

News in This Quarter



JCSDA Partner
Agencies: Focus on
NOAA's Office of

Oceanic and Atmospheric research

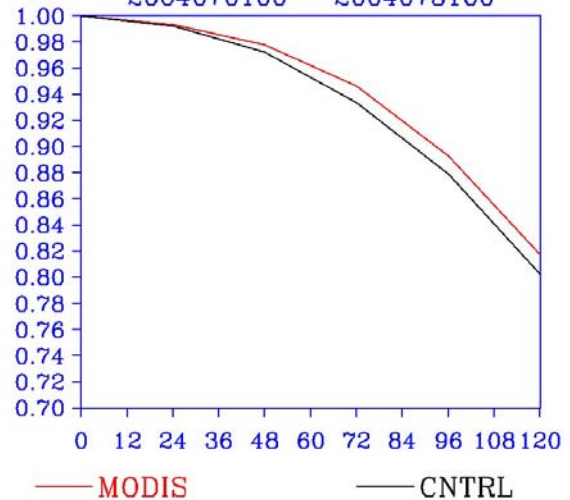
The NOAA Office of Oceanic and Atmospheric Research (OAR) is one of six line offices within NOAA and is responsible for research in support of NOAA's operational services, including weather forecasting, coastal monitoring, satellite applications, and fisheries management. The work performed within OAR spans a wide range of operationally-driven activities, including the development of supercomputer-based climate prediction models, new meteorological sensors and systems, assessment of the chemical state of the atmosphere, and improvement of weather forecasting models through regional process studies. Within OAR, the NOAA Environmental Technology Laboratory (ETL) and Forecast Systems Laboratory (FSL) perform research specifically in support of the Joint Center for Satellite Data Assimilation. This work focuses on testing of advanced observation systems to improve forecast accuracy and specificity and full utilization of current NOAA observation systems. Primary efforts include fast radiative transfer (RT) modeling for all-weather microwave satellite radiance assimilation within ETL and modeling and observation system testing at FSL.

The ETL all weather assimilation effort has resulted in the development of a new fast scattering-based algorithm for computing the Jacobian of the forward RT model. The algorithm is suitable for accommodation of scattering in both the microwave and optical regimes at operational speeds. It is currently being incorporated into the NCEP Common Radiative Transfer Model (CRTM) framework for compatibility testing and will be applied to global assimilation of AMSU and NPOESS data. The algorithm will also be an important component of an observation system simulation experiment being developed to study the design of a geosynchronous microwave sounder. FSL has recently drawn upon work completed in the summer of 2004 showing that asymptotic moisture error in NWP models is greater than expected. To address this problem a strategy of assimilating GPS bias-corrected gradient structure from the GOES imager and eventually coupling this with either the WRF Rapid Refresh or Gridpoint Statistical Interpolation (GSI) assimilation system is being explored.

(A. J. Gasiewski (NOAA/ETL) and D. Birkenauer, NOAA/FSL)

Science Update: Navy Assimilates MODIS Winds Operationally

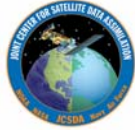
NOGAPS DATA ASSIMILATION TEST
500 MB NP REGION HEIGHT ANOMALY COR
2004070100 - 2004073100



Improvement in average 500 mb height anomaly correlation as a function of forecast range (hrs) in the Navy's MODIS tests for July 2004 north of 60°N. MODIS forecasts use all operational data + MODIS winds; CNTRL forecasts use all operational data.

After successful testing, the U.S. Navy's Fleet Numerical Meteorology and Oceanography Center (FNMOC) is assimilating MODIS (MODerate-resolution Imaging Spectroradiometer) winds in polar regions in its global forecast model. The tests (see figure) indicate a 5-hour extension of forecast skill in Polar Regions. The winds are derived by tracking cloud and water vapor features in MODIS imagery in successive passes by NASA's Terra and Aqua polar-orbiting satellites over high latitudes. NOAA's Cooperative Institute for Meteorological Satellite Studies at the University of Wisconsin-Madison produces the winds in near-real time, using 11 μ m infrared and 6.7 μ m water vapor imagery.

Testing of MODIS winds was accomplished by running NAVDAS (NRL Atmospheric Variational Data Assimilation System) using all operational data with and without the addition of MODIS winds, then running the Navy Operational Global Atmospheric Prediction System (NOGAPS) to generate forecasts out to five days. A positive impact was seen in the 500 mb height anomaly correlation, especially in the Southern Hemisphere and in the Arctic for forecast ranges



greater than 48 hr. The improvement in the Arctic was also accompanied by a reduction in RMS errors for not only vector winds but also heights and temperatures. Further details about the MODIS tests can be found in Pauley and Pauley (2005).

(Pauley, P.M., and R.L. Pauley, 2005: Operational testing of MODIS winds in NAVDAS. Preprints, 9th Symposium on Integrated Observing and Assimilation Systems for Atmosphere, Ocean, and Land Surface, American Meteorological Society, San Diego, California.)



Meet Dan Pawlak

Major Dan Pawlak recently began his assignment as the Air Force Liaison to NOAA's National Centers for Environmental Prediction. In this position, he ensures cooperation between NCEP's Environmental Modeling Center and the Air Force Weather Agency by enhancing communication between the agencies. Dan will also be making a technical contribution to the Joint Center for Satellite Data Assimilation by focusing on the assimilation of radiances from the Defense Meteorological Satellite Program Special Sensor Microwave Imager-Sounder for use in the Weather Research and Forecasting mesoscale model.

Dan was born in Buffalo, NY and graduated from Kenmore West High School. He enlisted in the U. S. Air Force in 1984. After serving ten years as an enlisted meteorologist, he was selected for the Airman's Education and Commissioning Program and was commissioned through Officer Training School at Maxwell AFB. As a weather officer he supported the 2d Armored Cavalry Regiment and the Joint Readiness Training Center at Ft Polk, LA. He also expanded the Air Force Weather Agency's ability to support worldwide operations through the operation and enhancement of the MM5 forecast model system. Dan was the Commander of Detachment 1, 607th Weather Squadron, and was responsible for weather support to the 2d Infantry Division and operations along the Korean Demilitarized Zone.

Prior to his assignment to Penn State, Dan was a doctoral student, Air Force Institute of Technology, Civilian Institutions Division, at the Pennsylvania State University. His research efforts focused on the development of an accurate and efficient algorithm for mesoscale numerical weather prediction models to calculate the absorption and scattering of solar energy by atmospheric gases and liquid- and ice-cloud drops.

Major Pawlak and his wife, Anita, have two children, Thomas and Katherine.



After a 4-year long planning phase, the THORPEX (The Observing system Research and Predictability EXperiment) program will officially enter its execution phase in January 2005. The program's international governing body, the International Core Steering Committee (ICSC), met in early December 2004 in Montreal and accepted with some additions the THORPEX research Implementation Plan (TIP) that was prepared by an Expert Group, along with the management structure of the program. The day-to-day activities of the program will be led by an Executive Board, comprised of the leaders of the four scientific sub-program working groups on observing systems, data assimilation, predictability, and socio-economic applications research, as well as the chairs of the Regional Committees and other working groups. The EB will have a full time director and will be assisted by an International Program Office hosted at the World Meteorological Organization in Geneva. The ICSC meeting was followed in Montreal by the first THORPEX Science Symposium. This meeting attracted around 200 scientists from around the world who presented and discussed scientific results related to the four sub-program areas of THORPEX.

THORPEX is a World Meteorological Organization (WMO) sponsored, long-term international research program aimed at accelerating improvements in the quality and utility of high societal impact weather forecasts over the 1-14 days time range.

In the US, NOAA is an active participant in the program. The National Aeronautics and Space Administration (NASA), the Office of Naval Research (ONR), and The National Science Foundation (NSF) are in the process of defining their roles. The Joint Center for Satellite Data Assimilation (JCSDA), with its expertise in the areas of satellite remote sensing and data assimilation, is expected to contribute to the success of the THORPEX program.

(Zoltan Toth, NWS)



JCSDA Jottings

- **Visitors:** Rolf Reichle, NASA Goddard Global Modeling and Assimilation Office, presented a seminar on *Soil Moisture Assimilation in a Land*



Data Assimilation System, on Oct 20, 2004. During his visit Rolf met with Dog Lohman of NCEP's Hydrology Working Group.

Liu Xu, William L. Smith, Daniel Zhou, and Allen Larar, NASA Langley Research Center, visited on Nov. 23, 2004, and discussed with JCSDA staff a new approach to fast, accurate radiative transfer modeling. Liu presented a Special JCSDA Seminar on *A Super Fast Principal Component-based Radiative Transfer Model for Advanced Hyperspectral Sensors*.

- **FY 05 A/O:** The JCSDA received 16 full proposals in response to its FY 2005 Announcement of Opportunity for research grants. Review of those proposals compliant with the submission requirements will be complete by the end of January. Funding decisions based on the reviews and the availability of resources will be announced in late February.
- **Cloud/Precipitation Workshop:** The JCSDA international workshop on the *Assimilation of Satellite Observations of Clouds and Precipitation* will be held at the National Conference Center, Lansdowne, VA, about 12 miles from Dulles airport. The Organizing Committee is co-chaired by Ron Errico, NASA and George Ohring, JCSDA, and includes Joe Turk, Naval Research Laboratory, Jean-Francois Mahfouf, Environment Canada, Fuzhong Weng, NOAA/NESDIS, Ken Campana, NOAA/NCEP, and Peter Bauer, ECMWF.

UCAR are collaborating to determine the optimal set of quality control flags for COSMIC, based on CHAMP data. Finally, a preliminary assessment of the costs and benefits of assimilating bending angles instead of refractivity is being made. (Jim Yoe, NESDIS)

Directed Research Announcement

Funding decisions for the JCSDA Directed Research program were announced in late October. Twelve of the proposals submitted were funded. Three others may be funded later in the event that additional resources become available to the JCSDA. The Directed Research program supports Internal Investigators including NESDIS cooperative institutes and other JCSDA partners conducting research on near-term payoffs in transition of research to operations. The program is supported by NOAA/NESDIS, NOAA/NWS-US Weather Research Program, and NASA.

Outlook for Next Quarter

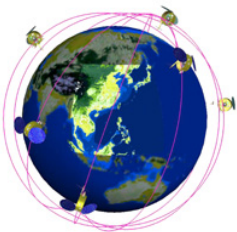


Upcoming JCSDA Seminars

2/23/05	Graeme Stephens	Colorado State University	Cloudsat and Calipso
3/16/05	Peter Norris	NASA Goddard Global Modeling and Assimilation Office	Assimilation of Satellite Cloud Data into the GMAO Finite Volume Data Assimilation System
4/13/05	Gene Poe	Naval Research Lab.	SSM/IS

Suggestions for speakers and topics are always welcome: please send them to george.ohring@noaa.gov.

Cosmic Corner



The launch date for the Constellation of Satellites for Meteorology, Ionosphere, and Climate (COSMIC) has been set for December 15, 2005. With preliminary preparation and testing for the assimilation of refractivity profiles from COSMIC

(and for METOP/GRAS) complete, emphasis is shifting to setting up and trouble-shooting operational links and procedures. CHAMP data have been processed by the COSMIC Data Analysis and Archive Center (CDAAC), delivered to the NESDIS in WMO BUFR format, and decoded, and tables for converting to "NCEP-flavored" BUFR have been devised. In the months to come, end-to-end testing of the data pipeline is planned to make certain that COSMIC observations can be processed and delivered in time for operational assimilation. The JCSDA and colleagues at

Please submit news items 2 weeks prior to the end of each quarter to george.ohring@noaa.gov