# Interactive data exploration through dynamic generation of HiPS tiles

Thomas Boch, François-Xavier Pineau
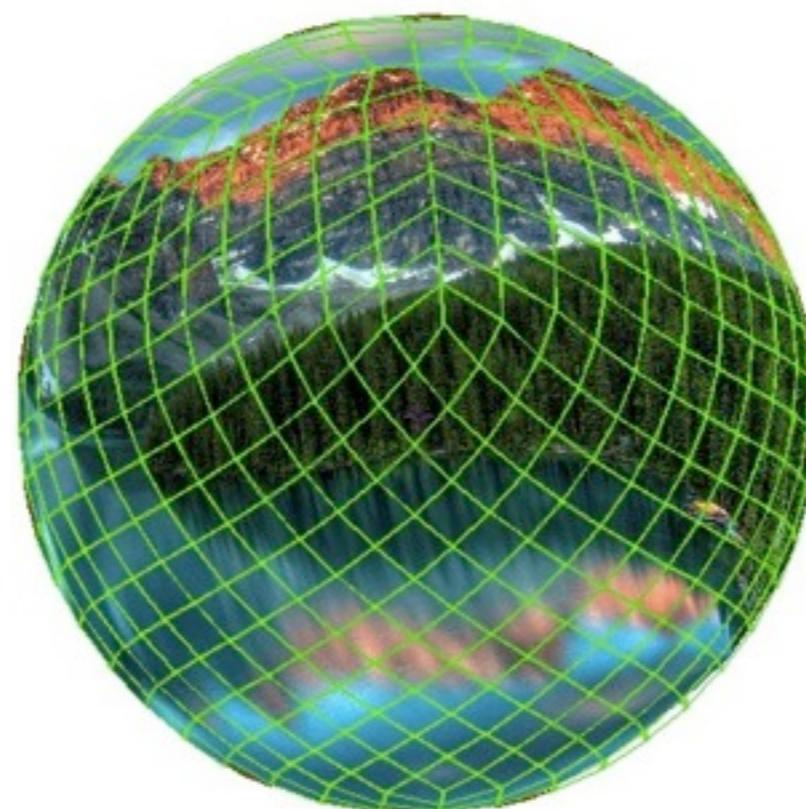
A few words on HiPS

- HiPS: **Hi**erarchical **P**rogressive **S**urveys

- Hierarchical tiling mechanism to browse seamlessly image, catalogue and cube data

  - HEALpix-based tessellation

- HiPS clients: Aladin desktop, Aladin Lite, Mizar

- *hipsgen*: tool to generate HiPS from a set of images/cubes/catalogue
  Tiles **generated once** and served **statically**

- More info, documentation & tools on
  http://aladin.u-strasbg.fr/hips/
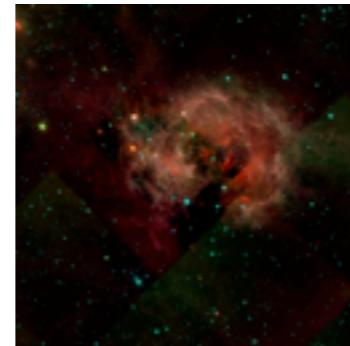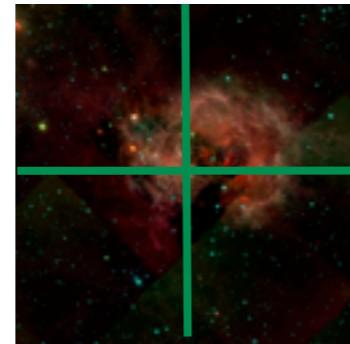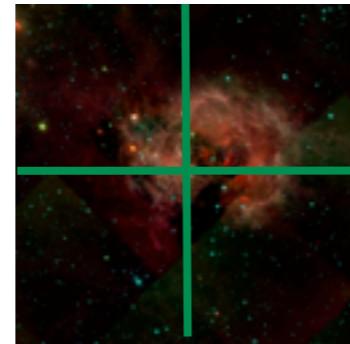
# HiPS pyramid

Level 4

HiPS pyramid

Level 4

HiPS pyramid

Level 4

Level 5

HiPS pyramid

Level 4

Level 5

HiPS pyramid

Level 4

Level 5

Thomas Boch, dynamic generation of HiPS tiles - IVOA Interop, Banff, Oct 2014
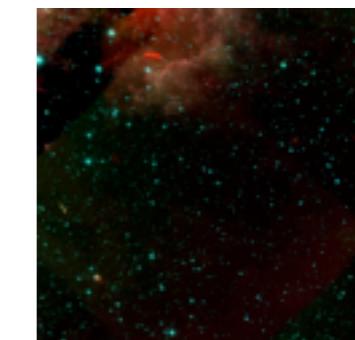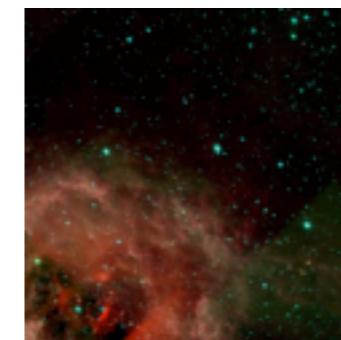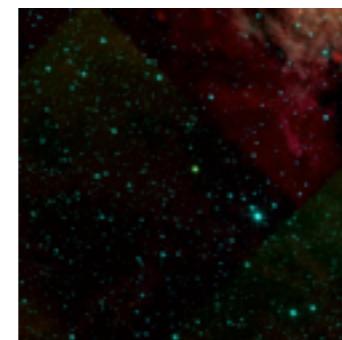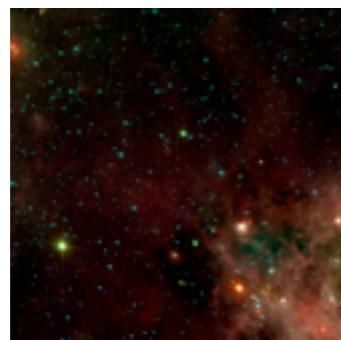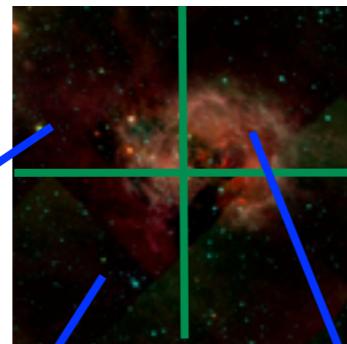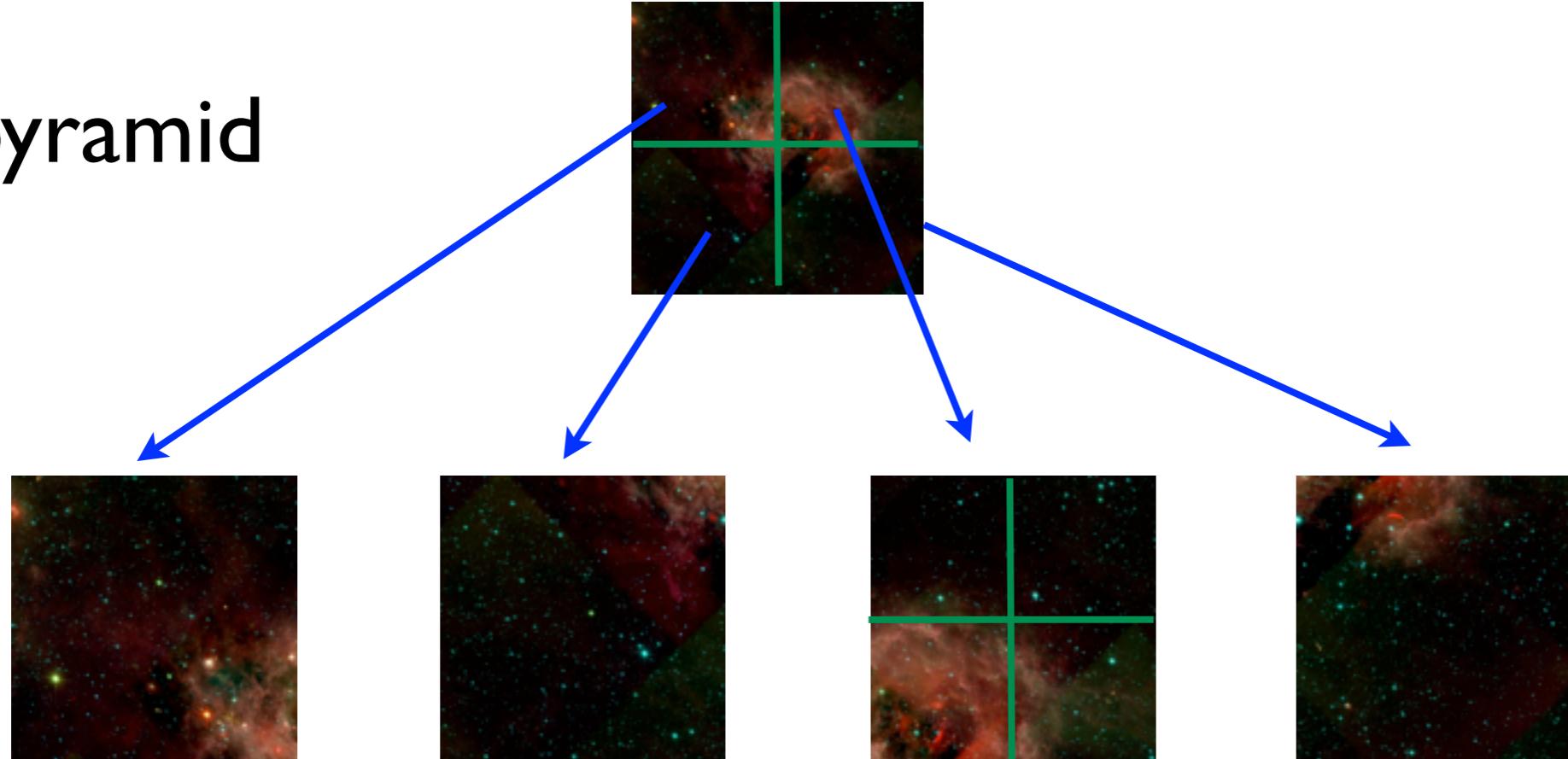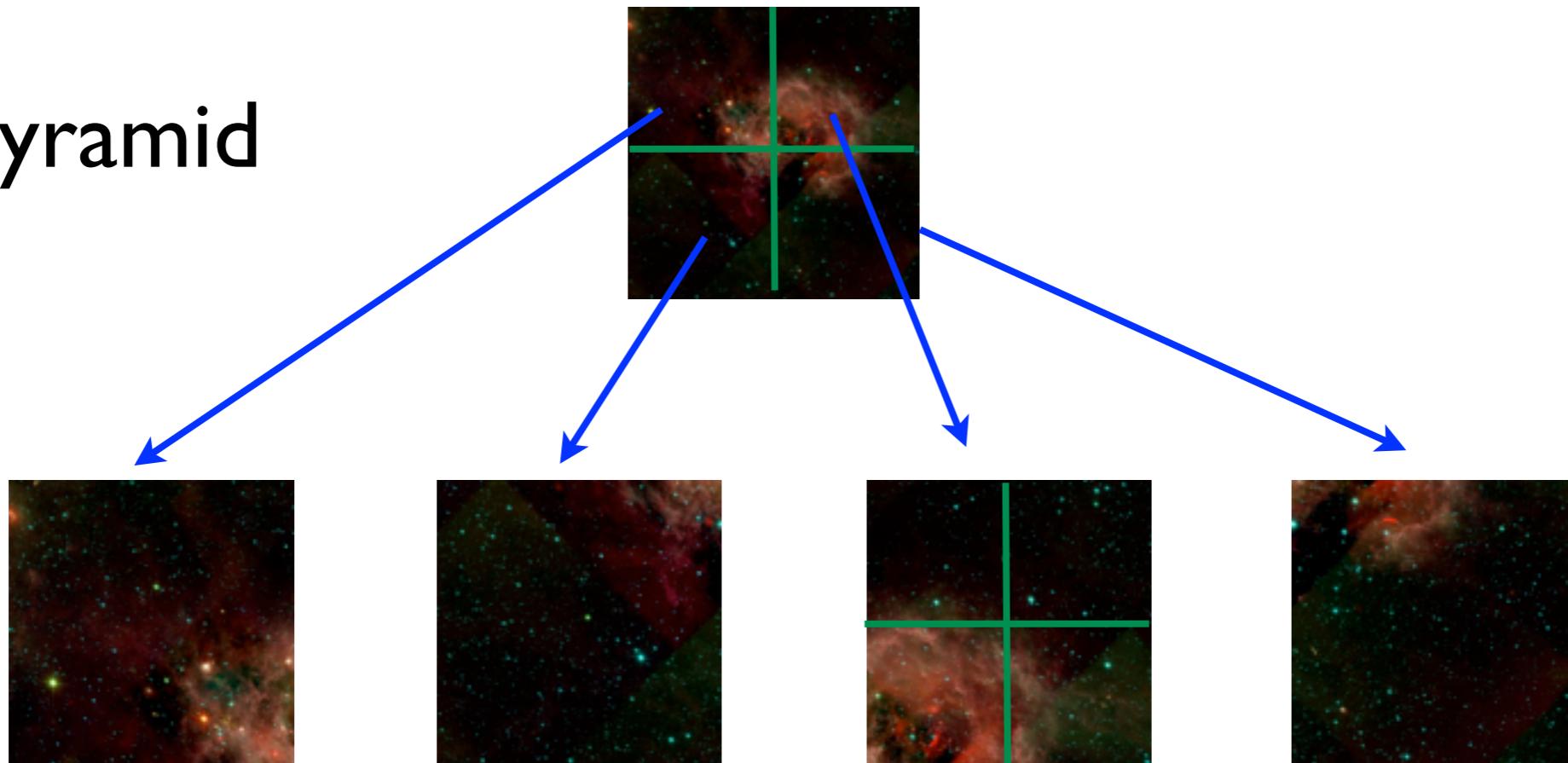
HiPS pyramid

Level 4

Level 5

Level 6

HiPS pyramid

Level 4

Level 5

Level 6
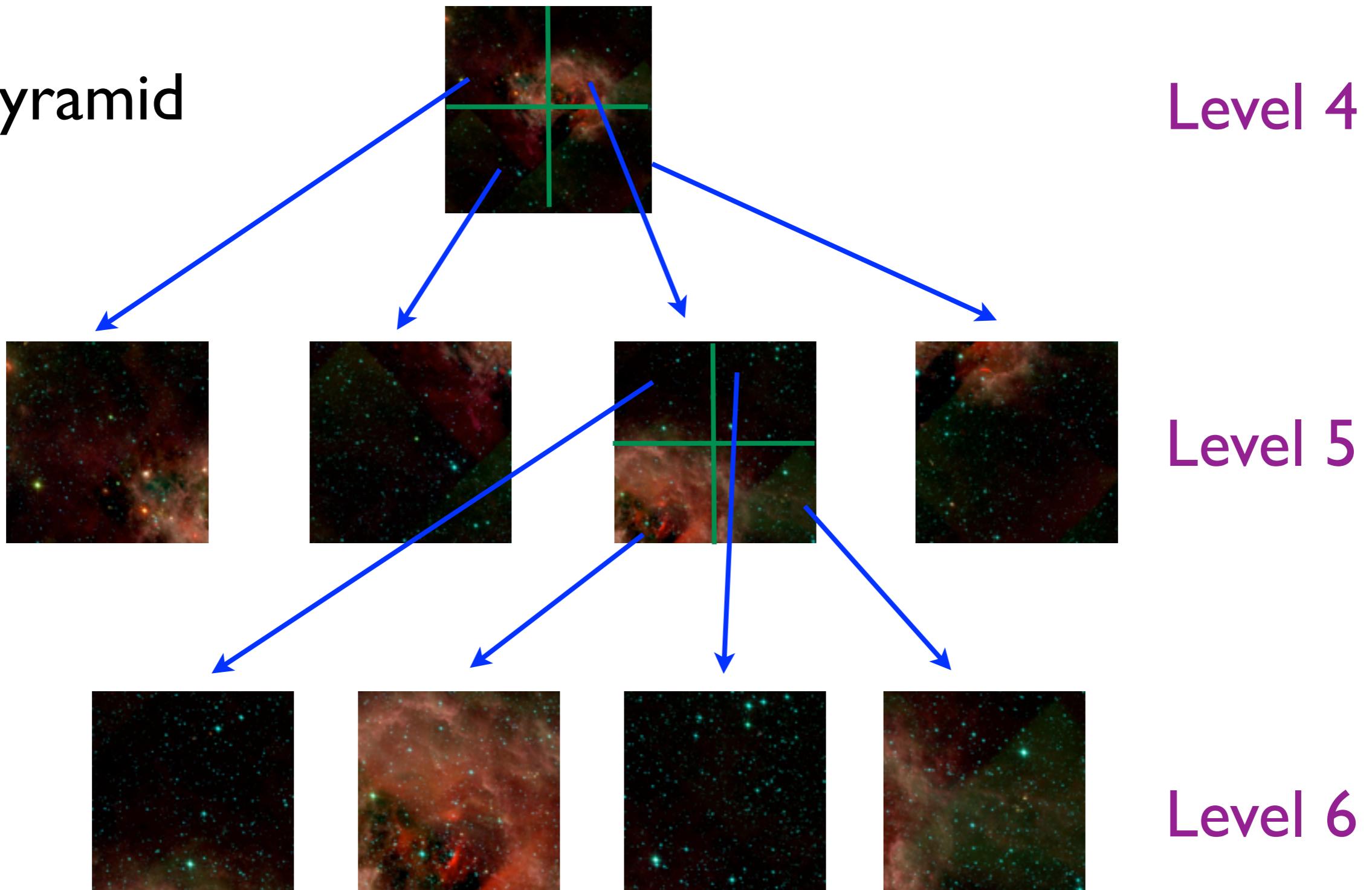
Nanocubes

- *A&T Labs - Research* paper (IEEE Infovis 2013)

  - http://nanocubes.net/

  - *"Real-Time Exploration of Spatiotemporal Datasets"*

    - Data with position, time and a few categorical attributes

- C++ code available

  - https://github.com/laurolins/nanocube

- Provides fast generation of

  - 1d-histograms

  - count maps (tiles with spherical Mercator projection)

Thomas Boch, dynamic generation of HiPS tiles - IVOA Interop, Banff, Oct 2014

JNanocubes

- CDS implementation of nanocubes data structure
  - written in Java
  - outputs HiPS tiles
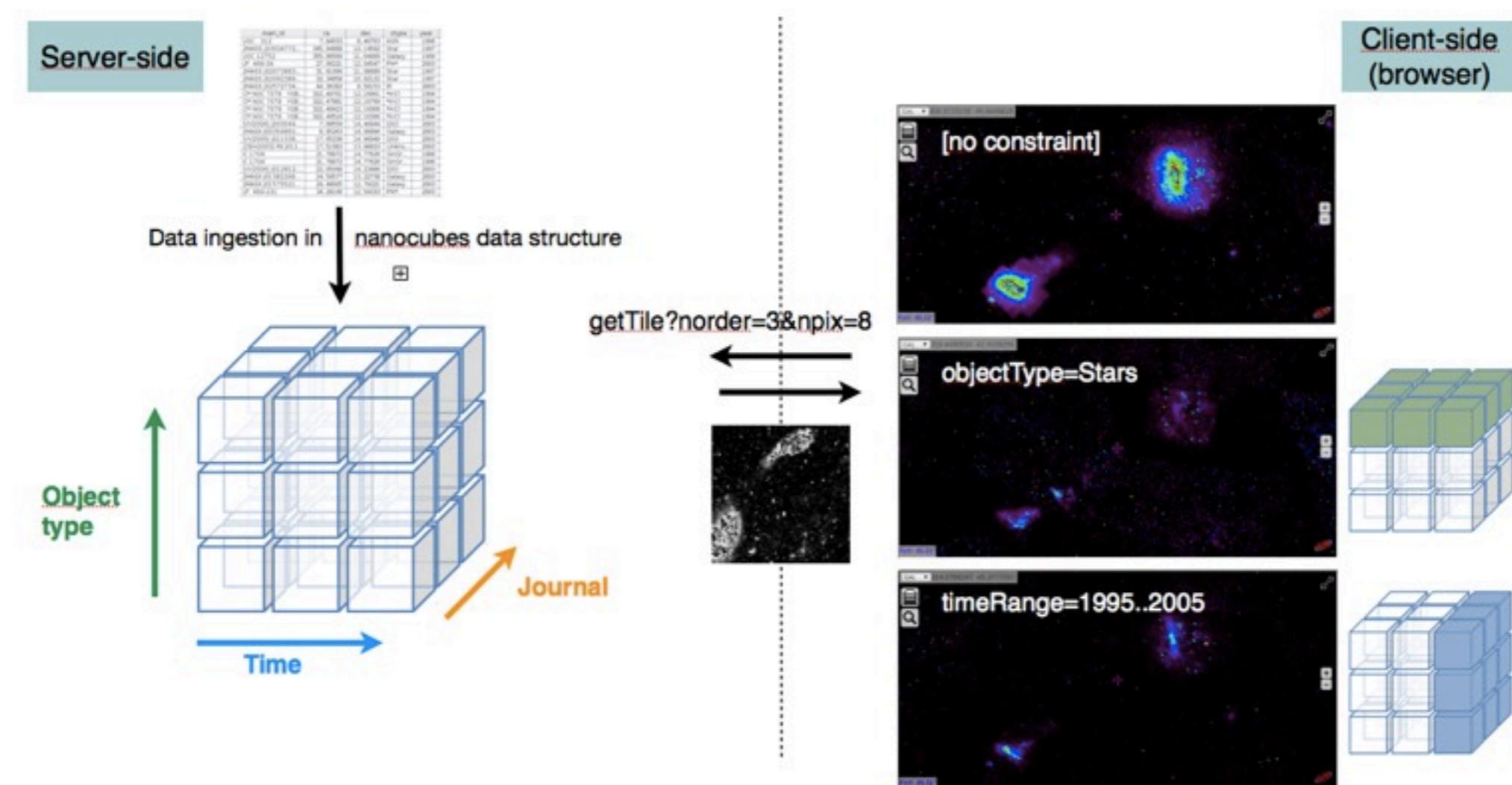
Demo

- Tested on SIMBAD data:
  8M objects with position, 2 categories (otype, journal) and a time

- Aladin Lite consumes HiPS tiles generated on-the-fly by JNanocubes server

- http://tinyurl.com/adass2014
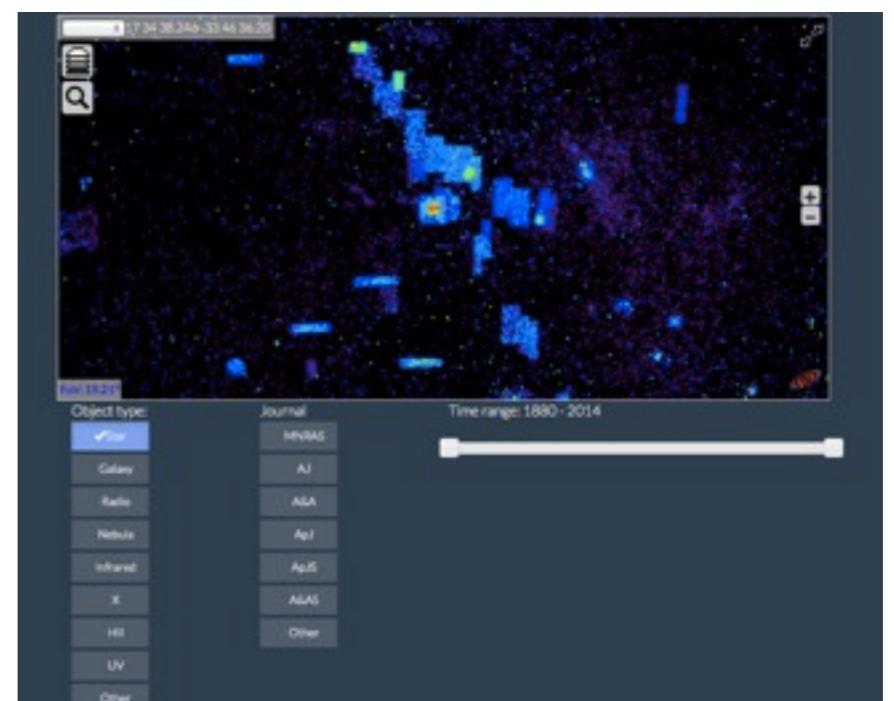
Key figures

- Nanocubes tree generation: 100 s

- Tile generation: 5-20 ms for a 128x128 tile (16k requests in nanocube tree)

- Memory greedy: 4 GB

How is that VO-related ?

- Help user explore/drill-down available data

- Similar idea as Tom Donaldson's
  [Guiding Queries with Data Summaries](#)
  (Hawaii Interop 2013)

Perspectives

- Find a smarter way to organize/serialize nanocube data structure

- Add 1-D histograms for categories and time dimension

- Test it with 100M+ table rows

- Distribute tool to generate JNanocubes