Third Meeting of the GEWEX Data and Assessments Panel (GDAP)

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The annual meeting of the GEWEX Data and Assessments Panel (GDAP) was held in two separate sessions back-to-back with the GEWEX Science Conference and the Pan-GEWEX and Pan-CLIVAR Meetings. Christian Kummerow of Colorado State University (CSU) chaired the meeting. The first session focused on the status of the individual data products and the production of the Integrated GEWEX Product. The second session focused on new and ongoing data quality assessments and how they relate to other activities, such as the Climate Model Intercomparison Projects (CMIPs).

Some of the data products for the Integrated GEWEX Product, including radiative energy, turbulent fluxes, and condensation heating, were finalized over the past year. Other data to be included were initially hampered by delays in individual components but are now nearing completion. The integrated product is being produced at CSU with the goal to finalize the first version at the end of 2014.

William Rossow reported that processing of the International Satellite Cloud Climatology Project (ISCCP) data has not started because improved quality control for B1 radiance data is needed, as are assessments of the temperature and water vapor inputs provided by the High Resolution Infrared Radiation Sounder neural network (HIRSnn) product. This product does not provide optimal input to the processing of the surface flux (radiation and turbulent) products. The currently used microwave estimates of near-surface temperature and humidity are not consistent with the lowest levels of the profile retrievals from HIRS. A possible solution is to merge the HIRS data and microwave estimates near the surface, but this requires validation from the water vapor assessment, which is not available. ISCCP data for the period 1979–2013 containing the HIRSnn is to be finalized by December 2014.

Robert Adler provided the status of the Global Precipitation Climatology Project (GPCP) product. The GPCP test example based upon GPCP Version 2.2 (daily disaggregated from the TRMM Multi-satellite Precipitation Analysis 3-hour product) will be used for the Integrated Product. The National Oceanic and Atmospheric Administration (NOAA) is supporting the transfer of GPCP Version 2 towards "routine" processing at the National Climatic Data Center, and the University of Maryland is producing a test Interim Climate Data Record. Work has just begun work on developing a GPCP Version 3 product.

Stefan Kinne reported on the Aerosol Comparisons between Observations and Models (AeroCom) Max Planck Institute Aerosol Climatology (MAC-v1), which is a monthly global climatology of aerosol optical properties (aerosol optical depth at 550 nm, single scattering albedo and asymmetry factor) that superimposes AERONET data onto a central model background to achieve a global estimate. The current version provides information on anthropogenic change from pre-industry into the future. It does not provide aerosol-type specific information, although general size information is contained. It also lacks information about localized aerosol events. Further improvements are planned, such as integrating other reference data and using CALIPSO profiles to improve the vertical distribution. The project has found strong increases in coarse (dust) aerosol over Arabia and strong decreases west of North Africa largely related to meteorology and associated dust transports. In addition, strong increases in fine aerosols (pollution and fire-related) were found over South and East Asia. Slight decreases of fine aerosols over the U.S. and Europe may be due to policy related controls.

Paul Stackhouse reported on the status of the Baseline Surface Radiation Network (BSRN) and the Surface Radiation Budget (SRB) Project. The archive contains 50 station years. There has been a significant uptake in the use of BSRN data in scientific publications, with 12 percent growth from 2011 to 2012 and a further 32 percent growth from 2012 to 2013. BSRN will hold a workshop in Bologna, Italy on 9–12 September 2014. The SRB Version 4 data set has several flux sensitivities to changed inputs, including an increase of the longwave downwelling flux over the Sahara that is caused by sensitivity to aerosols in the new ISCCP HX clouds. Changed sea-surface temperatures derived from AVHRR provided by SeaFlux and land-surface temperature derived from HIRS provided by Landflux give significant changes in upward flux. Compared to the use of surface temperatures from the MERRA reanalysis, flux differences can reach 40–50 W/m^2 (e.g., over the Australian continent). Because Version 4 will not be finalized until 2015, the Panel decided to use a baseline Version 4 that includes changes from the new ISCCP HX cloud data.

Carol Anne Clayson reported on the ocean surface turbulent flux project, SeaFlux, whose data products contain estimates from systematic and random effects in the measurements and retrievals that are propagated to mapped air-sea turbulent flux products. The most recent version has surface wind speed estimates based on SSM/I retrievals instead of cross-calibrated multi-platform wind analysis, as not all instrument data in the combined product may have sufficient quality. All items needed for the integrated product are ready and have been delivered. SeaFlux has performed analyses of the different choices for surface and air temperature, and near-surface specific humidity microwave estimates. NOAA is supporting the setup of a routine processing of air-sea fluxes beyond the year 2008.

Eric Wood presented the LandFlux activities related to the Integrated GEWEX Product. Four algorithms that estimate terrestrial latent heat (evapotranspiration, ET) are being run globally at 0.5-degree resolution at a daily time step. Initial validation and intercomparison has been carried out at tower, small basin, large basin and continental scales. Global data sets have been developed for sensitive flux parameters (e.g., aero-

dynamic resistance and minimum surface resistance) based upon data from approximately 200 global FluxNet towers and relevant co-variates. In addition, the HIRS-consistent forcing data, including land surface, air temperature, and surface humidity, were completed for the period 1979–2010. ET processing for 1984–2007 will be completed soon.

On behalf of Tianjou Zhao, Christian Kummerow presented an evaluation of global monsoon precipitation changes from different global reanalyses (Renping Lin et al., 2014), which clearly showed that the GDAP has developed the methods to analyze the quality of the integrated product.

Wouter Dourigo presented the status of the International Soil Moisture Network (ISMN), which includes soil moisture in situ measurements from 42 networks (active and historical) from about 1600 stations. The ISMN has become indispensable for validation of satellite estimates. Improvements in the quality control procedures take into account co-varying variables, such as air, soil temperature, precipitation, and snow depth. Funding for ISMI after 2016 is uncertain at this time.

On behalf of Jim Mather, Christian Kummerow gave a brief summary on the status of the Atmospheric Radiation Measurement (ARM) reference sites. The most significant change is that ARM will develop two sites into supersites, the first being the Southern Great Plains site and the second along the North Slope of Alaska. Other locations can be served temporarily by the ARM mobile facilities. This change in strategy is a concern to satellite product validation activities that rely on ARM data (e.g., the radar site in Darwin, Australia).

Marc Schröder reported on the Water Vapor Assessment (G-VAP), which is of great importance to the development of a new standard water vapor product. Within the current GEWEX Integrated Product, water vapor estimates from different products are needed to facilitate the most accurate individual components for atmospheric parameters and surface fluxes. G-VAP is making considerable progress on all three water vapor products (total column, profiles, and upper tropospheric relative humidity) as shown in the figure at right. The project will hold a workshop at the Freie Universität Berlin, Berlin, Germany on 9–10 October 2014 and present a draft assessment report at the next GDAP meeting in fall 2015.

GDAP has begun planning a new precipitation assessment. The last one was almost solely based on evaluating the quality and applicability of the GPCP data set at that time. Now that many new products are available, there is a definite need to provide orientation to the science community in terms of the quality and applicability of these products in reference to the GPCP product.

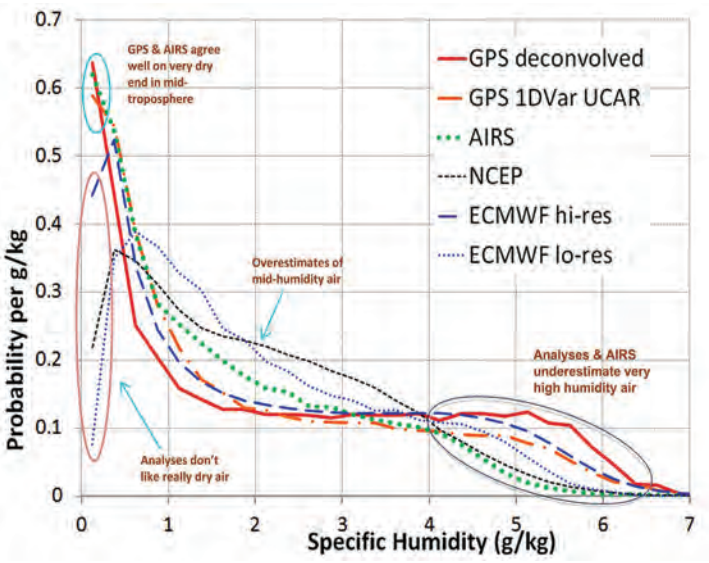
To improve the timely delivery of assessments to the scientific community, new assessments will be restricted to what is achievable within a 2-year timeframe. This will require that assessments be independent from upcoming releases of already-existing or new data sets. Each assessment would provide the functionality for a relatively fast update of assessment results and new products.

Potential links with the next round of CMIPs by the WCRP Working Group on Climate Modeling were discussed. Jörg Schulz reported on a recent planning workshop of the Observations for Model Intercomparisons (Obs4MIPs) initiative by NASA. Obs4MIPs supports the evaluation of climate model simulations in the context of CMIPs by providing the necessary data records via the Earth System Grid (ESG). The workshop identifed ways to improve the use of satellite data sets in CMIP model evaluation and research. Other topics included process studies aimed at assisting climate model development by providing model output and observations at higher-than-daily resolution. In response to the workshop, GEWEX formulated the Process Evaluation Study (PROES). The Integrated Product will provides a linkage to PROES, with more products to be added if more synergistic variables and observations for a given process are identified. The integration of the GEWEX data sets into ESG will require resources to restructure the products.

At the end of the meeting and after seven years of leadership, Christian Kummerow stepped down from chairing GDAP. Jörg Schulz, the incoming chair, thanked him for guiding the many and diverse activities of GDAP, and especially for his perseverance in directing the GEWEX Integrated Product.

References

Renping L., T. Zhou, and Y. Qian, 2014. Evaluation of Global Monsoon Precipitation Changes based on Five Reanalysis Data Sets. *J. Clim,* 27, 1271–1289.



Specific humidity histograms at 5-km altitude: (1) from two different GPS COSMIC retrievals; (2) Version 5 AIRS retrieval; and (3) three NWP model analyses [NCEP 1°x1°, 17 levels up to 300 hPa; ECMWF low-resolution (2.5°x2.5°), 7 levels up to 300 hPa; and ECMWF high-resolution (25 km)², 91 levels up to 0.01 hPa]. Each histogram covers 30°S–30°N, for a full year. This type of analysis can clarify issues at the extreme ends of the humidity distribution. Courtesy of E. Robert Kursinski, Moog Advanced Missions and Science, Golden, Colorado.