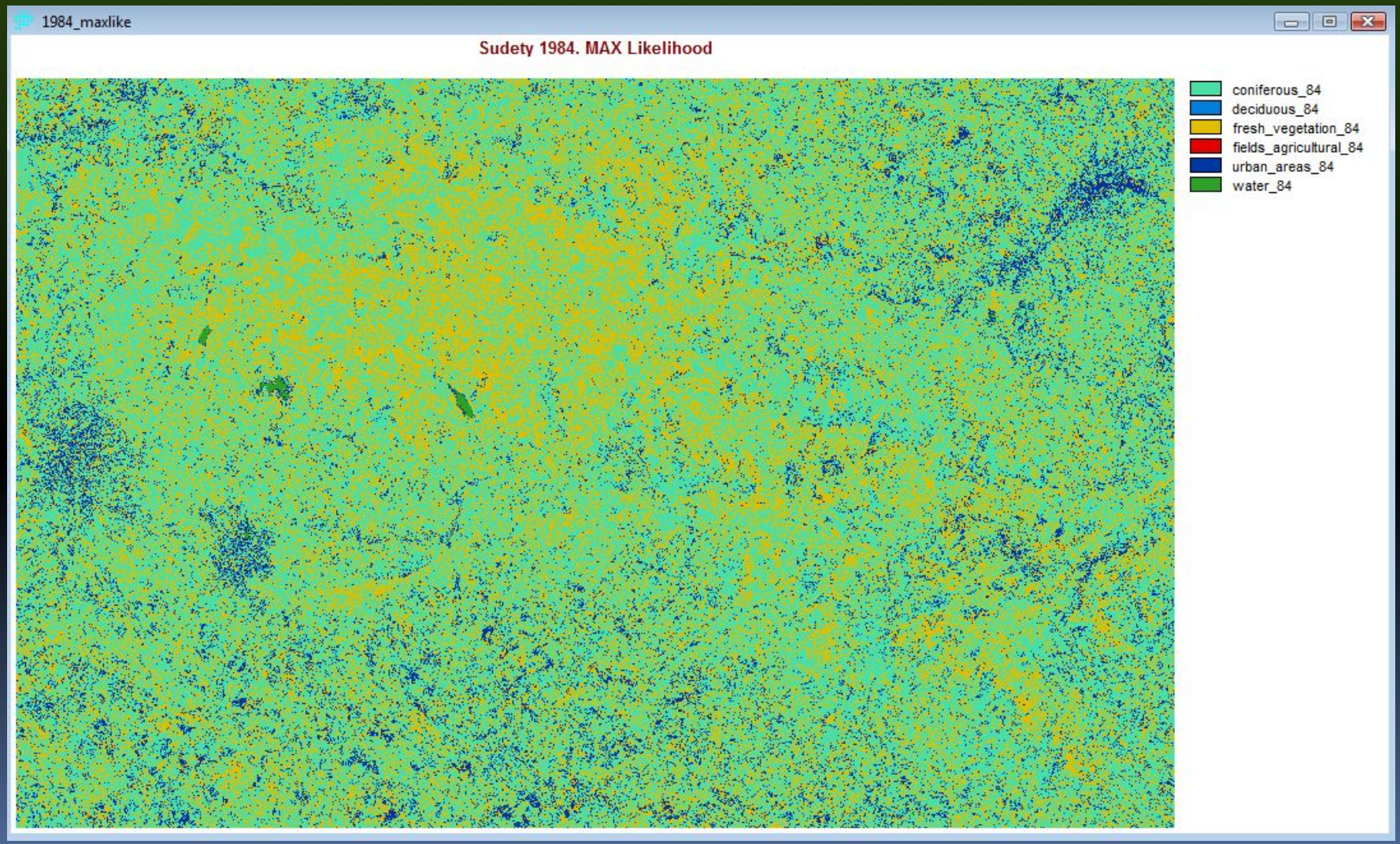


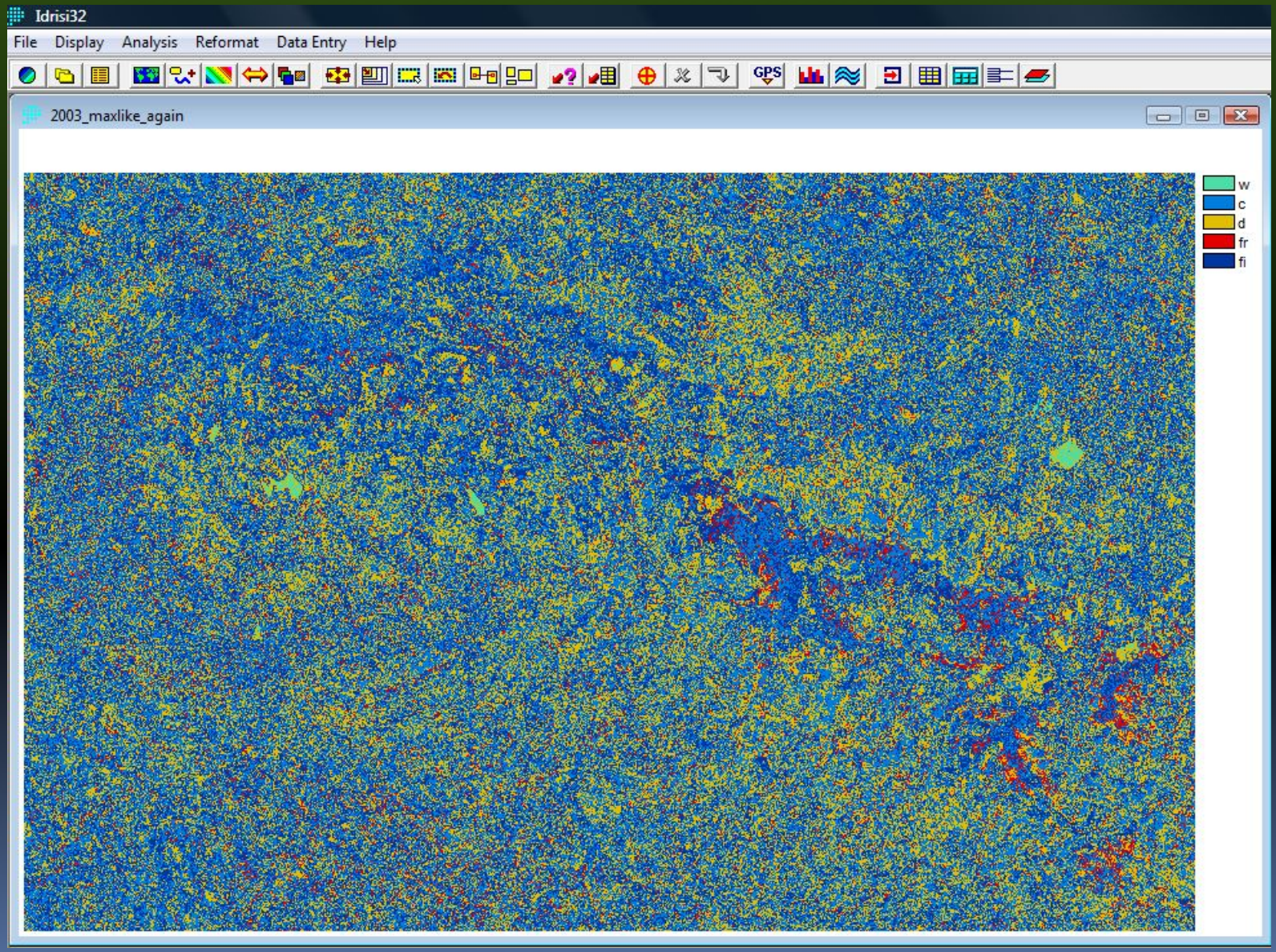
II b). Supervised Classification: Maximal Likelihood function of IDRISI.

Land Cover Classes of the Sudetes. 1984. MAXLIKE approach

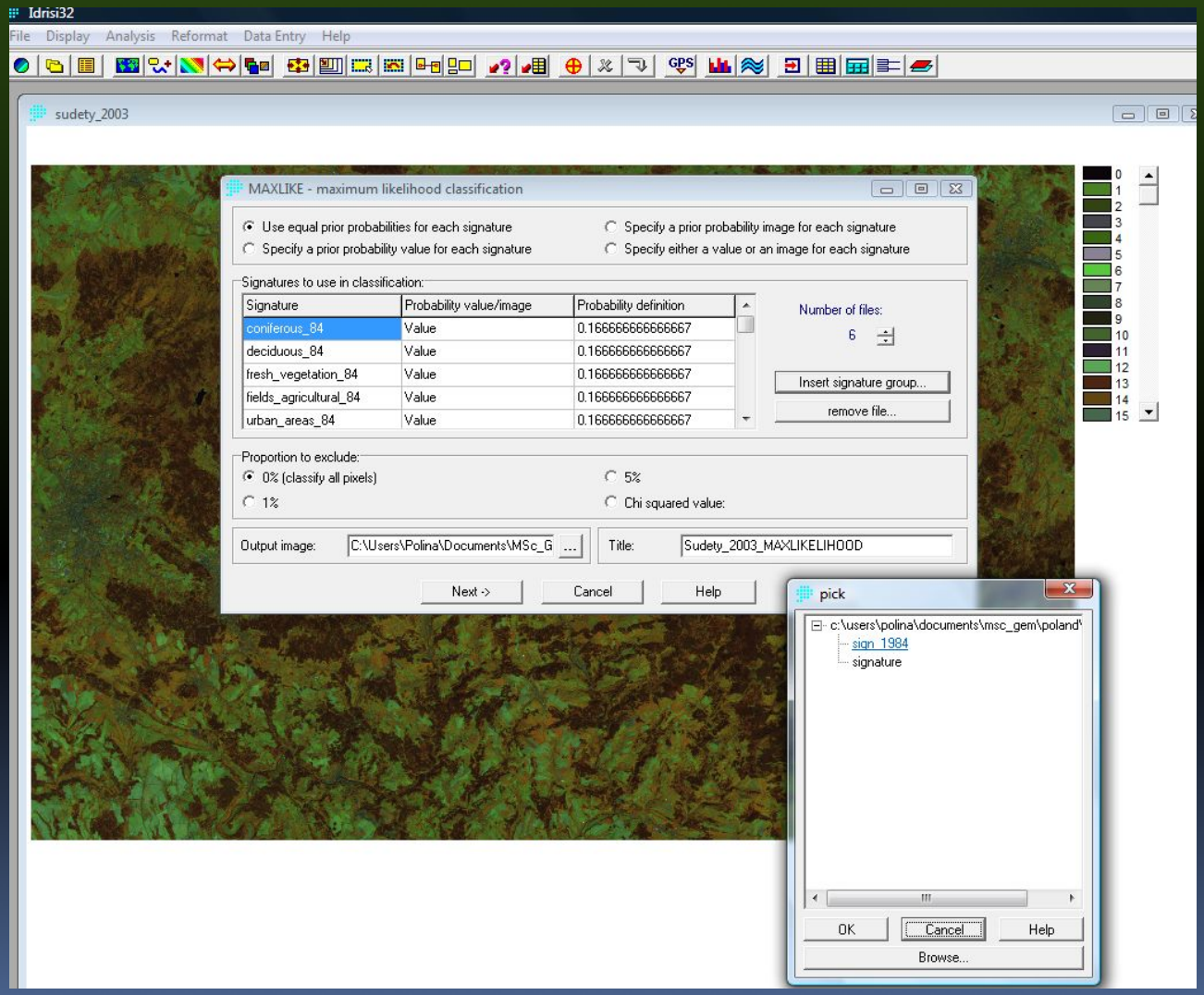


Supervised Classification: MAX Likelihood function of IDRISI.

Land Cover Classes of the Sudetes. 2003. MAXLIKE approach



Supervised Classification: Maximal Likelihood function



Used literature

- IDRISI Andes Tutorial. (2006) J.Ronald Eastman
- ESPERE Climate Encyclopedia. Topic in cities, http://espere.mpch-mainz.mpg.de/documents.pdf
- Article "*Sudetes Mountains*". Wikipedia, www.wikipedia.org
- Article *Przyroda Karkonoskiego Parku Narodowego* from the website of the Karkonoski Park Narodowy, http://www.kpnmab.pl/
- Article "*Karkonoski Park Narodowy*", Wikipedia, http://pl.wikipedia.org/wiki/Karkonoski_Park_Narodowy