Modeling, Rendering, and Simulating Clouds
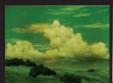
Yoshinori Dobashi
Hokkaido University
http://ime.ist.hokudai.ac.jp/~doba
doba@ime.ist.hokudai.ac.jp

Contents

- Introduction
- Modeling of clouds
- Rendering of clouds
- Animation of clouds
- Conclusion

Introduction

- Realistic display of clouds
  - Synthesizing images of outdoor scenes
  - Flight simulators, movies, commercial films, etc.
  - Long research history

[Gardner 1985]   [Nishita 1996]   [Schpok 2003]

Introduction

- Challenges

Realistic shapes   Realistic colors

Realistic motion   Efficiency/controllability

Our Approach

- Realistic shapes
  - Image-based modeling
- Realistic colors
  - Efficient rendering of clouds with atmospheric effects
  - Efficient computation of multiple scattering
- Realistic motion
  - Procedural simulation
  - Physically-based simulation
  - Controlling simulation

Conclusion

- Visual simulation of clouds
  - realistic density distribution
  - realistic color
  - realistic motion
- Efficiency/controllability
  - hardware-accelerated computation
  - goal-based method
- Future Interest
  - Increasing controllability
  - Increasing efficiency