PLENARY SESSION II: REVIEW OF ACTIVITIES SINCE G-XVI (PART 1)

SESSION REPORT

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ABSTRACT

Review of GHRSST-related activities since GHRSST XVI.

1. Introduction

Each topic area provided a 10-minute review of its GHRSST-relevant activities since GHRSST XVI. A recurring question after several talks and in the lunch discussion afterward involved how users would be informed when the operational centers modified or discontinued their products. Users who rely on the operational products for their own operational purposes would prefer clear advance notification of planned changes and interruptions. If a product is to be discontinued, it would be helpful to identify suggested alternative or replacement products to use in place of the discontinued or interrupted data streams. Such advance notice and mitigation suggestions will simplify the effort by SST product users to adapt their processes to planned changes in the available data, thereby maintaining SST as a reliable basis for a range of operational applications.

2. GHRSST Connection with CEOS: SST-VC - Anne O'Carroll

Report prepared by co-chairs Anne O'Carroll and Kenneth S. Casey. Committee on Earth Observing Satellites (CEOS0 SST Virtual Constellation (VC). Concentrating on two main aspects: VC-1 List of relevant datasets from VCs and VC-19 Documented plan for the SST virtual constellation. Conducted several teleconferences, workshop in Melbourne (host Helen Beggs; see presentations online), technical workshop in Darmstadt. Preparations for SST-VC in Japan 2016.

81 GHRSST products in archive; search for GHRSST collections or full product table. GDS V2 fully operational. Documented plan for SST virtual constellation (white paper). Will be under review soon, to be discussed at session Friday.

Questions: none

3. GHRSST System Components: GDAC - Ed Armstrong

US Global Data Assembly Center (GDAC; Ed Armstrong). Statistics, user metrics, new tools from last year. A number of contributors acknowledged. Nearly all data sets in GDS 2.0; some monthly distributions over 30 TB. Supporting operational data streams and data from 15 RDACS. User community engagement by responding to user requests and applications users (report Mon afternoon). Populating forum with data recipes and tutorials.

Growth in number of users this year compared with prior years. Data volume is significantly increased from prior years, largest is over 40TB per month. Access through OPeNDAP and THREDDS in addition to FTP (still largest by far). FTP will be going away at NASA in favor of NASA User Registration Service (URS). A user account is required to access data through HTTP or OPENDAP. Tool summary included SOTO$_2$D visualization, PO.DAAC web services, HiTIDE database sub-setter, and others. Data extraction python scripts should be able to wrap in password access and still allow automated data access. Emerging technology includes (see poster) virtual quality screening service (VQSS), Ocean Xtremes, Distributed Oceanographic Matchup Service, and others to improve search relevancy.

New GDS2 datasets include MODIS L2P, VIIRS ACPSO and VIIRS NAVO L2P, L3 AVHRR Metop-B, L4 GOS Mediterranean and Black sea, others. Only things not in GDS2 are primarily L1 data. GHRSST GDS2 catalog is near complete, subsetting tools are provided.

Peter Cornillion: will WGET still work with new access? Answer: yes.

Eileen Maturi: If getting rid of FTP, how will PODAC pull data: Answer: still pull with SFTP and regular protocols.

4. GHRSST System Components: EU GDAC - Jean-François Piollé

Activities at Ifremer. Acknowledge additional contributors. Ifremer is primary RDAC/GDAC in France since 2005. Does push top US-GDAC, which serves as a mirror. Includes additional regional ESA products under ODYSSEA and Mersea/MyOcean/MyOcean2 multisensor global products. Data flow combines long and short term storage of EU and mirror of products from US-GDAC and LTDAC. A list of available products was presented identifying some as to be discarded soon. Data access is via FTP and OpenDAP with complete archive on Nephelae cloud. System serves ~5.5 TB per month, 163 registered users, ~1,700,00 files per month. In April 2016 this activity constituted 5% of total Ifremer data transfers. User interaction with diverse groups is largely managed through multi-partner project using CERSAT and EU-GDAC infrastructure. Issues: interfaces of new R/GTS redistribution policies, duplication of datasets, GDAC relevancy, redistribution issues from data providers. Distributed data access: would a GHRSST cloud be of interest? Share investment in remote processing, validation tools, etc.

Chelle Gentemann: Who are users for cloud dataset? A: yes we have some users identified.

Craig Donlon: Action for science team to look at issues of redistribution policy in a world interconnected by metadata.

5. GHRSST System Components: LTSRF - Ken Casey

Long term stewardship and reanalysis facility (acknowledgement of team). Survived merger and moving forward. Show where NOAA relates to GHRSST. Continues to archive all GHRSST data via GDAC, directly receive NOAA ACSPO SST. New products (lots that don't show up on screen due to color table) in GDS2 format. Dynamic data table is summary of data volumes, file start/stop dates, updated for accuracy. Digital Object Identifiers are implemented for data sets but not required. Real time archive of ACSPO from RDACS are archived without 30-day lag to meet NOAA requirements from JPSS. CEOS CWIC integration: update granular level inventory, nearly 100% discoverable. Records indexed in discovery system. Moving into elastic search capability to handle 10^9 number of granules. Work with other groups to understand needs of users and how they want to access data. Upward trends in data access over 10+ years of service providing GHRSST data. Users steady in 35-40 users per day range. Issues on the horizon: URLs will change to new NCEI name.

No questions

6. GHRSST System Components: SQUAM and IQUAM - Alexander Ignatov

Sasha Ignatov acknowledges team. Squam In situ SST Quality Monitor (iQuam) and SST Quality Monitor (SQUAM). IQuam is emphasis on in situ data, providing data matchups for satellite SST monitoring with SQUAM. Collect in situ data since 1981, perform uniform and accurate QC, serve QCed data to number of US and international users. iQuam updated to version 2 last year, upgrades including data to beginning of satellite era (1981). Four new in situ data types including ships, drifters, tropical moorings, and coastal moorings. Data is updated twice daily. Completing transition to iQuam2 format and iQuam1 will no longer be supported. Answers for users assisted by online set of FAQ and answers.

Major SQUAM additions since last meeting include Himawari SST and AVHRR reprocessing. Various sources provided the reanalyses for each. Showed an example using iQuam2 and SQUAM looking at NOAA and JAXA Himawari processing for Himawari 7 and 8; bias in initial JAXA product. Ongoing work to remove products that have received little interest from users.

Peter Cornillon: Does the Pathfinder data represent a new version? Answer: Consider replacing Pathfinder with ACPSO, now there are multiple global products with various combinations of sensors. Ken Casey: providers are looking at improvements on both ACPSO and Pathfinder; make decisions on which or both products in a role once these improvements have been fully implemented and evaluated.

Peter Cornillion: what about navigation of earlier AVHRR data? A: Have not processed earlier data.

7. GHRSST System Components: Felyx - Jean-François Piollé

Felyx extracts data subsets (miniprod) over static and dynamic data sets, produce statistics over these subsets. It is a capability to generate matchup data sets with a web interface. Can use in remote scripts (i.e., Python) using available API. It has been tested in different contexts, with new capabilities being added for the various applications. Show some example usage: Database of hurricane/storm observations to identify data under storm tracks, Example: matchup database for SLSTR refining/evaluating SLSTR retrievals. Example: preparing a climate data assessment framework to assess whether a dataset is appropriate for climate trend detection. Documentation at felyx.readthedocs.org with a virtual machine available for testing (http://felyx.org).

Craig Donlon: Question for science team consideration: Who on science team is interested in collaborating on Felyx applications to leverage international cooperation?

8. RDAC Update: ABoM - Helen Beggs

Thanks collaborators, introduces Chris Griffin (first GHRSST meeting), Review: still providing real time GHRSST products, regional 1/12 degree and global ¼ degree in GDS 1.6; update to GDS 2.0 soon. Reprocessed 24 years of data at 1 km resolution, provided in GDS 2.0 format in skin and foundation SST. Provided information to access data, all available publically except L2P data, which is looking for a home to be archived and accessed (24-year record). Now producing a real-time Himawari-8 L2P SST using regression with VIIRS data rather than regression with comparatively sparse surface drifter data. More info in Himawari-8 session tonight. New data from 0.1-degree global model has much smaller SST errors, likely due to assimilation of data closer to the forecast time. Report about 3-day satellite oceanography users workshop 9 – 11 Nov 2016; meeting was well received and there are plans for IMOS to host a similar meeting every 2 years. IMOS Ship SST depth looking to have high quality observations of SST as a function of depth, to be provided via iQuam for broader distribution. 11 ships reported over last year, reported once per minute. A lot of data in Indonesia region that is otherwise largely unobserved by buoys and Argo floats.

9. RDAC Update: CMEMS - Françoise Orain

CMEMS Copernicus Marine Environment Monitoring Service (started 01/05/15). Objective is regular reference information on environments. CMEMS satellite SST has global and regional near real time reprocessed multisensory L3 and L4 SST products. Main activities since GHRSST XVI is near real time assimilation of AMSR2, VIIRS ACSPO in OSTIA foundation SST, replace METOP_A with METOP_B, reprocessing 1982-12015 data over Mediterranean and Black Sea. OSI SAF SST products data distribution presented. Issues: SLSTR L2P Sentinel to be used; need reliable observation error variance estimates associated with the input SST.

Ken Casey: Motivation providing data in NetCDF 3: A: Have users that still want NetCDF 3.

10. RDAC Update: CMC - Dorina Surcel Colan

Canadian Meteorological Center. Describe different data sets provided: Global 0.2-degree version 1, version 2 1991-present, version 3 global 0.1-degree run daily with data since Sep. 2015 but has not yet been assigned operational status. Input data from NAVOCEANO via PO.DAAC (NOAA and Metop), RSS AMSR2, NOAA/NESDIS/ACSPO VIIRS, in situ from GTS. Show improved performance from v1 to v2 to v3. CMC analyses are used by NWP systems in Canada for weather forecasts; also used by Canadian Global Ice Ocean Prediction System (GIOPS, operational since 2014). The Global Coupled Prediction System is being implemented in experimental mode. Presently the GIOPS is performing about as well as the operational 0.2

degree CMC but not as well as the global 0.1 degree version 3 analysis. Next year is planned to migrate operational predictions to new computer platforms. Unlikely to implement new operational products during this migration. Experimental products likely to be interrupted.

Ed Armstrong: Question about availability of version 3 during transition. A: Probably interrupted, plan to maintain single operational product and interrupt non-operational/experimental products that have previously been provided.

Martin Lange: Question about how operational users will be informed about planned discontinuation of products. A: not clear.

Prasanjit Dash: Reiterate question about when CMC 0.2-degree SST will be discontinued in the Summer. Will the users be notified in advance as there are quite a number of users? A: Plan to transition to and maintain availability of v3 product (global 0.1 degree product. Some effort will be made to inform users of changes. Prasanjit says that his preliminary investigation shows the 0.1-degree product should be a good replacement.

Unknown: For version 3 will you reprocess data? A: maybe next year. Unknown: When will the migration occur? A: July or August. Comment: The new product is wanted for GMPE.

11. RDAC Update: EUMETSAT - Anne O'Carroll

Overview and acknowledgement of collaborators. EUMETSAT has a range of satellite products in addition to SST. It is an operational provider of level 2 data. Most recent launches Copernicus Sentinel-3A, MSG-4, Metop-B. Planned Sentinel-3B, Metop-C, MTG-I1, Metop-SG, MTG-S1. Plan Meteosat—8 Indian Ocean from January 2017 onwards. Sentinel-3 SLSTR launched Feb 2016, in orbit review to occur July 2016, validation team will get early access to data. Several posters related to Sentinel-3; ask questions there, IASI SST with upgrade of processor in June. SST retrieval update to identify a larger number of clear observations. GHRSST-2 drifting buoys will incrementally improve the capability of drifting buoys for satellite SST validation. SLSTR is working on cloud screening over sea ice, working to provide sea-ice surface temperature. Development and validation of retrievals should have initial capability in late 2016, implementation in 2018/19.

List planned data delivery status for various satellite products. List 3rd party data re-distribution of products from various sources. EUMETview to provide data visualization.

Q: sea ice versus land ice: A: Focus will be on sea ice, but will have land ice temperature as well.

Hold other questions until after lunch.

12. RDAC Update: EUMETSAT OSI SAF - Stéphane Saux Picart

Ocean and Sea-Ice Application Facility of EUMETSAT. Describe ongoing real time SST production: Metop-A,B, METEOSAT 10/SEVIRI, GOES-13 L3 and L2 Products regional and global. Main activities since GHRSST XVI updating processing chain for low earth orbiters and MSG/SEVIRI reprocessing (final data set to cover 2004-2012 on 0.05 regular grid (primarily Atlantic). Update on high latitude SST: New L2 SST product poleward of 50N/S; also working on L3 SST to include ice surface temperature. Data can be accessed through Ifremer FTP, PO.DAAC, EUMETCast, EUMETSAT data center. Will stop distribution of data in GRIB format by end of 2016.

No questions.

13. RDAC Update: JAXA - Misako Kachi

Mission Status on Aqua/AMSR-E (completed Dec 4 2015; data from prior three years available); GCOM-@ no major problems, anticipated life to May 2017; GPM Core observatory (NASA-JAXA) no major problems, mission life Apr. 2017; GCOM-C preparation for launch in Japanese FY2016 (early 2017). JAXA datasets from JAXA GHRSST server. GMI SST updated in Mar. 2016; planned Windsat SST update June 2016. Main activities since GHRSST XVI include organization of Marine Environment Monitoring research team; AMSR-E algorithm updates; AMSR2 algorithm updates. Planned TRMM updates, new GPM versions, Mimawari-9

agreements and update in summer 2016. Side meeting on Himawari-8 tonight. Describe JAXA L1, L2 Himawari products. GCOM-C/SGLI preparation for launch; will apply SGLI SST algorithm to Himawari-8 and Aqua/Terra MODIS data for consistency among datasets. Data available via automatic registration process at JAXA sites. No restriction to data for non-commercial applications. Issues: ingest JAXA products into GDAC; also Global Space-Based Inter-Calibration system with GISST evaluation.

No questions.

14. RDAC Update: JMA - Toshiyuki Sakurai

First GHRSST meeting. JMA responsible for produce daily global SST (0.25-degree resolution); to be included in GMPE system. JMA operates Himawari-8 and MTSAT-2 (at present a stand-by satellite). Timeline for Himawari-8/-9; Himawari-9 scheduled for launch in 2016. Main activities since GHRSST XVI: Himawari-8 L3 SST; development of regional SST analysis using Himawari-8 data. Ongoing development to improve MGDSST includes work with shorter time-scale component of AMSR2 and incorporation of VIIRS ACSPO L3 SST. Data availability covers MGDSST, HIMSST, and Himawari-8 L4 and L3 products. Himawari-8 L3 SST is hourly with 0.02-degree horizontal resolution, compared with 0.04-degree resolution available from MTSAT-2. Himawari-8 has better overall agreement with matchup buoy SSTs than did MTSAT-2. Regional SST analysis (HIMSST) at 1/10-degree resolution for western North Pacific had test operations start in March 2016. HIMSST reduces unnaturally sharp gradients near international date line. HIMSST shows better cooling response after typhoon passage than did MTSAT-2.

No questions.