

News in This Quarter

AIR Force Steps up Participation



The US Air Force recently took steps to increase its participation in the JCSDA with the appointment of Dr Michael McAtee of The Aerospace Corporation to serve as the Air Force Weather Agency's (AFWA's) technical liaison to the JCSDA. Dr. McAtee currently provides onsite technical support to

AFWA in their data assimilation efforts. AFWA recently moved into the world of variational data assimilation with last year's successful implementation of the DoD's first operational three-dimensional variational system (3DVAR). That system, which supports worldwide operational execution of AFWA's mesoscale forecast model, relies heavily on the use of satellite data to provide critical information over conventionally data-sparse contingency areas such as Iraq and Afghanistan. AFWA's active participation in community data assimilation efforts such as JCSDA and the Weather Research and Forecast (WRF) model are seen as key to their ability to meet the needs, present and future, of the US military. In addition to sponsoring Dr. McAtee's participation, AFWA is establishing and funding a UCAR visiting scientist position at the JCSDA. Applicants are being sought to address one or more of the following:

- The Weather Research and Forecast (WRF) system development;
- Three dimensional variational (3DVAR) and advanced four dimensional data assimilation techniques for satellite data (primary), as well as radar, wind profiler, aircraft, and other non-conventional data;
- Improved mesoscale cloud forecasting and cloud microphysics, including assimilation of real-time satellite-based cloud and precipitation information;
- Mesoscale modeling techniques, to include cumulus, boundary layer and radiation parameterizations, and radiative transfer applications for the assimilation of satellite radiance observations.

Details on the position requirements and the application process can be found at the UCAR Visiting Scientist Web Site: <http://www.vsp.ucar.edu>

Science Development and Implementation (JSDI) Program

On August 6, 2003, the Joint Center management team reviewed the JSDI program. The JCSDI program is intended to support directed research by scientists at the JCSDA partner agencies. It is focused on short-term payoff, technology transfer type projects and complements the JCSDA A/O, which supports extramural research with longer-term technology transfer benefits. Currently, JSDI tasks are funded primarily by NESDIS/Office of Research and Applications - Joint Center funds, but next year other JCSDA partner agencies will participate in both funding and science activities. Several JSDI projects have made outstanding progress: 1) NASA EOS-Aqua AMSR data have been converted to the BUFR format required by NCEP/EMC. This task is also partially supported by NASA Headquarters. 2) The NCEP/EMC NWP cloud analysis and verification system produces high-quality cloud information (cloud fraction, heights, liquid water and ice water, particle size) to improve the NWP grid-scale cloud prediction scheme. 3) A microwave snow emissivity model has been developed to improve and increase the use of satellite microwave sounding data over high latitudes. 4) Global real-time green vegetation fraction data is being generated and will be tested this fall in the NCEP/EMC Land Data Assimilation System (LDAS). The real-time data will replace the climatological data currently being used. 5) A new physical approach, based on direct radiance assimilation of AVHRR observations, has been developed to derive sea surface temperatures (SST) from satellite observations. It is extensible to other instruments which are sensitive to SST, in particular

37 Letters of Intent Received for FY04 Announcement of Opportunity (A/O)

Thirty-seven letters of intent (LOI) have been submitted to the JCSDA in response to its 2004 Announcement of Opportunity. A total of 18 LOIs were selected for submission of full proposals. The deadline for the full submission is 5:00pm EST, October 1, 2003. Details for FY2004 AO can be found at the website site:

<http://www.ofa.noaa.gov/~amd/SOLINDEX.HTML>

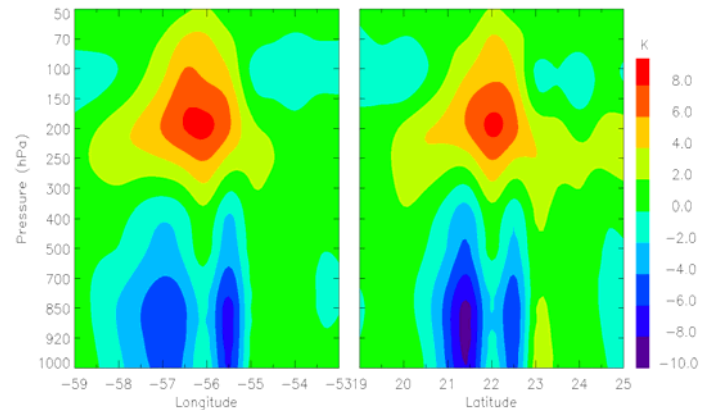
Approximately \$1 million will be available to fund successful proposals; an additional \$ 1 million will support A/O projects started under the FY 03 A/O.

Management Oversight Board (MOB)

The JCSDA MOB Directors (Louis Uccellini, Franco Einaudi, Marie Colton, Mike Farrar, and Simon Chang) met at NOAA Science Center on September 15, 2003. The JCSDA management team presented the FY 03 annual report and FY 04 program plan. The MOB concurred with plans for FY 04 JCSDA funding by the partner agencies. While the MOB is very pleased with the collaboration between NESDIS and NWS, it recommended that the JCSDA management team increase collaboration among other partners through directed and A/O research. The MOB also suggested having a JCSDA Advisory Board meeting in the coming year to determine if there are any major policy issues related to the future development of the JCSDA. The JCSDA management team recommended, and the MOB approved, adding two technical liaisons to the Center from NESDIS/Office of Satellite Data Processing and Distribution (OSDPD) and DoD/ARMY. This will further enhance communications among broad communities that need improved satellite data assimilation technologies.

Science Update: Advanced Microwave Sounding Unit (AMSU) Observations of Hurricane Isabel

Microwave soundings of the cloudy, precipitating atmospheres in hurricanes are affected by the clouds and precipitation as well as temperature and moisture. Fuzhong Weng and Tong Zhu of the JCSDA have developed a way of extracting hurricane temperature and moisture profiles by correcting the observations for the cloud and precipitation influences. To produce this correction, hurricane radiosonde and dropsonde observations are collocated with the satellite microwave measurements. The collocated data are used to simulate the microwave radiances for clear atmospheres. The differences between the actual satellite measurements and simulated radiances are used to determine a set of correction coefficients. At microwave frequencies, the observed brightness temperatures, after correction, can be directly utilized in one-dimensional variational retrieval to obtain temperature and water vapor profiles under cloudy conditions. The technique was applied to NOAA-16 Advanced Microwave Sounding Unit (AMSU) observations of hurricane Isabel and revealed quite vividly the warm core structure of the system, as shown in the accompanying figure. Notice that at the mature state Hurricane Isabelle had an 8 K warm-core anomaly and a radius about 70 km, conditions comparable to Hurricane Bonnie in 1998 but with a warm core size somewhat smaller than that of Bonnie. The thermal-dynamic information obtained from the AMSU is also assimilated into NWP models to improve Isabel intensity and track forecasts.



Vertical cross section of temperature anomalies at 06:00 UTC 09/12/2003. Left panel: west-east cross section along 22°N, and right panel: south-north cross section along 56°W for Hurricane Isabel

Outlook for Next Quarter

13th International TOVS Conference

The International TOVS Working Group (ITWG) will sponsor its 13th International TOVS Study Conference, Montreal, Oct. 29-Nov.4. ITWG initially focused on the uses of NOAA TOVS sounding data but today it covers NWP data assimilation, including radiative transfer modeling, climate applications, advanced sounding instruments and products, international coordination, and exchange of visiting scientists between major NWP centers. A number of JCSDA scientists will participate.

Upcoming Seminars



Kostya Vinnikov

After a summer break, JCSDA seminars will resume in the fall. Kostya Vinnikov, in a seminar co-sponsored by the NESDIS/ORA seminar series, will discuss Trend of Mean Tropospheric Temperature Observed by Satellites on October 15. Michael McAtee, Air Force Weather Agency, will speak on Data Assimilation Activities at the Air Force Weather Agency on November 19. And Bill Rossow, NASA Goddard Institute for Space Studies, will present on Satellite Measurements of Cloud Properties on December 17.