



Center for

Information Fusion

Data Visualization System for 3D Data

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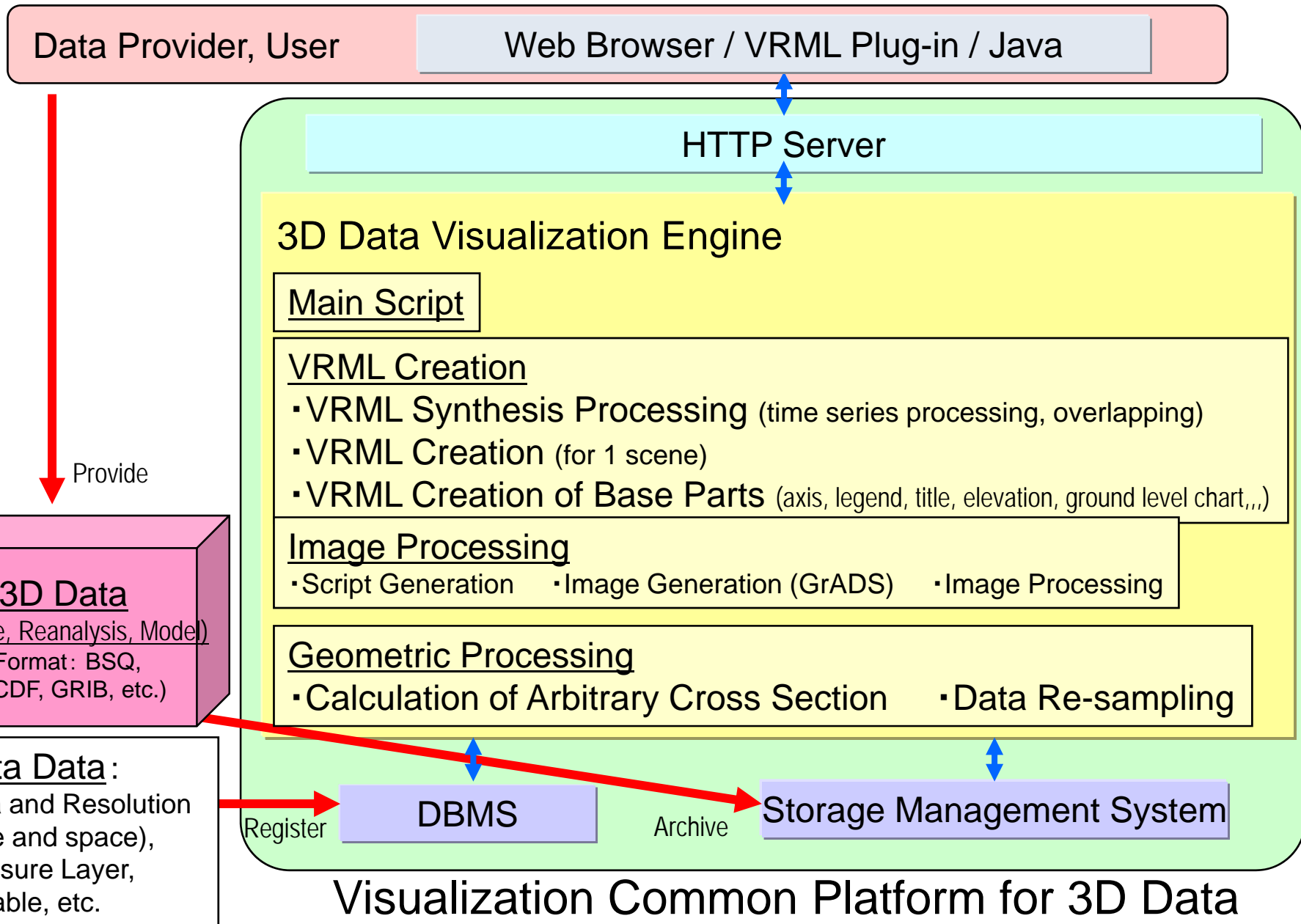
Powered Visualizer for 3D Data

Visualization system for three-dimensional datasets (AIRS products and JRA25 output)

Three key functions are implemented. The first is a rather naive function that allows users to visualize three-dimensional raw data through VRML. Second, the user can specify an arbitrary curve over the three-dimensional data set and then visualize its cross section. This has been proven to be very powerful for analyses of flow phenomena flow analysis. Third, users can easily specify various kinds of related data in IFRES to overlay on the cross section.

PVES: Powered Visualizer for Earth Environmental Science
Masaki Yasukawa, Masaru Kitsuregawa, Kenji Taniguchi, Toshio Koike
IEEE Systems Journal, 2, 3, 390-400, 2008

Powered Visualizer for 3D Data

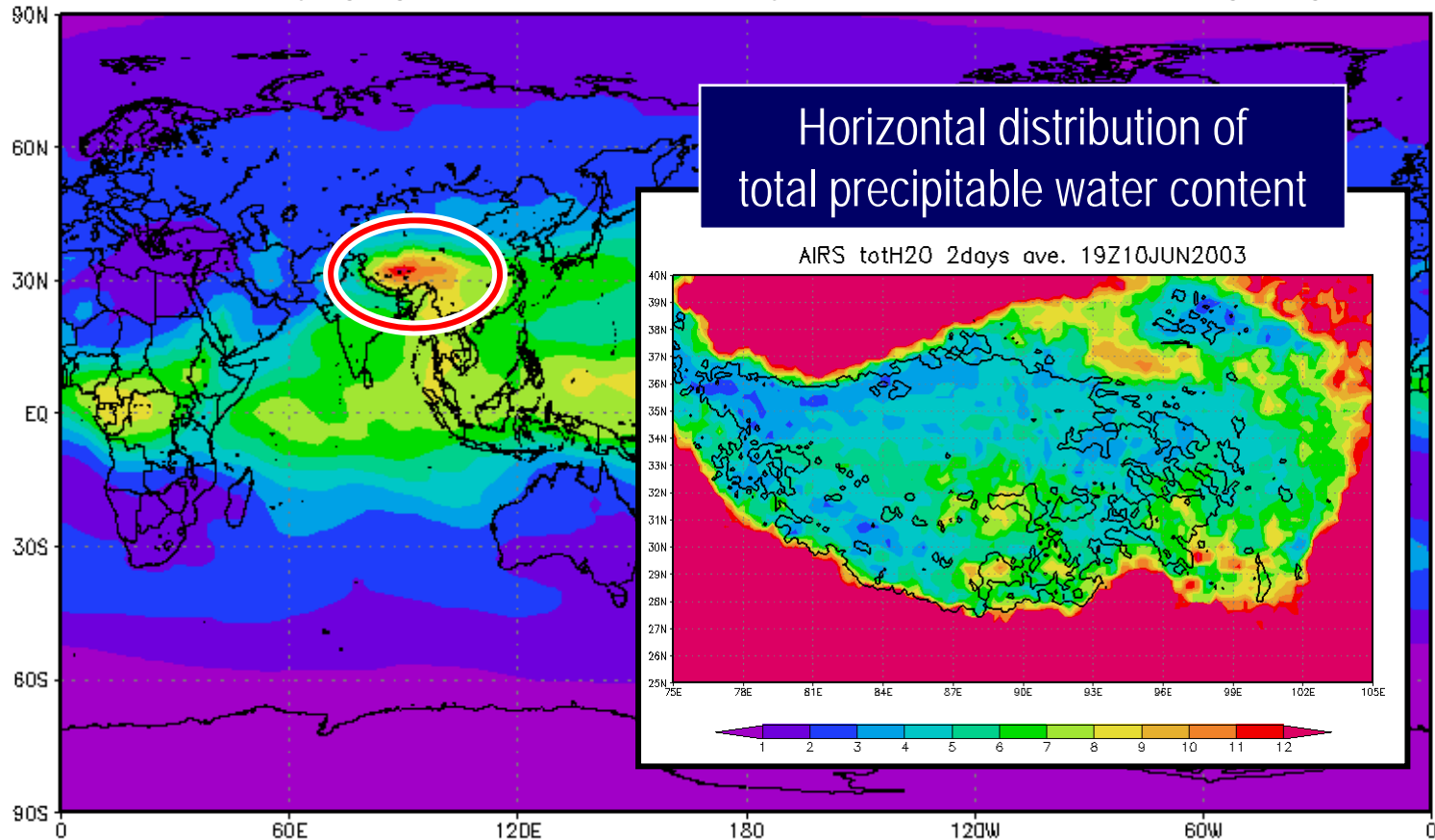


Analysis of Moisture Inflow in Tibetan Plateau

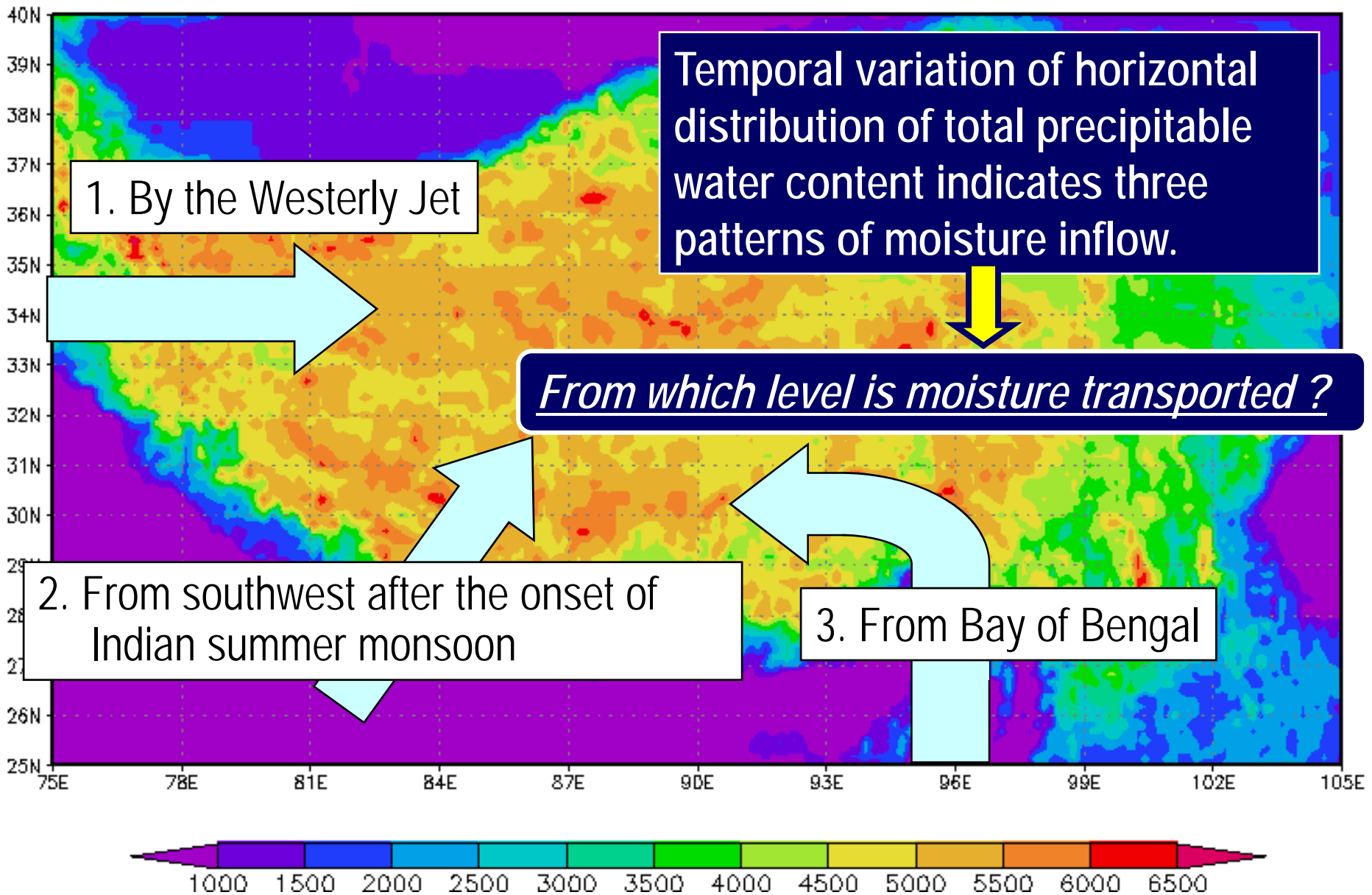
AIRS Data Arbitrary Slicer (3D plotting)

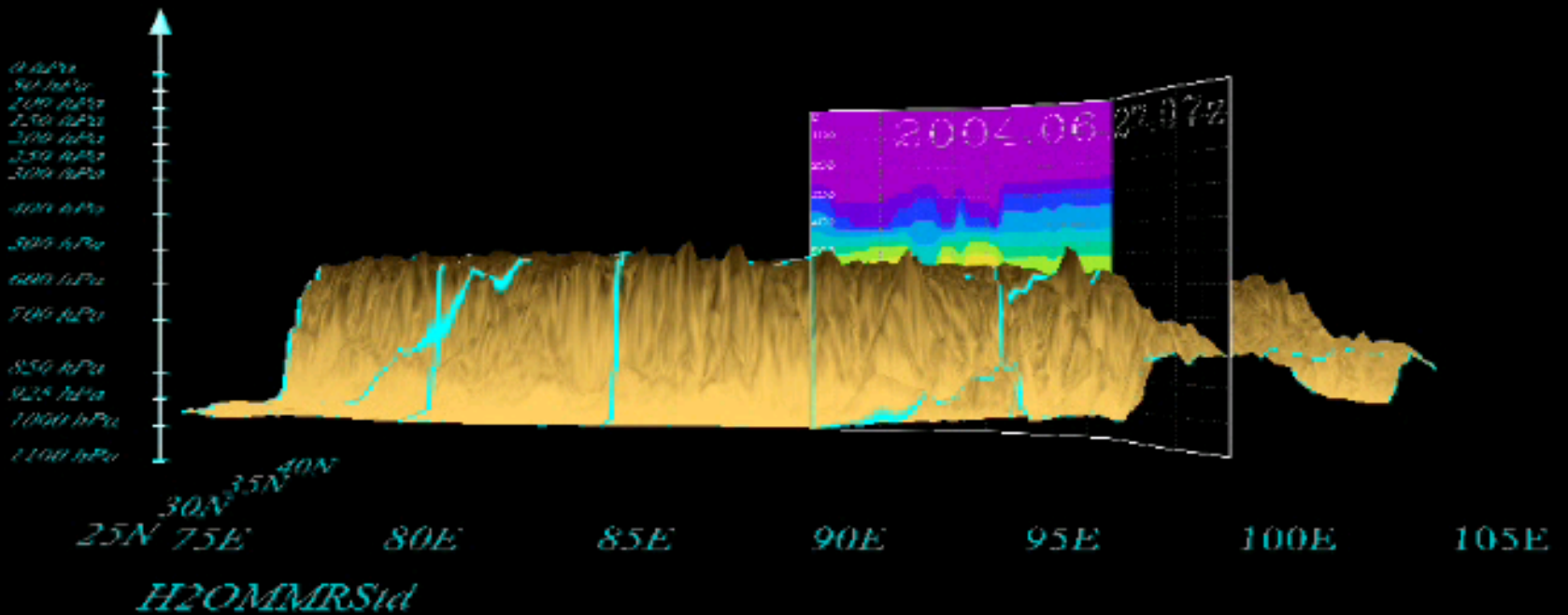
Study Target : Moisture source of Tibetan plateau

Specific Humidity (g/kg, NCEP/NCAR reanalysis) 500-300hPa Apr.-Aug. avg. 2003



AIRS Data Arbitrary Slicer

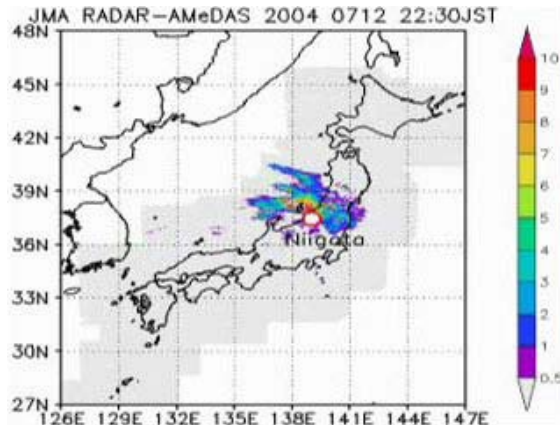


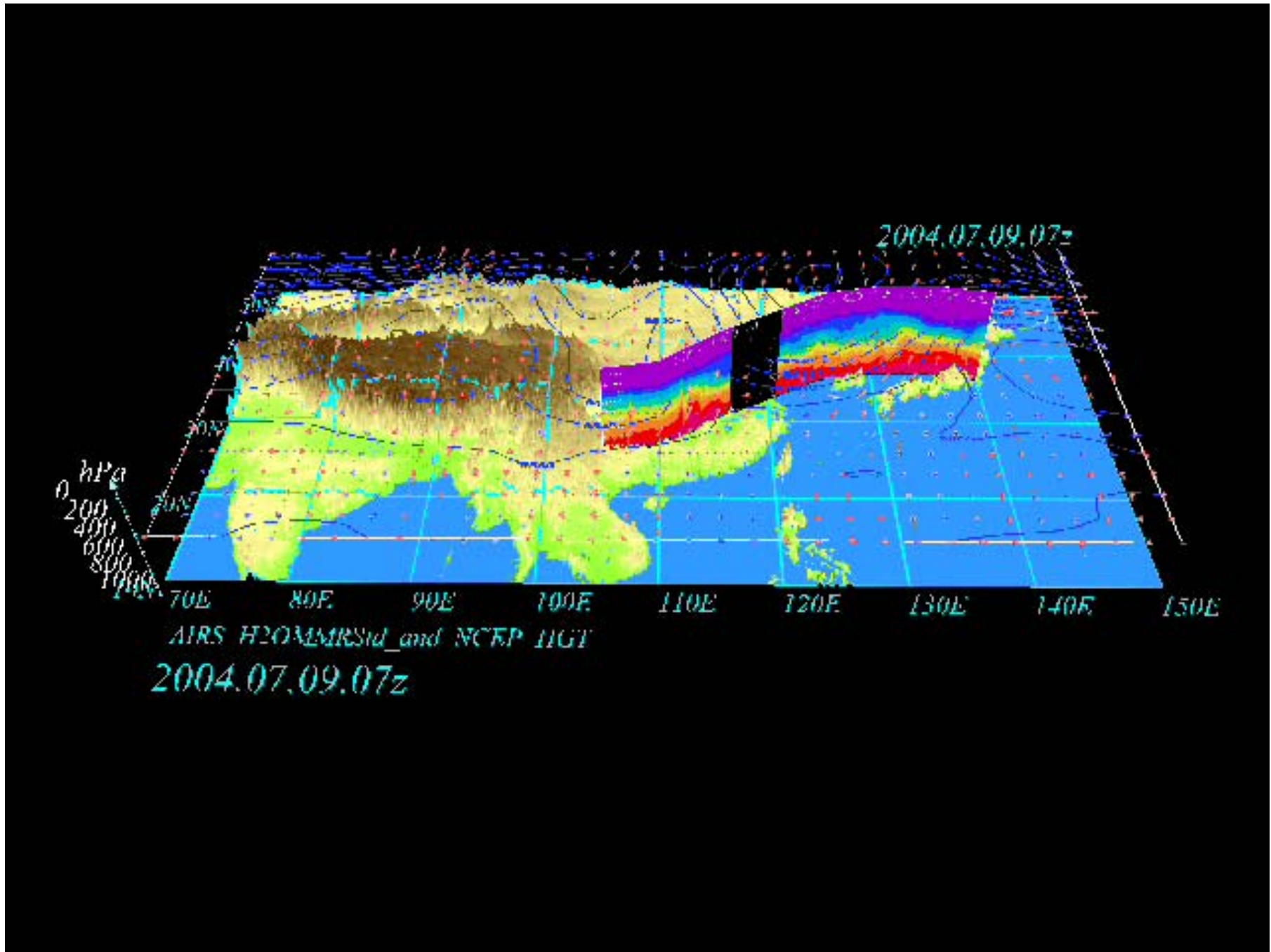


Analysis of Bai-u front in Japanese Islands

Heavy Rainfall in Niigata Prefecture and Fukui Prefecture in 2004

- ◆ 2004/07/09-2004/07/14
- ◆ Water vapor ratio of AIRS products
 - AIRS (Atmospheric Infrared Sounder) on Aqua Satellite
 - 28 pressure levels
 - Arbitrary cross section (Shaded contour plot)
- ◆ Geopotential height and wind of NCEP/NCAR reanalysis data
 - 17 pressure levels (Original)
 - Contour line (geopotential height)
 - Arrow (wind)





Recent Development of Visualization System for 3D Data

Powered Visualizer for 3D Data

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System Enhanced

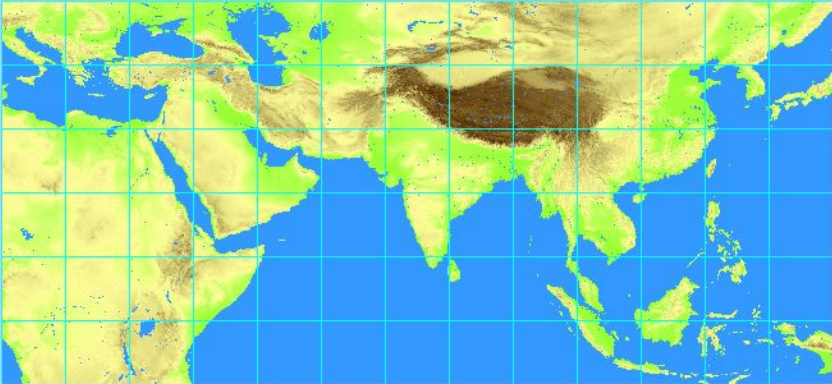
**New Target: NCEP/NCAR reanalysis data
(daily long term mean)
and its processed data**

Data Selection Page

3D Visualizer for NCEP Reanalysis Data - Windows Internet Explorer

http://fsviz.tk.iis.u-tokyo.ac.jp/ARPS/NCEP.cgi

3D Visualizer for NCEP Reanalysis Data



NCEP Reanalysis Data

Start: Month Day End: Month Day ← **Period**

Area Start Latitude: End Latitude: Start Longitude: End Longitude: ← **Area (Lat/Lon)**

Products: Anomaly Temp. (K) Adiabatic Heating (K) Diabatic Heating (K)
 Horizontal Advection (K)
 Thred: Elevation: From (m), To (m)

Products: Anomaly Temp. (K) + Wind Adiabatic Heating (K) + Wind Diabatic Heating (K) + Wind ← **Target Data (Users can select multiple elements)**
 Horizontal Advection (K) + Wind
 Thred: Omega Weight: Elevation: From (hPa), To (hPa)

Products: Anomaly Temp. (K) + Divergent Wind Adiabatic Heating (K) + Divergent Wind
 Diabatic Heating (K) + Divergent Wind Horizontal Advection (K) + Divergent Wind
 Thred: U-V Wind Weight: Omega Weight: Elevation: From (hPa), To (hPa)

Troposphere: No Yes

Visualization

Time Series: Slide Animation ← **Display Method (Slide or animation type)**

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The analysis on the tropospheric warming around the Tibetan Plateau at the onset phase of the Asian summer monsoon using the 3-dimensional visualized data

Background

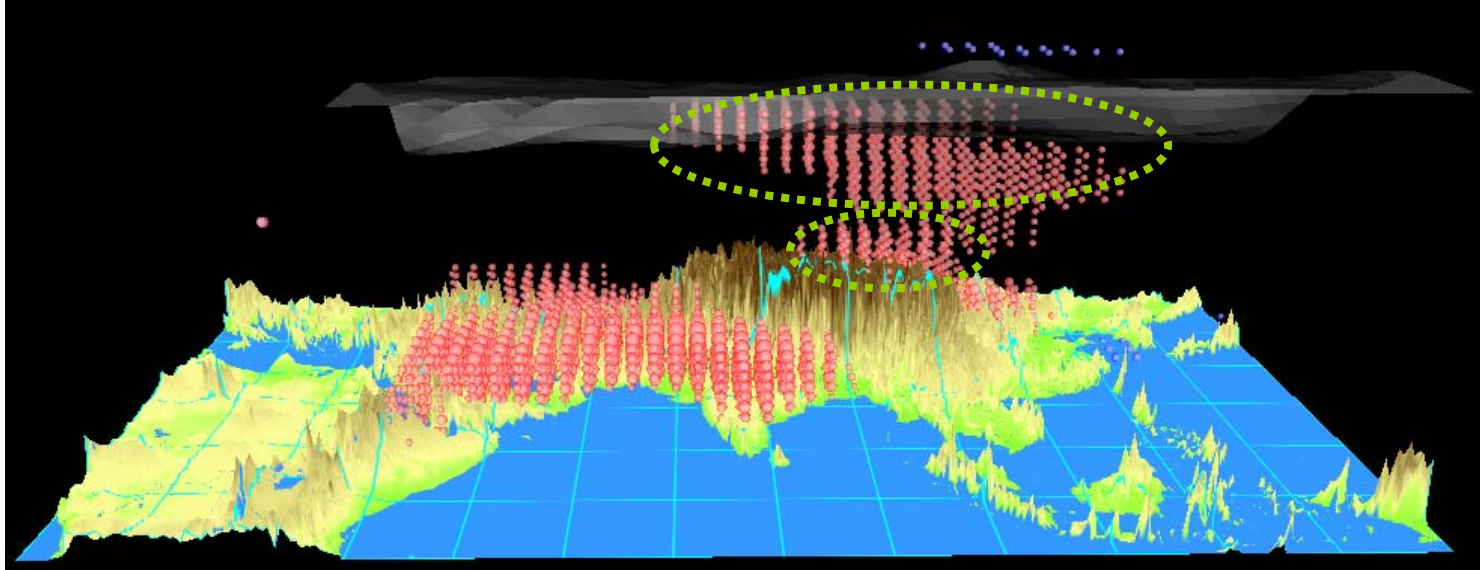
The Asian summer monsoon (ASM) is associated with the thermal contrast between land and sea in the deep troposphere.

>>Previous studies have suggested that the thermal forcing of the Tibetan Plateau (TP), as an elevated heat source, play an important role in the generation of the ASM. However, more recent studies (Taniguchi and Koike, 2007; 2008) revealed that the TP land surface heating cannot explain the upper tropospheric warming near the tropopause at the onset phase of the ASM, i.e. before the summer rainy season over the TP.

>>Objective: To Reveal the mechanism of the upper tropospheric warming over the TP at the onset phase of the ASM.

Data, Method

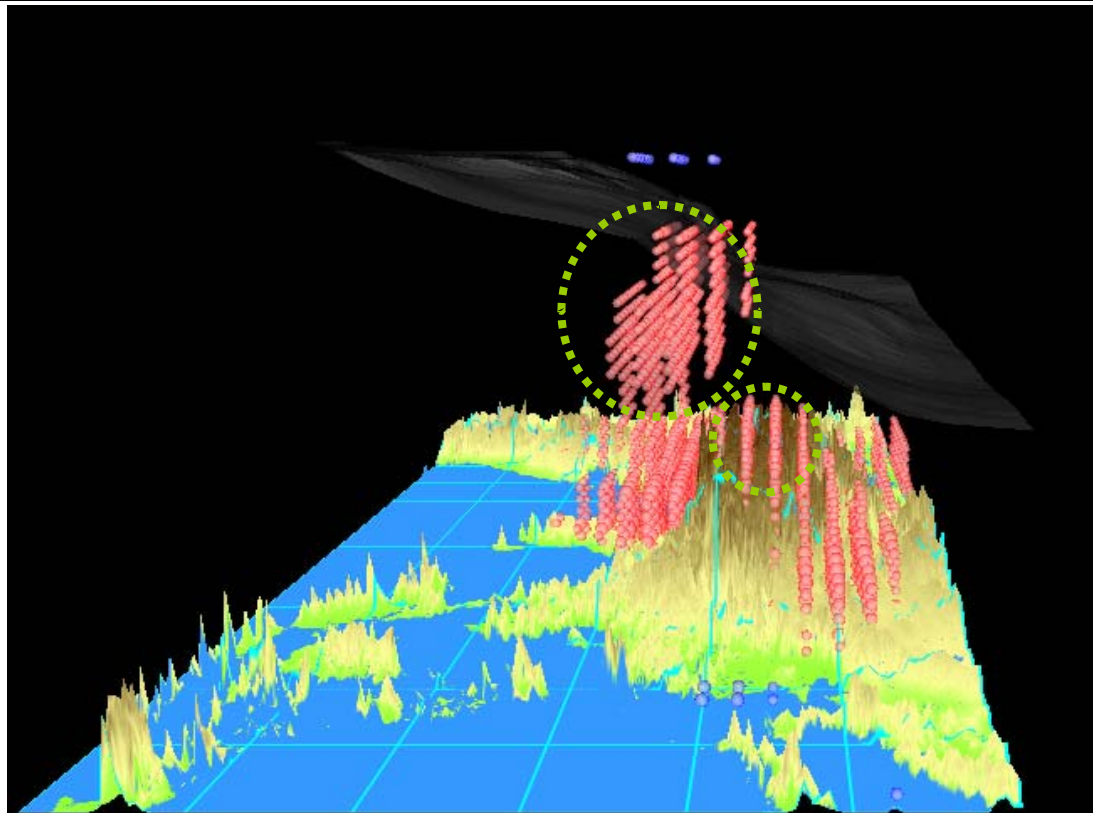
Data is processed based on the climatology (1968-1996) derived from the NCEP/NCAR reanalysis data. Visualize the temporal and spatial variation of the atmospheric temperature as well as the heat budget analysis.



Figures show the zonal asymmetric temperature (zonal anomaly) more than 4 K on climatological 10th May

>> In the mid to upper troposphere around the TP, there are the two significant warm anomalies. One is over the land surface of the TP, and the other is over the southern slope of the TP.

>> Dual tropospheric heating; land surface heating of the TP, and the adiabatic heating associated with the tropical deep convections



Summary

- PVES
 - Moisture inflow around Tibetan Plateau
 - Heavy rainfall in Niigata and Fukui
- Enhanced PVES
 - Tropospheric heating around the Tibetan Plateau

Future Plan

- Expansion of PVES for NCEP/NCAR reanalysis data
 - Increasing target data
 - Expansion of integration display