Journal of Visualization, Vol. 7, No.4 (2004) 272

Camera visualization of cloud fields simulated by non-hydrostatic atmospheric models

Iwabuchi, H. [1)] ***and Tsuboki, K.*** [1,2)]

1) *Frontier Research Center for Global Change, Japan Agency for Marine-Earth Science and Technology, 3173-25 Showa-machi, Kanazawa-ku, Yokohama, Kanagawa 236-0001, Japan.*
2) *Hydrospheric Atmospheric Research Center, Nagoya University, Furo-cho, Chikusa-ku, Nagoya, Nagoya 464-8601, Japan.*

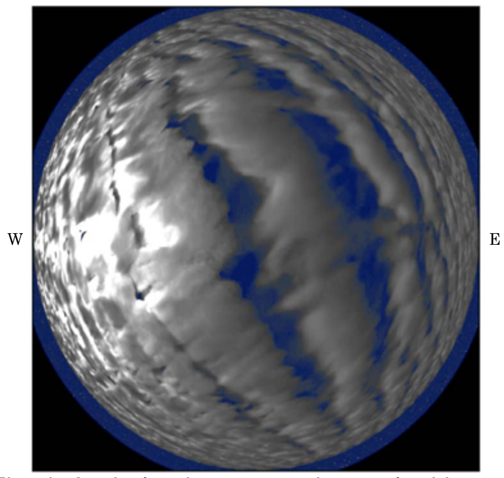

Fig. 1. A whole-sky camera image looking up from ground.

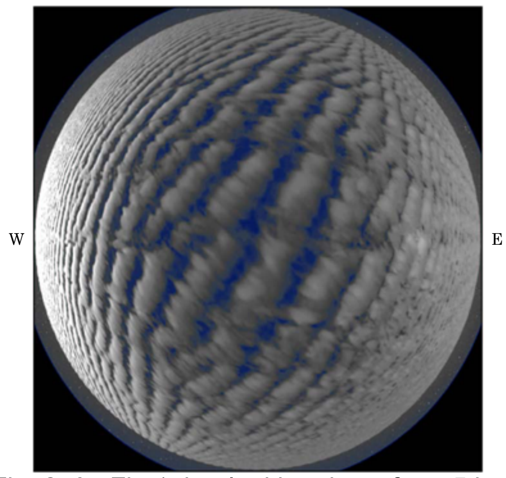

Fig. 2. As Fig.1, but looking down from 5 km above cloud top.

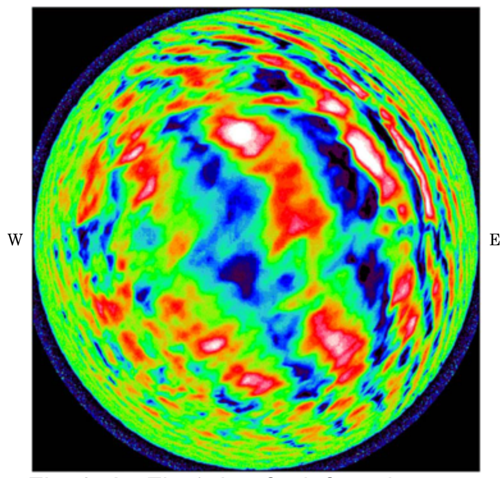

Fig. 3. As Fig.1, but for infrared camera.

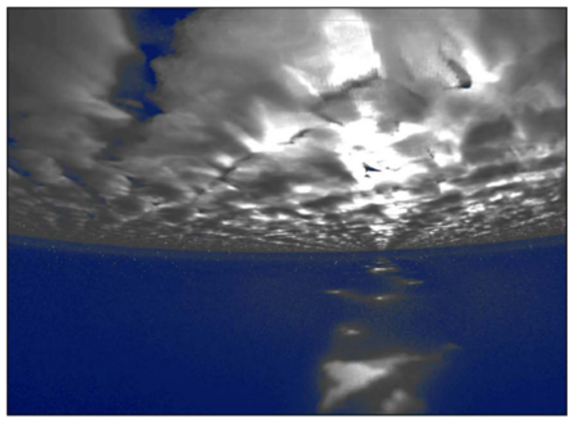

Fig. 4. Wide-angle camera image pointed at 10 degrees elevation angle and 20 degrees south of west, from 400 m above the ocean surface.

These figures show simulated camera images of marine stratocumulus clouds, which were realized by a non-hydrostatic atmospheric model, CReSS (Cloud Resolving Storm Simulator). The solar elevation is 30 degrees, and the sun is in the west. Monochromatic radiances at visible and infrared wavelengths were simulated by a three-dimensional radiative transfer model, which was based on the Monte Carlo photon-transport algorithm. Characteristics such as bright cloud edges near the sun and dark shadowed sides are consistent with human experiences. Reality of the visualized clouds depends solely on how well the cloud-resolving model represents physical processes, because the visualization using the radiation model is highly accurate.