Stored Textures

CSCI 4239/5239
Advanced Computer Graphics
## Spring 2022

What are Stored Textures

- Textures in OpenGL are Stored Textures
  - Not computed by shader but sampled by shader
  - Usually 2D
  - Simultaneous textures through multi-textures
- Textures are applied in shader
  - sampler2D point to texture units
  - texture2D sample textures
  - texture coordinates used to identify pixels
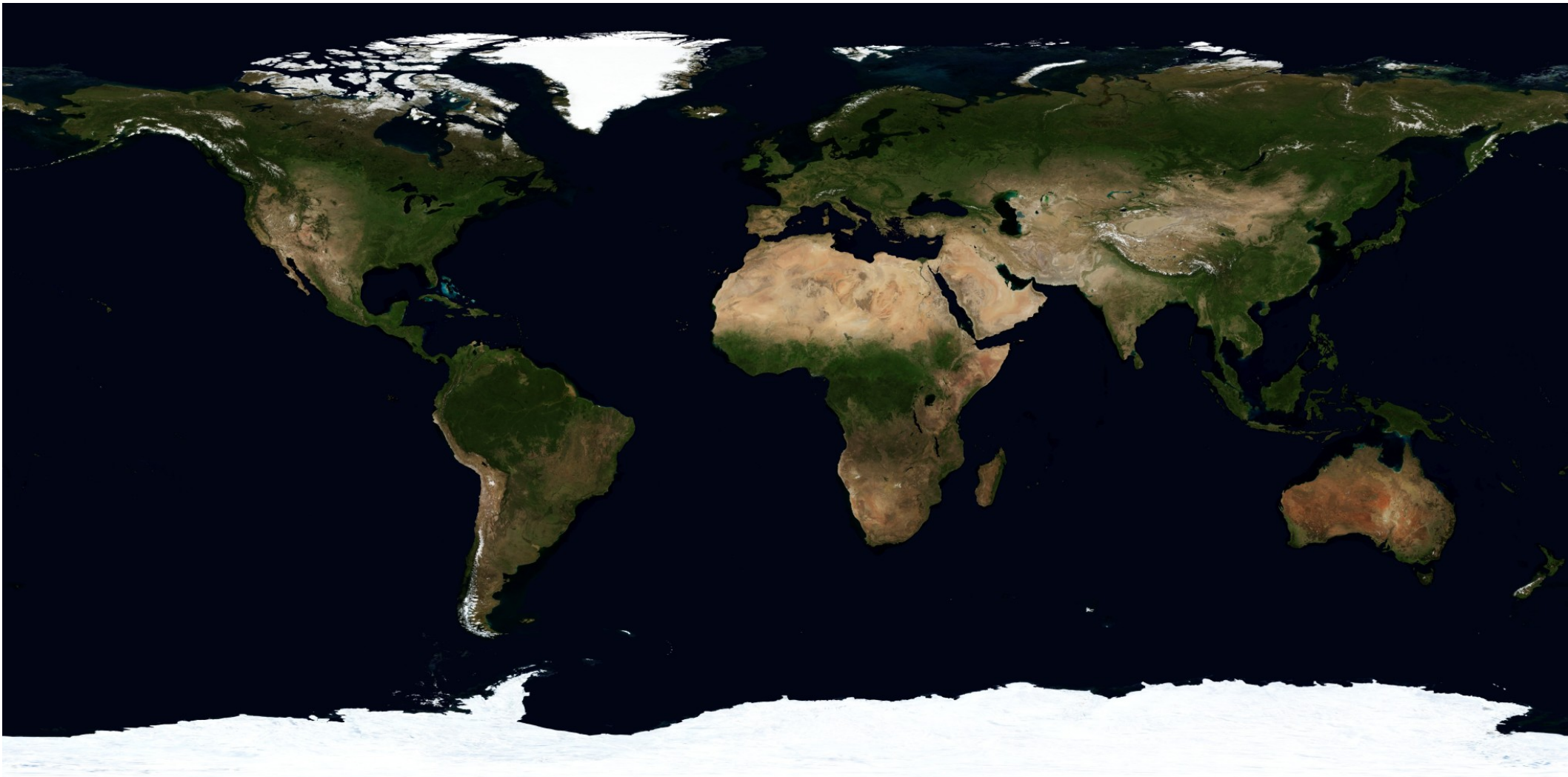
Blue Marble Example

- MODIS satellite data
  - 1km raw resolution
- High resolution textures
  - Monthly cloudless daytime
  - Earth's city lights
  - Clouds
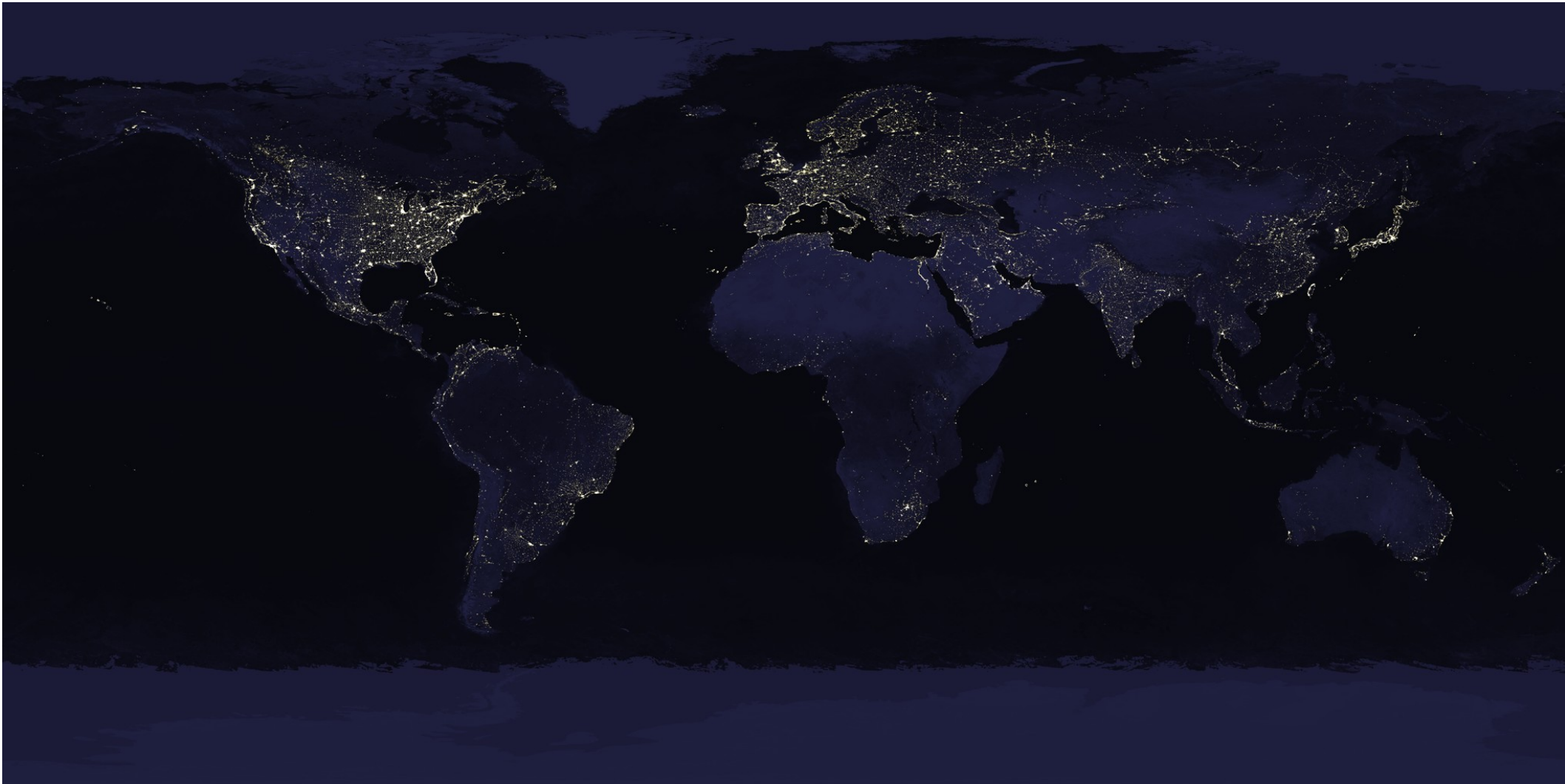- Mercator projection
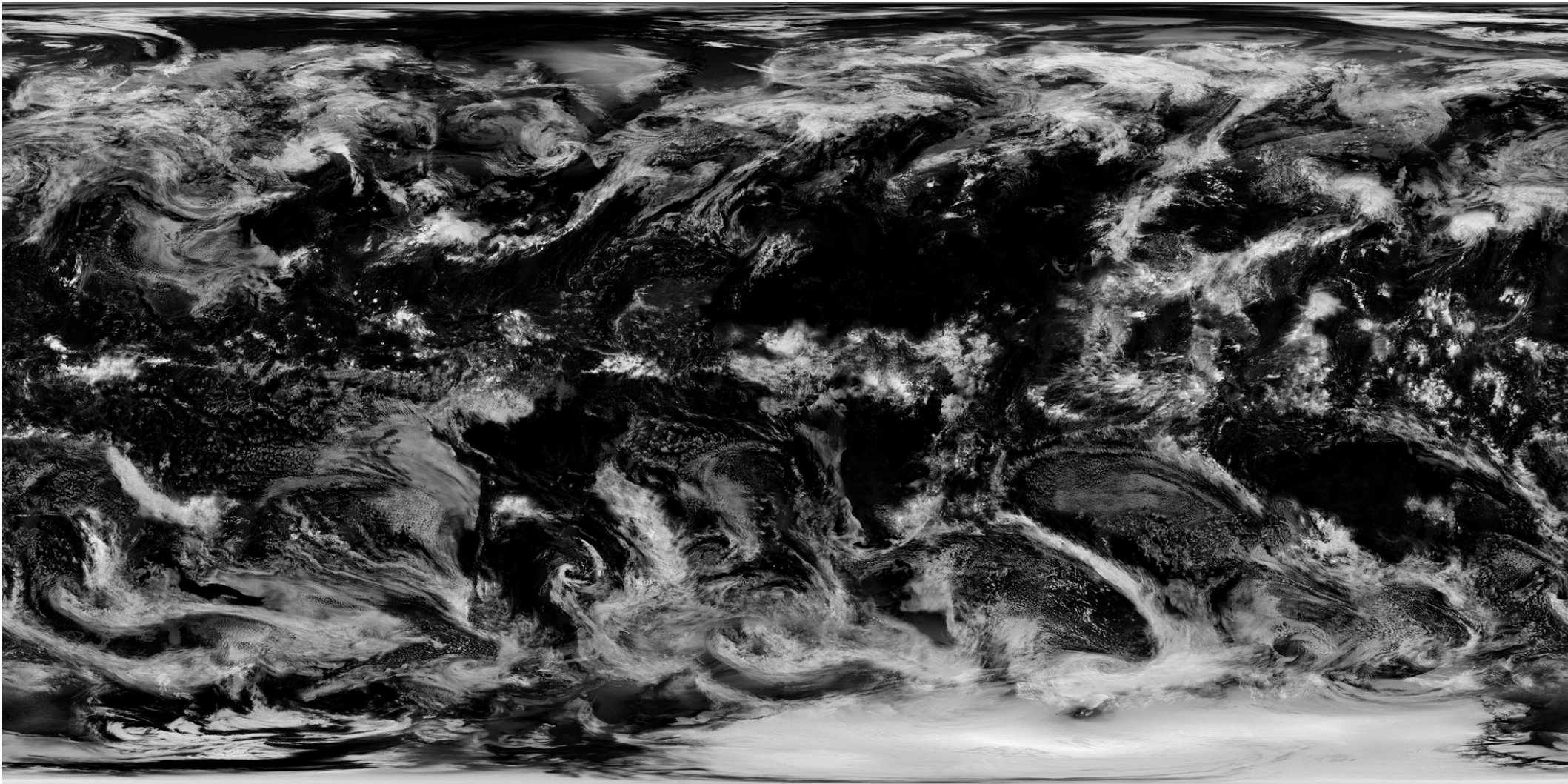 - Works with gluSphere

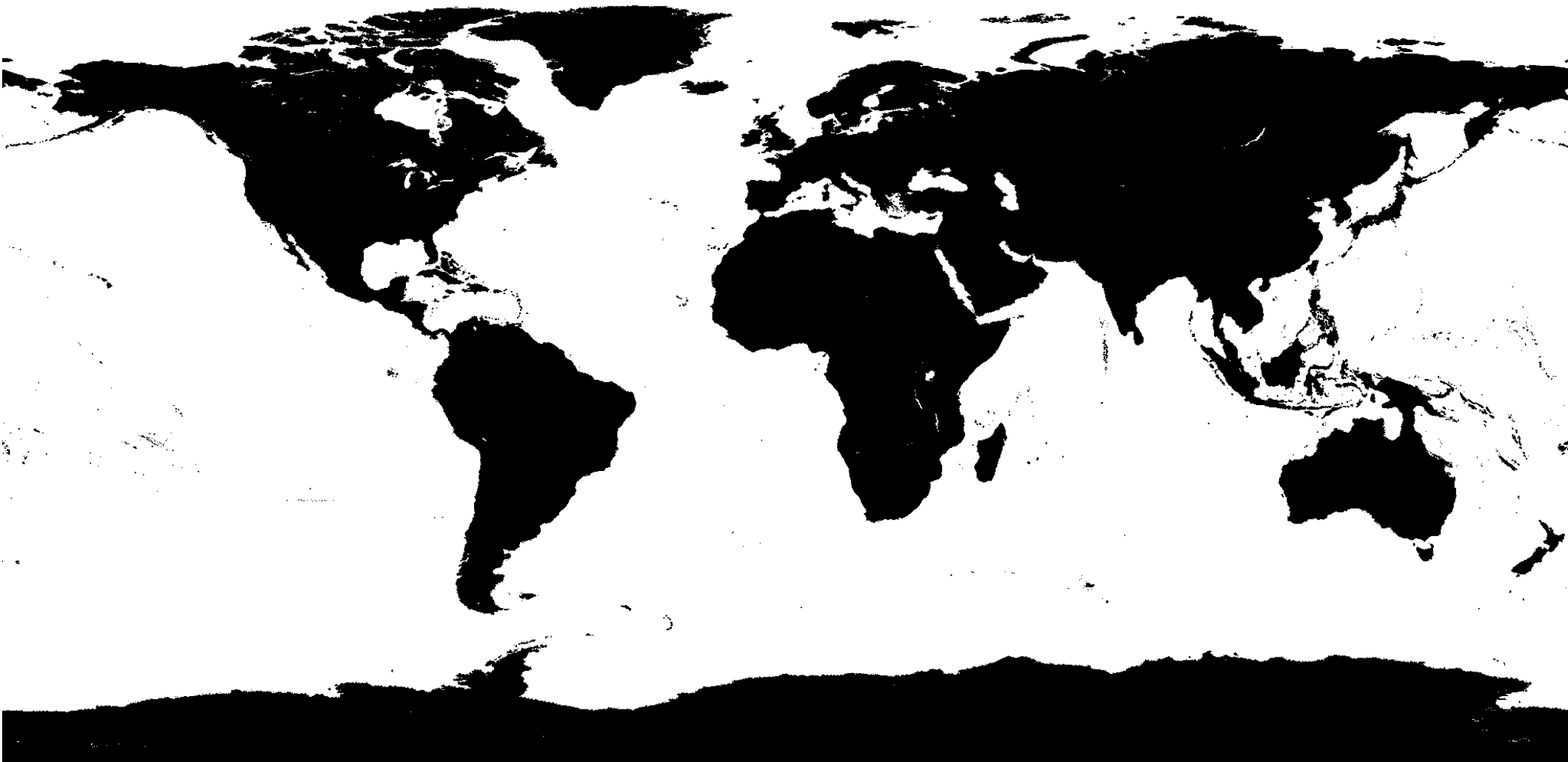# January Daytime Texture
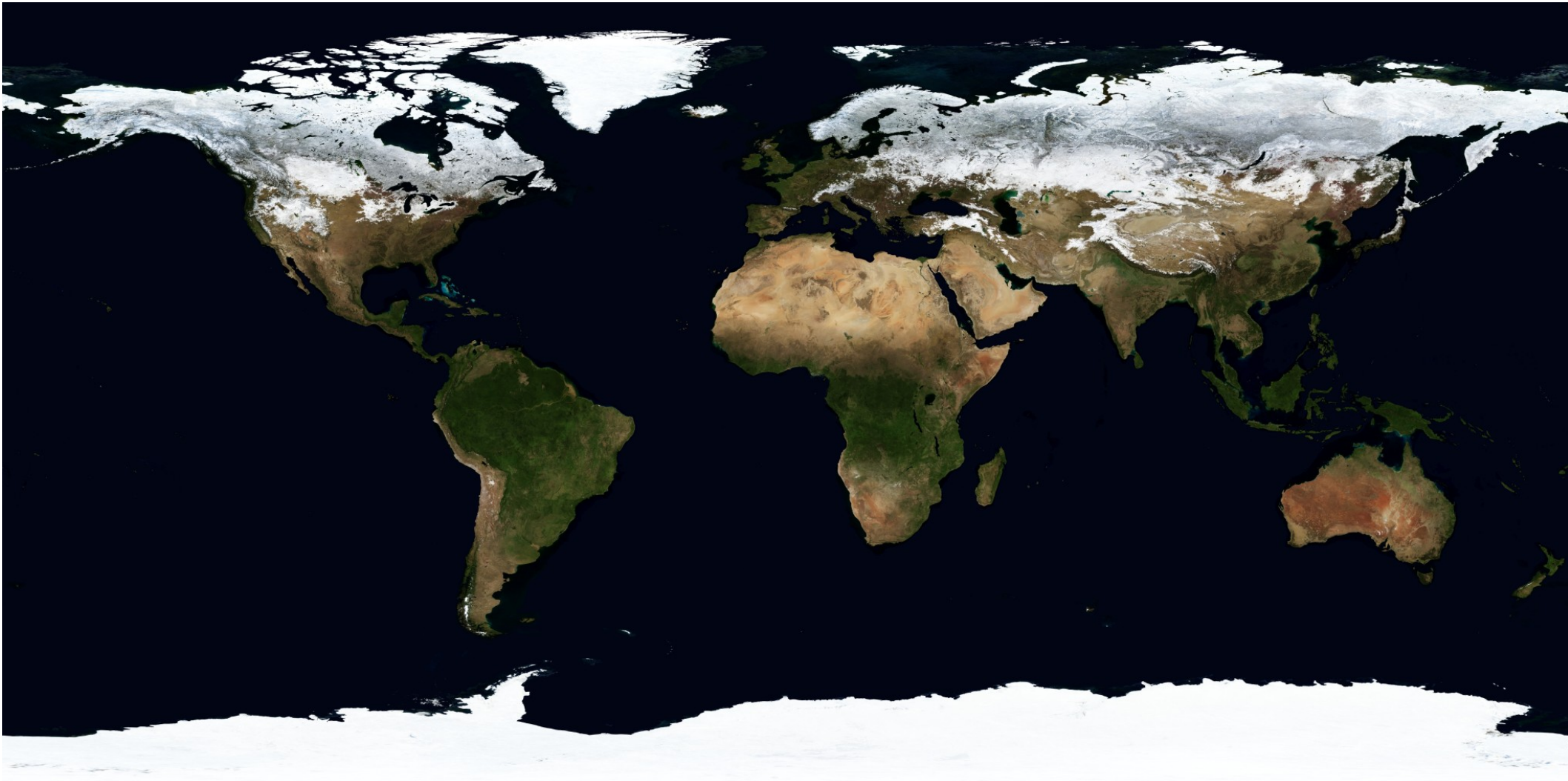
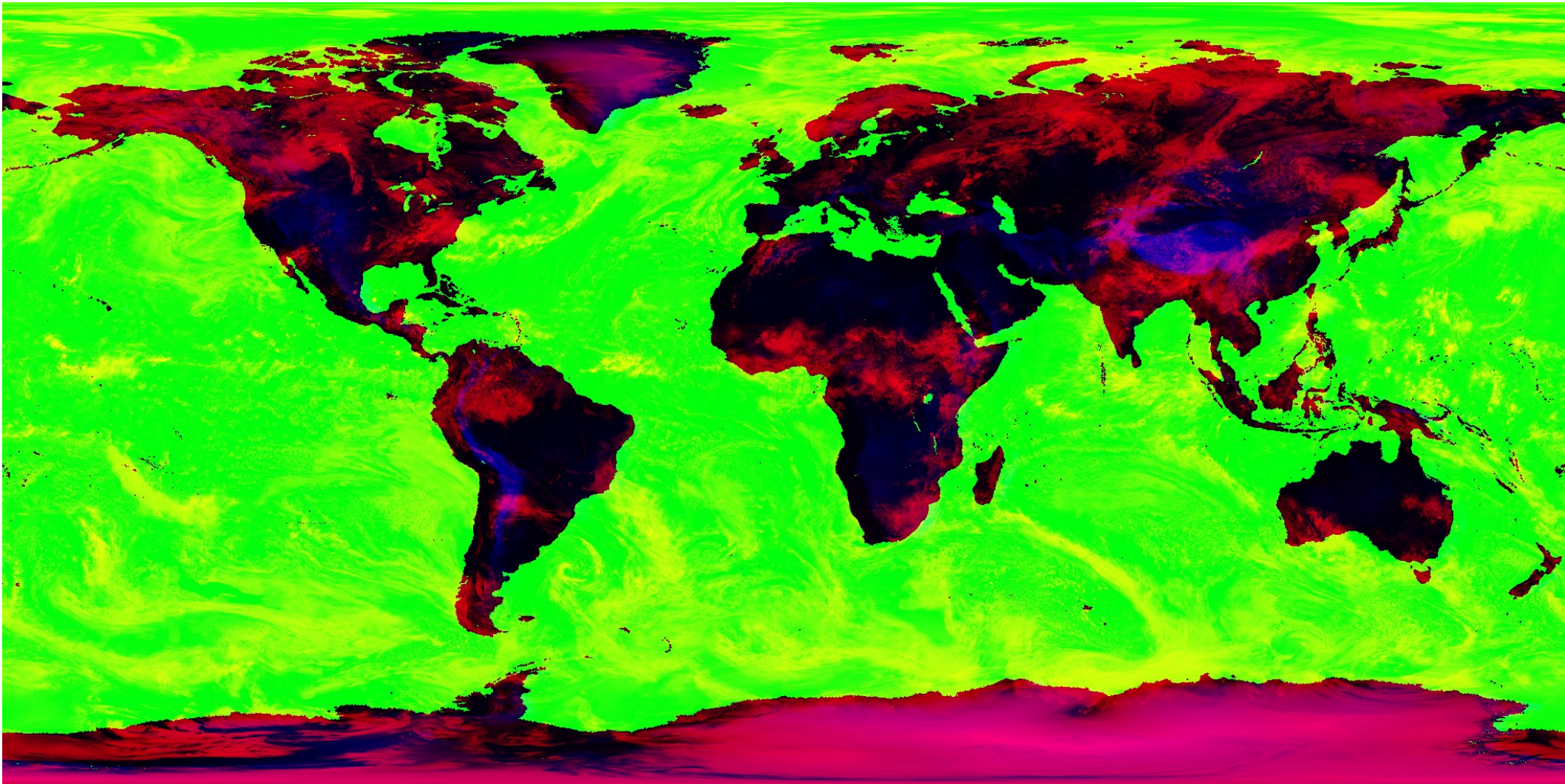# July Daytime Texture

Nightime Texture

Cloud Texture

Gloss (Ocean) Texture

Elevation Texture

Cloud (R) Gloss (G) Elevation (B)

Tasks

- Compute lighting
  - Gloss sets specular shininess
- Mix daytime textures to day of year
- Mix day and night textures
- Mix cloud with image
  - Reflects sun during day
  - Block lights at night

Passing textures to shaders

- Select texture units
  - glActiveTexture(GL_TEXTUREx)
- Select active texture
  - glBindTexture(GL_TEXTURE_2D , *name*)
- Map sampler to multitexture
  - id = glGetUniformLocation(shader , *varname*)
  - glUniform1i(id , ***x***)
    - ***x*** is 0,1,2,3 – texture unit
- In shader access is by sampler
  - texture2D(*varname* , texture_coords)

This is what it should look like

- Photograph from Apollo 17
  - Bright everywhere
  - Light blue oceans
  - Bright white clouds
- Lighting properties
  - Sun far away
  - Refraction