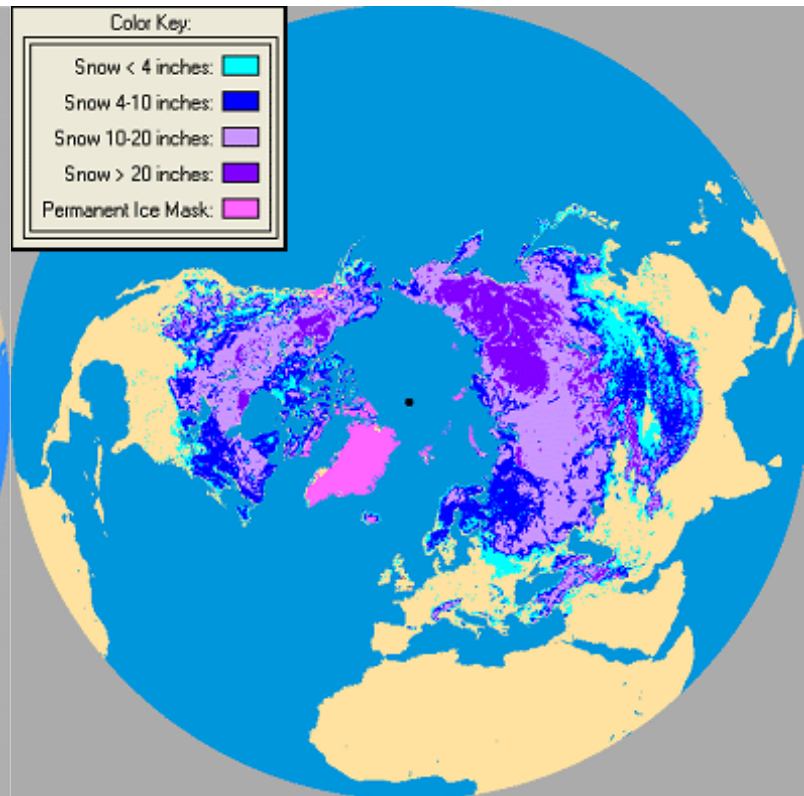


News in This Quarter Science Update

Air Force Weather Agency Land Information System and Snow Analysis Model



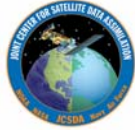
MODIS/AMSR-E Snow Cover
 (Feb.20, 2008)



AMSR-E Snow Depth (Feb.20, 2008)

The Air Force Weather Agency (AFWA) and NASA Goddard Hydrological Sciences Branch have worked together extensively over the past few years to build a system to support high resolution Department of Defense (DoD) land surface characterization capabilities through the NASA Land Information System (LIS). The most significant recent advancement in LIS is the inclusion of a generalized version of the NASA Global Modeling and Assimilation Office (GMAO) Ensemble Kalman Filter (EnKF) to support future data assimilation goals, including remotely sensed surface observations. The GMAO EnKF module was released in LIS version 5, and is available for download from the NASA LIS website at <http://lis.gsfc.nasa.gov>.

The AFWA continues to participate with the National Centers for Environmental Prediction (NCEP) Environmental Modeling Center partnership to improve LIS capabilities. Currently, the LIS team is working with the JCSDA and NCEP to build an interface to the Community Radiative Transfer Model. The combination of the EnKF and CRTM modules in LIS will enable a much broader satellite-based land surface observation assimilation capability in the future. Additionally, NASA is nearing the completion of a project to evaluate the assimilation of geostationary-based skin temperature observations and NASA Earth Observing System (EOS) Moderate resolution Imaging Spectroradiometer (MODIS) snow cover and Advanced Microwave Scanning



Radiometer for EOS (AMSR-E) snow water equivalent observations into LIS through the EnKF module.

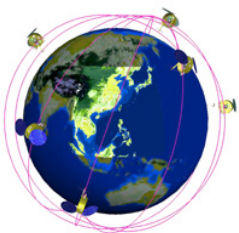
AFWA is actively working to complete final software engineering work prior to operational implementation of LIS by late 2008. The LIS software will initially be implemented in parallel with the current AFWA Agriculture Meteorology (AGRMET) model for a short period of time until downstream users and applications complete the transition to use LIS-based products.

AFWA is also working with the NASA Goddard Snow Team (GOST) to add new capabilities to incorporate remotely sensed snow cover and depth observations into the AFWA global Snow Depth Analysis Model (SNODEP). The current operational SNODEP model relies primarily upon surface-based synoptic snow depth measurements to create the global snow depth analyses. The improved science developed by the GOST team is a new algorithm that blends MODIS snow cover measurements with AMSR-E snow depth and snow cover measurements. The new algorithm, termed ANSA for AFWA NASA Snow Algorithm, provides a significant boost in the AFWA global snow measuring mission (see figure, previous page).

AFWA is actively working to integrate the new ANSA capabilities into the SNODEP model with a target operational date in the summer of 2009. NASA and AFWA continue to collaborate on further development of the ANSA algorithms to add new snow melt products using AMSR-E and NASA QuikSCAT data. The new products should help to augment the AFWA global snow mapping and snow characterization mission support to the DoD community.

(J. Eylander, AFWA; C. D. Peters-Lidard, D. Hall, J. Foster, and R. Reichle, NASA GSFC; and S. Kumar, SAIC Inc. and NASA GSFC)

Cosmic Corner



Processing of data by the University Corporation for Atmospheric Research COSMIC Data Analysis and Archive Center reached a peak of 2500 profiles on July 30th, 2008. The number of soundings processed and delivered to the operational numerical weather prediction centers varies from day to day but averages around 1500 soundings.

The JCSDA is updating the procedures for checking data quality and characterizing the observation errors. This update will improve the use of the COSMIC observations and also allow the assimilation of radio-occultation data from the CHAMP and GRACE-A satellites, which are being processed in Europe.

The JCSDA has also started analyzing the quality of GRAS observations, the radio-occultation instrument on Metop-A. Preliminary results indicate that the latency of the data is still too high (too long a delay between observation time and receipt of data by operational centers) and the quality of the data may not be as good as that of the other radio-occultation instruments. The processing center in Europe is working on both issues and expects to declare the data operational during September 2008.

JCSDA's Director, L.-P. Riishojgaard and L. Cucurull participated in the Formosat-3/COSMIC Annual Science meeting Oct 1-3, held in Taipei in conjunction with the 4th Asian Space Conference. NOAA management officials participated in meetings following the Conference to discuss options for a COSMIC follow-on mission. L. Cucurull visited and presented a seminar at the Central Weather Bureau (Taiwan) on Sept. 30.
(L. Cucurull, JCSDA)



The 2nd International THORPEX Workshop was held 22-26 September 2008 in Geneva, Switzerland. At the opening plenary meeting, participants heard reviews of activities over the past 2 years by the Observing System, Data Assimilation and Observing Strategies, the Predictability and Dynamical Processes, and the GIFS-TIGGE Working Groups (WG), the African, Asian, European, North American, and Southern Hemisphere Regional Committees, and the World Weather Research Program (WWRP) Socio-Economic Research Applications (SERA) WG. This was followed by separate meetings of the 4 THORPEX WGs. The Workshop ended with a plenary where the THORPEX WGs presented their plans for the coming 2-3 year period to the THORPEX Executive Council. The plans will be further reviewed by the THORPEX International Core Steering Committee (ICSC) at their upcoming meeting in November.

Upcoming meetings of interest are the 4th North American Ensemble Forecast System (NAEFS) Workshop (6-8 October 2008, see:

http://wwwt.emc.ncep.noaa.gov/gmb/ens/UserWkshop_Oct2008.html) and the Winter T-PARC Planning Workshop (8-10 October 2008, see:

http://wwwt.emc.ncep.noaa.gov/gmb/ens/TPARCWkshop_Oct2008.html)

(Z. Toth, NOAA/NCEP)



International Items



Measuring the Skill of Forecasts: The Met Office Global NWP Index

To monitor the performance of the U.K. Met Office global NWP model, and changes made to it, a metric has been developed which is referred to as the Global NWP Index. It combines in one measure the overall performance of the global NWP system, using skill scores for a number of forecast domains, variables and ranges. Each skill score is calculated monthly as:

$$S = 1 - r_f^2 / r_p^2$$

where r_f = r.m.s. forecast error and r_p = r.m.s. persistence error.

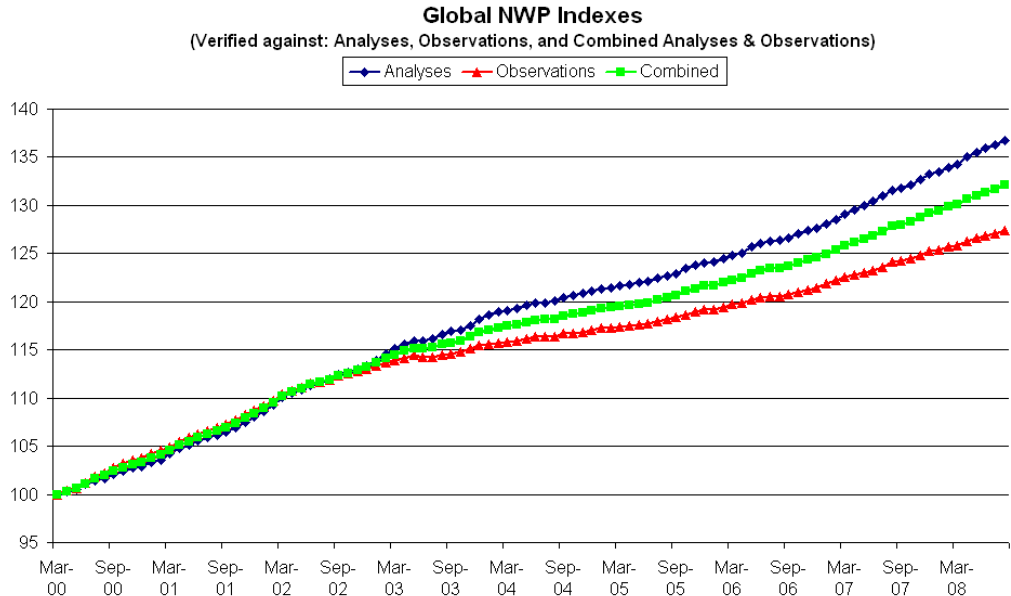
The separate skill scores are combined to form a weighted mean, S_{mean} , with the weights given in Table 1.

| | | Forecast Range (hrs) | | | | |
|---------|------|----------------------|----|----|----|-----|
| | | 24 | 48 | 72 | 96 | 120 |
| N. Hem | PMSL | 10 | 8 | 6 | 4 | 4 |
| | H500 | 6 | 4 | 2 | | |
| | W250 | 12 | | | | |
| Tropics | W850 | 5 | 3 | 2 | | |
| | W250 | 6 | | | | |
| S. Hem | PMSL | 5 | 4 | 3 | 2 | 2 |
| | H500 | 3 | 2 | 1 | | |
| | W250 | 6 | | | | |

Table 1. Weights used in the Met Office Global NWP Index. PMSL=Sea Level Pressure, H500=500 mb Height, W250=250 mb Wind, W850=850 mb Wind

The weights are intended to represent the relative importance of these fields to the Met Office’s main customers. They reflect the fact the Met Office global NWP system is focused on short-range forecasts and that most of the customers are in the N. Hemisphere. However, they also reflect the global responsibilities of some of the Met Office’s services, including its role as a World Area Forecast Centre for civil aviation.

The mean skill score is converted to a monthly index according to:



$$N_m = (1 - S_{mean})^{-1/2}$$

which has the property of increasing without bound as the model skill improves. This monthly index (N_m) is then averaged over the previous 36 months to remove seasonal fluctuations.

The 36-month index (N) is then normalized to give a value of 100 at the start date:

$$\text{Global NWP Index} = 100 \times N / N_0$$

where N_0 = value of N at 31 March 2000.

When testing changes to the NWP system, the index is calculated over the period of the trial.

The index is computed separately using forecasts verified against observations and against analyses. The combined index is the average of the two. The Figure shows the performance of the two indexes separately and combined over the last 8 years for the Met Office global NWP system. The combined index stands at 132 on 31 August 2008.

As an aid to interpretation of this index: if r.m.s. forecast errors are reduced by 1% in all fields in Table 1, then the index increases by 1%.

(D. Forrester, J. Eyre, and R. Saunders, MetOffice)



**JCSDA Summer Colloquium on Data Assimilation
Stevenson, Washington
July 7 – 17, 2009**

Program Announcement

The NASA/NOAA/DoD Joint Center for Satellite Data Assimilation (JCSDA) is pleased to announce a Summer Colloquium on Data Assimilation in 2009 engaging graduate students and individuals with early postdoctoral appointments in the science of data assimilation for the atmosphere, land, and oceans. The program will include lectures by internationally recognized experts in data assimilation and an opportunity for students to interact with the lecturers in an informal setting. The objective of the program is to foster the education of the next generation of data assimilation scientists.

Colloquium Topics: The following topics will be covered during the Colloquium:

- Data assimilation fundamentals including variational and ensemble techniques
- Satellite data applications including infrared and microwave
- Overview of atmospheric, ocean, and land data assimilation
- Overview of the global observing system

Eligibility: Graduate students who expect to receive their PhD in the physical, environmental, atmospheric or related science prior to June 2010 are invited to apply as well as individuals with no more than two years of postdoctoral experience at the time of the Colloquium. Preference will be given to applicants with US citizenship or permanent residency.

Application Process: There is no application form. Qualified applicants are encouraged to apply by sending the following materials:

- Curriculum vitae
- Transcript
- Statement of interest (no more than one page) with a one-page summary of the applicant's doctoral research
- Three supporting letters from faculty members.

The above documents should be sent via email by **December 1, 2008** to:

Dr. Wayman Baker (Email: wayman.baker@noaa.gov)
Chair, Organizing Committee

Candidates will be selected competitively based on the documentation they provide and will be notified of the disposition of their applications by **February 15, 2009**.

Financial Support: Travel support to and from the Colloquium, lodging expenses, and per diem will be provided for the two-week program for approximately 15 participants. Additional applicants may be invited to participate, but they will need to provide their own financial support.

Venue: The Colloquium will be held in Stevenson, Washington. Information about the venue for the Colloquium may be obtained at: <http://www.skamania.com/> Detailed logistical information for the Colloquium will be provided to the individuals selected for participation at the time they are notified of their selection.



30th LIDAR Working Group Meeting



Seated, left to right: *Dr. David Tan, Dr. Alexander Shelekhov, Dr. John Theon, Dr. Ramesh Kakar, Dr. Robert Brown, Dr. Wayman Baker, Debra Hallmark*
 Standing, left to right: *Stephan de Wekker, Dr. Michael Hardesty, Dr. Farzin Amzajerdian, Dr. Scott Shipley, Dr. James Yoe, Dr. George Emmitt, Dr. David Bowdle, Dr. Michael Kavaya, Dr. Christian Grund, Mr. Bruce Gentry, Mr. Ken Miller, Mr. Floyd Hovis, Mr. Yucheng Song* (Photo courtesy of Dr. Michiko Masutani)

Approximately 25 U. S. and European scientists and lidar specialists attended the 30th meeting of the Working Group on Space-Based Lidar Winds (Lidar Working Group), held in Wintergreen, VA, July 8 - 11, 2008. The meeting highlights included: presentations/discussions on the plans for upcoming wind lidar airborne campaigns, especially the THORPEX Pacific Asian Regional Campaign (T-PARC); an update on the status of the ESA Atmospheric Dynamics Mission (ADM), now scheduled for launch in May 2010; and a presentation/discussion on the successful study effort by the GSFC Instrument Design Laboratory (IDL) to investigate the feasibility of deploying a hybrid wind lidar on NexGen NPOESS. The IDL study effort concluded that: (1) The NexGen NPOESS Wind Observing Sounder (NWOS) can be accommodated on board the 2nd generation NPOESS satellite with low risk and good reliability. (2) There is no technology tall pole for the operational system. (3) There will be a good opportunity to verify the assumed requirements because the proof-of-concept Global Wind Observing Sounder (GWOS) flight would be in advance of the NWOS.

The next Lidar Working Group meeting is scheduled for January 27 - 30, 2009, in Destin, Florida.
 (W. Baker, JCSDA)

Editor's Note: Unsolicited articles for the JCSDA Quarterly Newsletter are encouraged as are suggestions for seminar speakers or topics. Please send them to George.Ohring@noaa.gov.

Outlook for Next Quarter

JCSDA Seminars



Readers of the JCSDA Quarterly Newsletter are encouraged to volunteer to present seminars or suggest speakers or topics. Contact George.Ohring@noaa.gov.

| Date | Speaker | Affiliation | Title |
|---------------|----------------|---------------------------|--|
| Oct. 15, 2008 | David Staelin | MIT | AMSU Observations of Arctic and Equatorial Precipitation: Validation and Meteorology |
| TBD | Steve Fletcher | Colorado State University | Non-Gaussian Data Assimilation Methodologies |