

Applications in Graphics

Multiresolution graphics

Spherical image compression

Multiresolution computer graphics

Introduction

- surfaces \Leftrightarrow images
- successive refinement is an important feature
- efficient representation both for rendering and storage

Recursive subdivision schemes

- recursive interpolation [Deslaurier & Dubuc]
- linked to autocorrelation of Daubechies filters
- smooth interpolation can lead to smooth objects defined by few points

Rendering

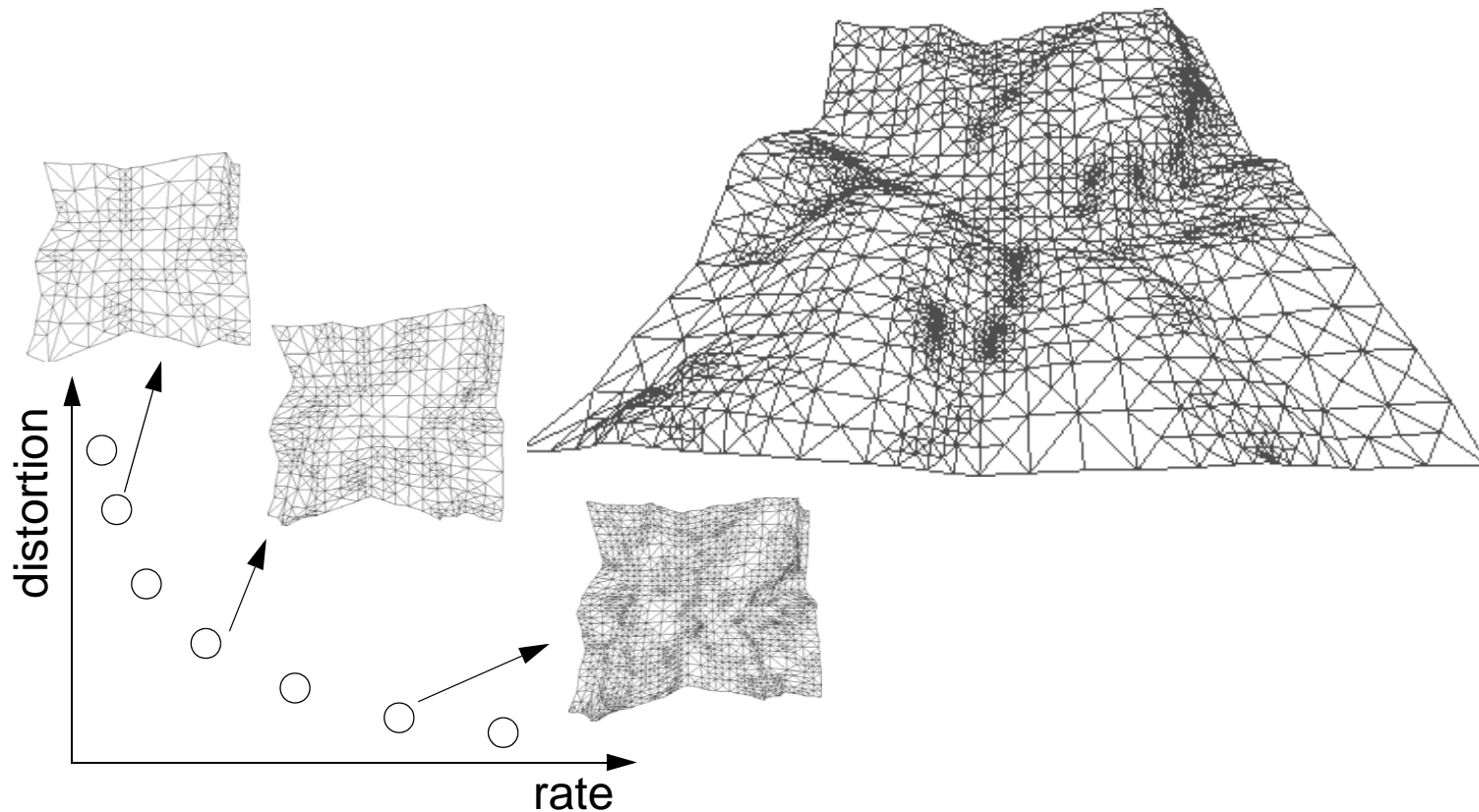
- often asks for piecewise linear or triangular surfaces

Examples below

- terrain modeling

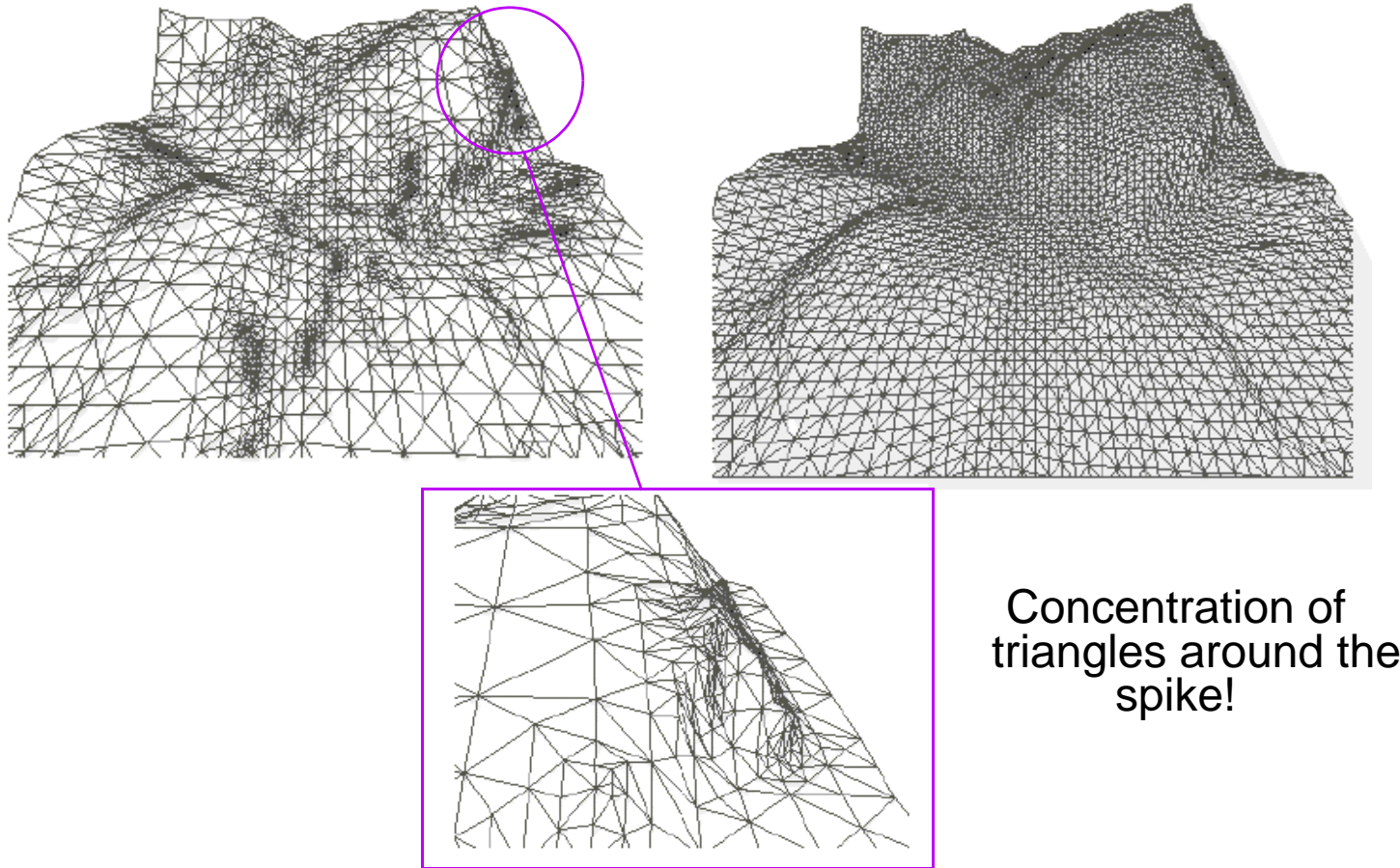
Multiresolution graphics

Example: optimize quality (distortion) for a target rate



- terrain elevation data, large data set, take a point every 25m
- successive approximation
- data accessible at various levels of resolution

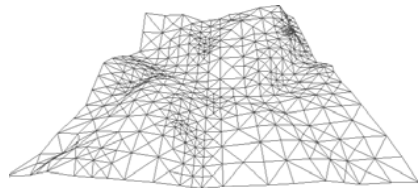
Multiresolution graphics



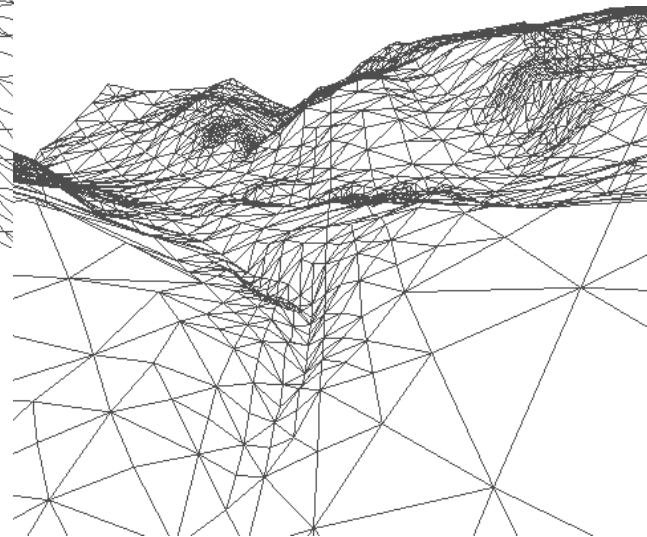
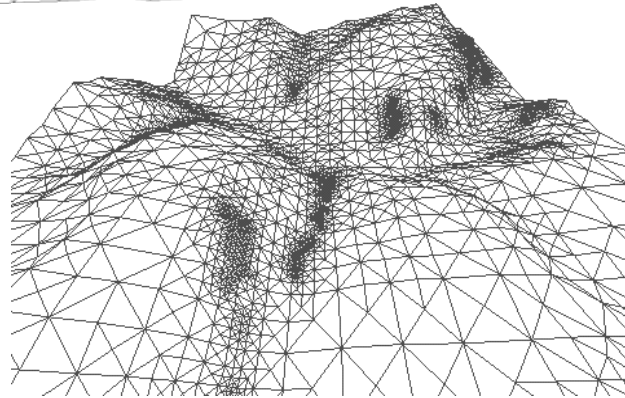
- adaptive meshing
- at points of high activity, many triangles

Multiresolution graphics

Refinement while zooming



Multiresolution allows to increase the amount of triangle while zooming on a region

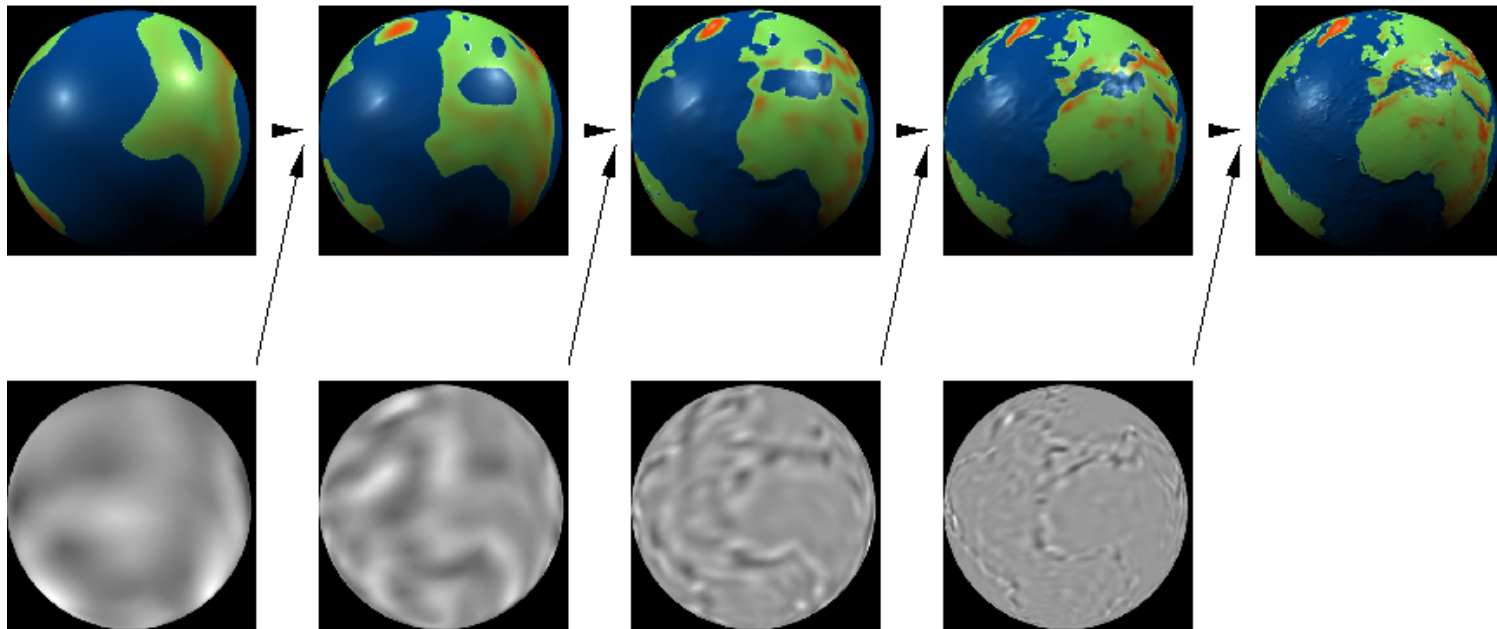


Spherical image compression

[Sweldens & Schröder]

3D data set from NASA

Scale spaces coarse to fine (pseudo colored)



Wavelet spaces coarse to fine (positive mapped to white, negative mapped to black)