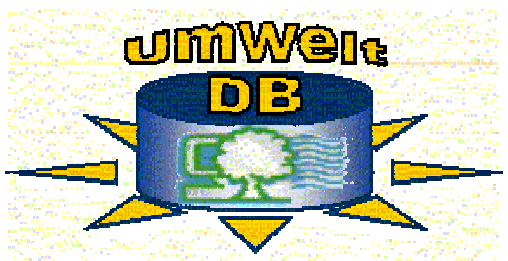
# Integrierte Meß- und Bilddatenhaltung für Umweltdatenbanken

**Workshop GI-AK Umweltdatenbanken**
**Berlin, 19. Mai 2003**




Peter Baumann

rasdaman GmbH,

FORWISS (Bayerisches Forschungszentrum für Wissensbasierte Systeme)

# Gliederung

- EuroClim
- rasdaman
- Live-Demo
- Zusammenfassung

EuroClim
EUROPEAN CLIMATE CHANGE MONITORING AND PREDICTION SYSTEM

# Datenmaterial

- European Climate Change Monitoring and Prediction System
- Datenmaterial
  - Schwerpunkt: Schnee/Eis-Bedeckung, -Temperatur
  - AVHRR Polar Pathfinder, MODIS etc.
  - Polar stereographic; Eingabeformate: HDF 5, GRIB (DKRZ)

| **Mode values for cryosperic parameter characteristics across all organisations** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Snow-on-land variables** | | | | **Sea ice variables** | | **Glacier vars** | |
| | *Albedo* | *Coverage* | *Temp* | *Wetness* | *Concen-tration* | *Tick-ness* | *Firn line altitude* | *Volume change* |
| Spatial Resol'n | **1km 10km** (3) | **1km** (8) | **1km 10km** (3) | **1km** (4) | **1km 100km** (2) | **1km 100km** (2) | **1km** (3) | **1km** (2) |
| Update Freq. | **7day** (5) | **1/day 5day** (5) | **1/day** (3) | **7day** (3) | **1, 7, 30dy** (2) | **1, 7, 30dy** (2) | **30dy** (4) | **30dy** (3) |

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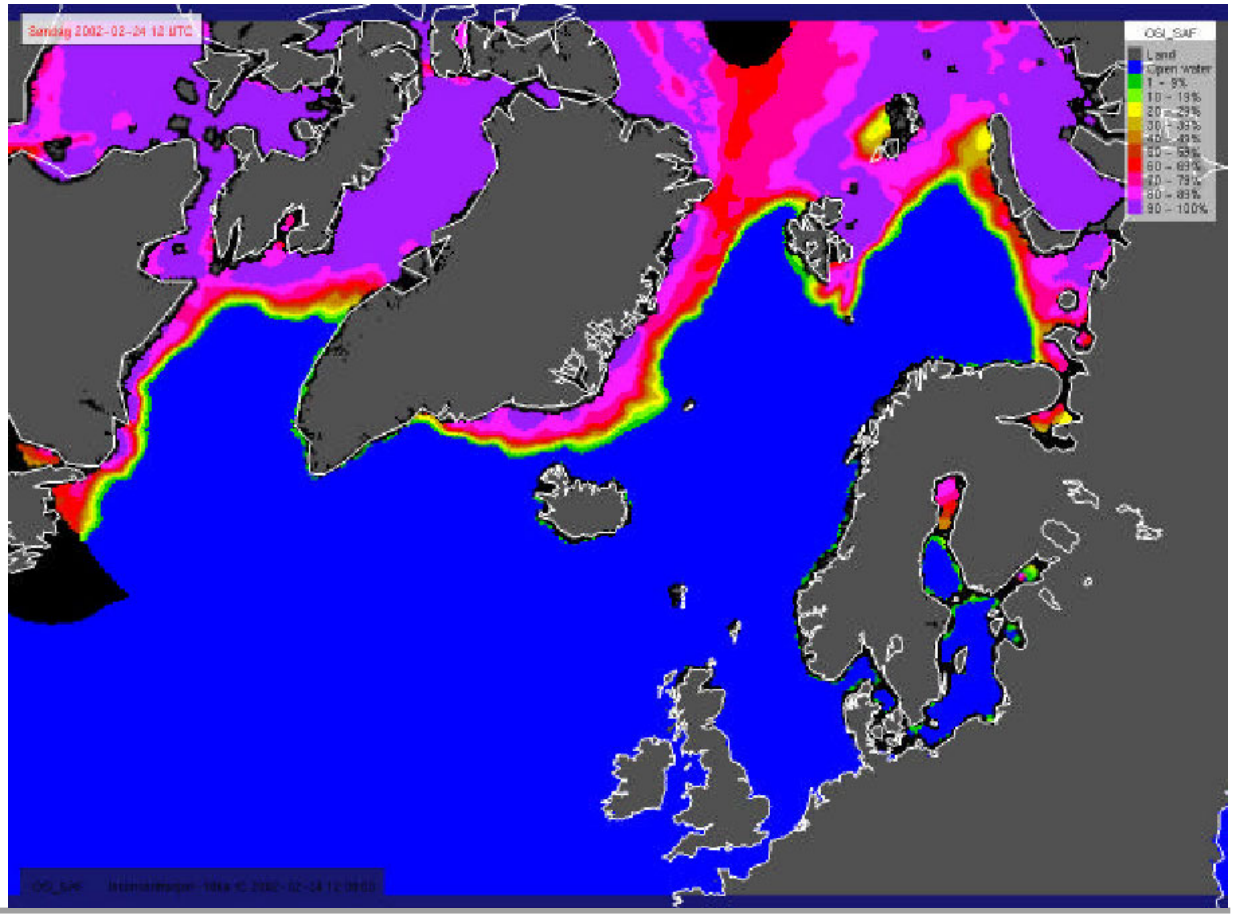
# Datenmaterial

- Sea ice concentration
- O&SI SAF (EUMETSAT)
  - SSM/I



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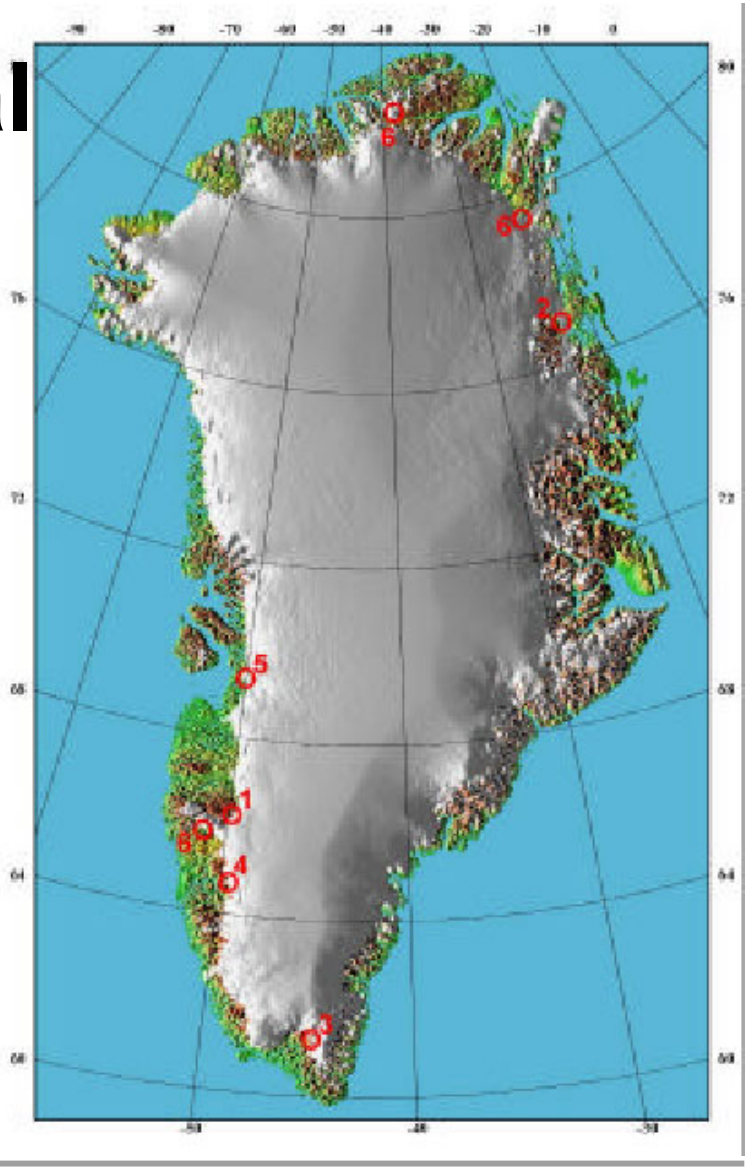
# Datenmaterial

- Temporal coverage:
  1982 - now
- Variables
  - T, humidity, precipitation cumulative, wind (speed and direction), sunshine hours, evaporation, global radiation



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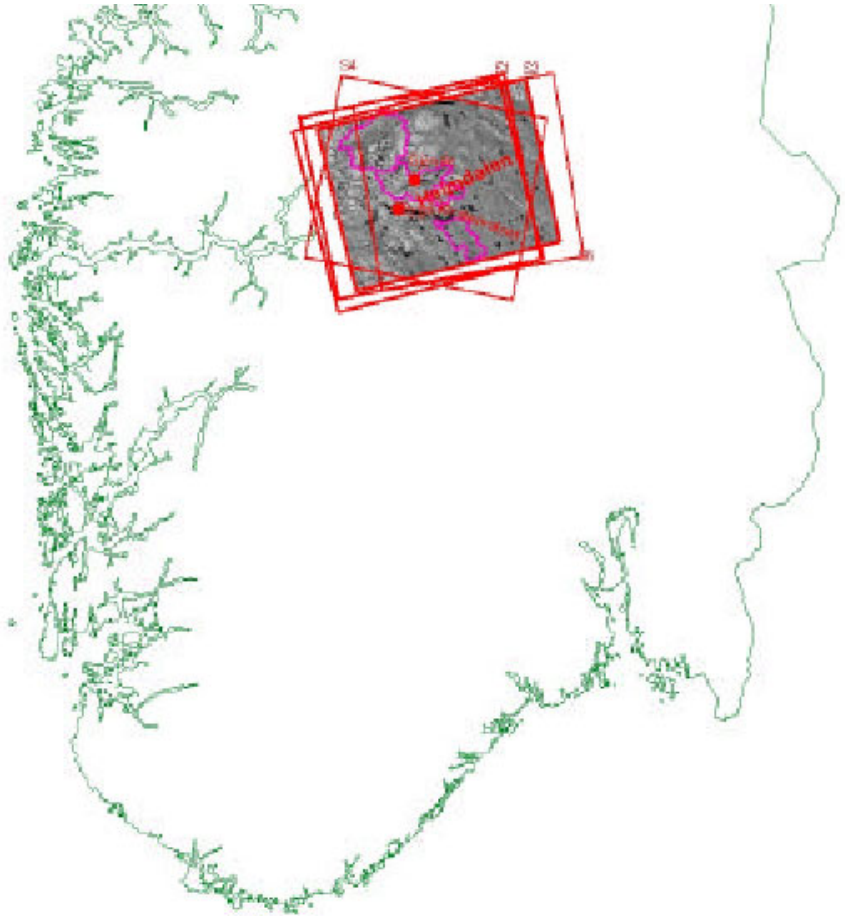
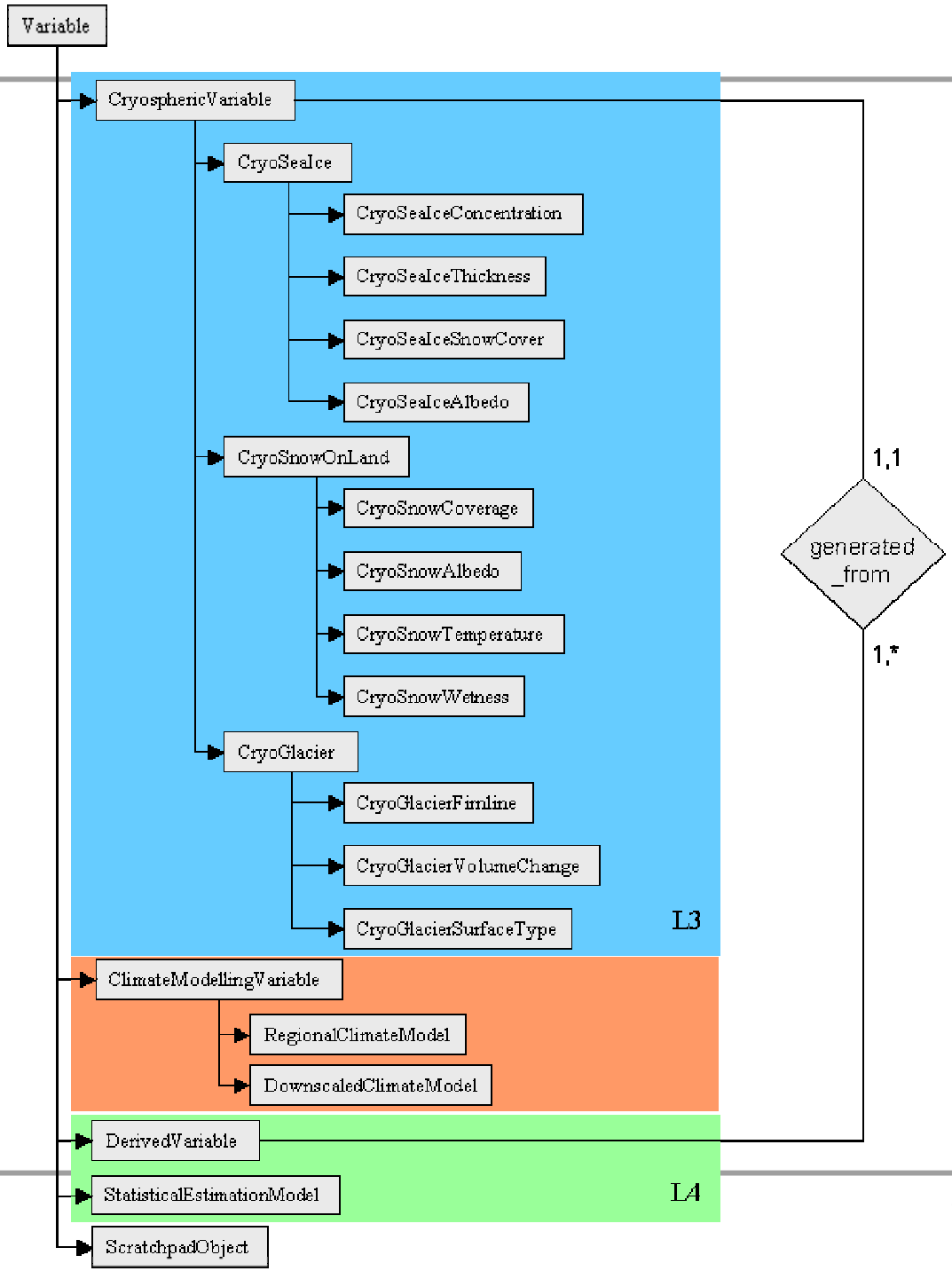
# Datenmaterial

- RADARSAT/Envisat, ERS-2
  - 100km



# 2D-Schema (vorläufig)



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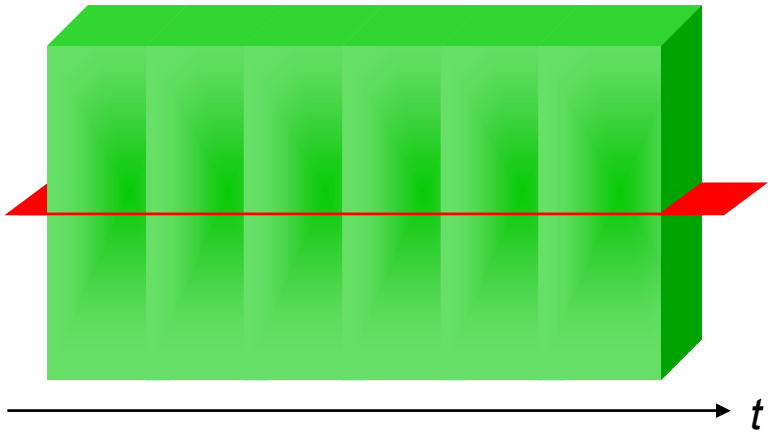
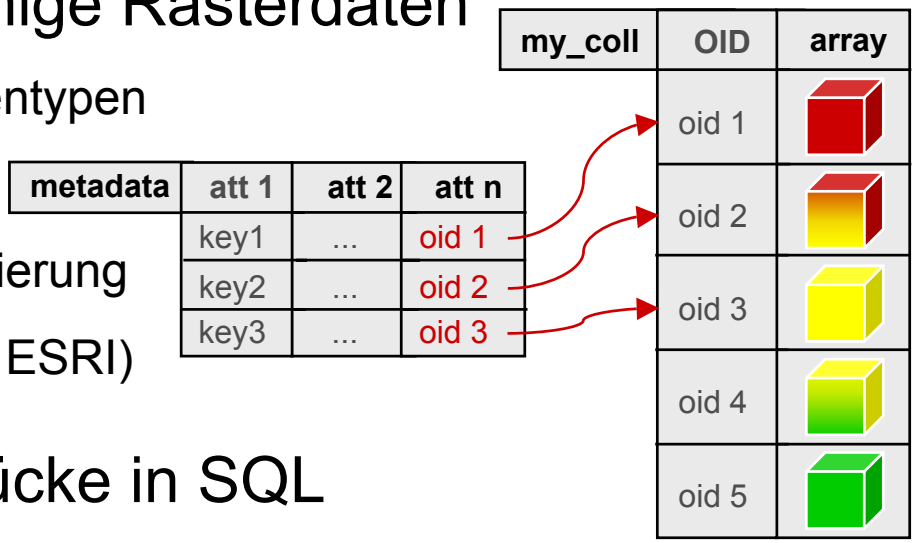
# 4D-Klimamodelle

- Beispiel: ECHAM T42-Modell
  - 128 x 64 x 17 x 2,190,000 Voxel
  - 2.5 TB pro Variable (24min)
  - 50 oder mehr Variablen pro Modelllauf

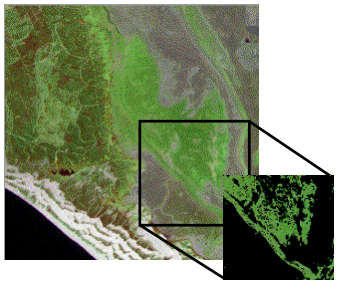


# rasdaman

- Middleware-Toolkit für großvolumige Rasterdaten
  - unbeschränkte Größe, Dimension, Zellentypen
  - multidimensionales SQL, Java, C++
  - intelligente Speicher- und Anfrageoptimierung
  - interoperabel: DB-Systeme, GIS (OGC, ESRI)




- rasql = multidimensionale Ausdrücke in SQL
  - `typedef marray < struct{ char red, green, blue, …; }, [x0:x1,y0:y1] > LandsatImage;`
  - `select img.green[x0:x1,y0:y1] > 130 from LandsatArchive as img`

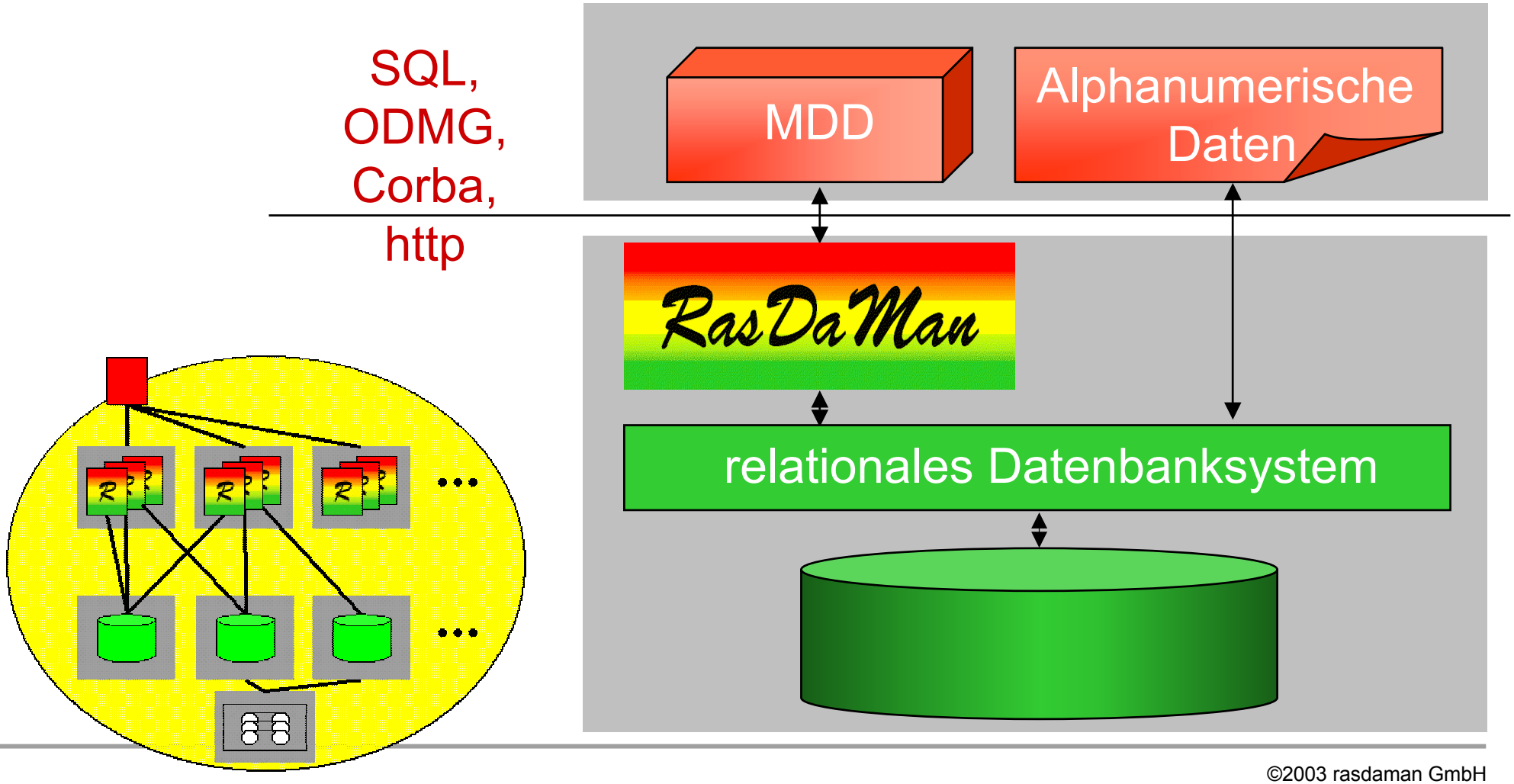


# Multidimensionale Definition & Abfrage

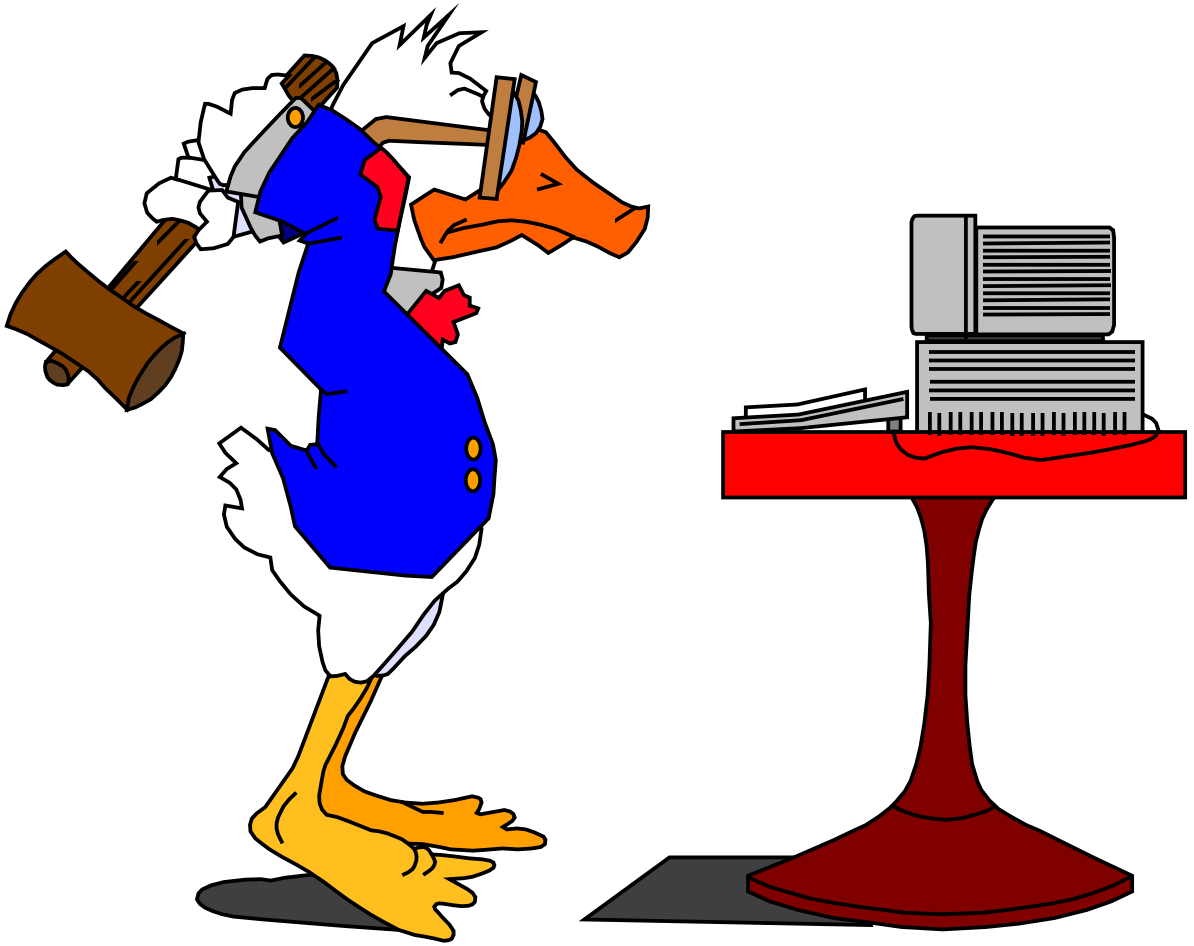
```
typedef marray< struct{ char red, green, …; }, [x0:x1,y0:y1] > LandsatImage;


SELECT jpeg(
                scale(img0[X00:X01,Y00:Y01],[1:300,1:300])          * { 1c, 1c, 1c}
      overlay (scale(img1[X10:X11,Y10:Y11],[1:300,1:300]) < 71.0) * {51c, 153c, 255c }
      overlay bit(scale(img2[X20:X21,Y20:Y21],[1:300,1:300]), 2)  * {230c, 230c, 204c}
      overlay bit(scale(img4[X20:X21,Y20:Y21],[1:300,1:300]), 7)  * {102c, 102c, 102c}
      overlay bit(scale(img5[X20:X21,Y20:Y21],[1:300,1:300]), 6)  * {255c, 255c, 0c}
      overlay bit(scale(img6[X20:X21,Y20:Y21],[1:300,1:300]), 3)  * {191c, 242c, 128c}
      overlay bit(scale(img7[X20:X21,Y20:Y21],[1:300,1:300]), 4)  * {191c, 255c, 255c}
      overlay bit(scale(img8[X20:X21,Y20:Y21],[1:300,1:300]), 1)  * {0c, 255c, 255c}
      overlay bit(scale(img9[X20:X21,Y20:Y21],[1:300,1:300]), 0)  * {102c, 102c, 102c}
      )
FROM …
```

# Architektur



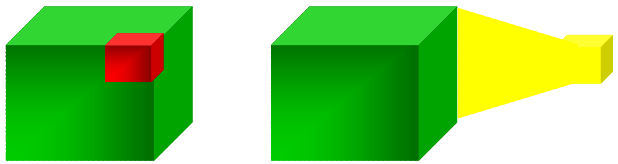
# Live Demo



# Zusammenfassung

- Aufgabe der Datenhaltung:
  - Import system-getrieben

  - Abgabe nutzergetrieben



- Beispiel: EuroClim
  - Dimensionsübergreifende Datenhaltung
- Rasterdatenbanken „heisses Thema“
  - „Kerninnovation“ (Oracle)
- Flexibilität der Anfragesprache!