

Year 1 Annual Report for NODC
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Contributions to:

Transfer of NOAA/NASA AVHRR Pathfinder SST Processing to NODC

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2000636 Competition IDs 2038591 Scientific Data Stewardship (SDS)

Total requested by NODC: \$237,600
Year 1: \$73,700 (Received \$63,700)
Year 2: \$79,200
Year 3: \$84,700

Introduction

Year 1 of the NOAA Scientific Data Stewardship (SDS) grant was a challenging, but ultimately successful one for the National Oceanographic Data Center (NODC). The challenges arose when our partner, the University of Miami (UMiami) did not receive their year 1 funding. Ultimately, they did receive most of the funding through a subcontract but not until well into the second project year. This delay in their funding has put the two partners (NODC and UMiami) somewhat out of step with one another. Through the willingness of UMiami staff to support the project, and through the extra effort of NODC personnel, we have been able to successfully make significant progress toward achieving the main goals of the project. The project goals can be summarized in three areas: Modernized Code Development and Implementation, Metadata and Documentation, and Archive and Access. The progress of the project is summarized below according to those categories.

Modernized Code Development and Implementation

This goal refers to the overall project effort to transition the AVHRR Pathfinder processing code and environment from UMiami to NODC, where it can be sustained over the long term. The NASA-developed SeaDAS processing environment was selected as the foundation for the modernized AVHRR Pathfinder processing for several reasons, including its widespread use in the community and that many of the functions needed by Pathfinder are already incorporated. Specific progress in the first project year included:

1. The SeaWiFS Data Analysis System (SeaDAS v5.0) was downloaded and installed by NODC. Assessments of the code base were performed by NODC personnel for its ability to support the use of dynamic libraries (for enhanced IT security) and to run on 64-bit machines (which comprise the NODC processing cluster). Neither of these conditions was met for the standard SeaDAS distribution. However, NODC was able to run the package in 32-bit mode for development purposes. Testing of the level 2 Sea Surface Temperature (L2SST) and L2 to L3 Space binning of L2 SST data (L2BIN) using Interactive Data Language (IDL) GUI interface was successfully completed. The first of these functions is being modified and will serve as the core of the Pathfinder system, and the second will be required to generate L3 data from the base L2 outputs of the system.
2. Following successful testing of the standard package, modifications were made to streamline the development process given UMiami's lack of Year 1 funding. The SeaDAS source code was trimmed down through removal of the aerosol reflectance computation, the estimated Chlorophyll computation, and some scientific data sets in the output product, such as Aerosol optical thickness at 869 nm, Epsilon of aerosol correction at 765 and 865 nm, the Chlorophyll Concentration, and Normalized water-leaving radiances at 412, 443, 488, 531, 551, and 667 nm. The modified version saved about 66% time and 55% data volume compared to the original SeaDAS software. [Performance note: It required about 2.4 minutes on anemone (an older developmental machine now being retired) to process one five-minute granule of

Level 1 test MODIS data, which resulted in a 19 MB L2 output]. With this streamlined code, NODC could begin making modifications and additions to the code base with little support from UMiami personnel.

3. Next, a function to read Pathfinder coefficient tables was completed by NODC staff. The original coefficient table sent to NODC from the UMiami team was split into nine tables, identified by NOAA polar-orbiting operational environmental satellites (POES) numbers 7, 9, 11, 12, 14, 15, 16, 17, and 18. These are the coefficients determined using the Pathfinder matchup database, and are required in the L1 to L2 SST generation step.
4. A module to assess pixel “quality” was also created, to derive an overall pixel quality level for each SST observation. The pixel by pixel science quality flags are generated from brightness temperature (BT) tests, BT uniformity tests, gross cloud contamination tests, stray sunlight tests, SST uniformity tests, satellite zenith angle tests, and reference Reynolds SST tests. The outputs of these tests are put through a decision tree, which results in the overall pixel quality value.
5. Modifications were then made to the output functions, which generate HDF files (the SeaDAS standard format) containing the L2 SST and associated quality and ancillary data. These modifications were made to insure the HDF files carry along all the metadata needed to eventually convert these HDF files into GODAE High Resolution SST (GHRSSST) – compliant netCDF files with Climate and Forecast (CF) metadata. See the section below on Metadata and Documentation for more information.
6. NODC is now in the process of providing these code alterations back to UMiami personnel (now that they have funding in project Year 2) to begin integrating these changes in the formal SeaDAS package. The NASA Ocean Biology Processing Group, responsible for SeaDAS, is working directly with UMiami to ensure the required changes are made in future formal releases of SeaDAS. The recent v5.2 release already includes a few preliminary changes needed to ensure the eventual full support of AVHRR Pathfinder within the formal and publicly available SeaDAS.

Metadata and Documentation

1. NODC evaluated the various standards for file level metadata and community standard data formats. A determination was made to support the community standard GHRSSST netCDF with CF metadata (see item 5 above for the required code modifications). While this NOAA SDS project is not funding the error uncertainty fields required by GHRSSST (and not currently part of Pathfinder), NASA has stepped up and agreed to fund their development so they can be included in the final results of this project. That funding is going to UMiami partners and they will incorporate the capability into our Pathfinder transition effort.

2. A review of the UMiami and NODC Pathfinder-related web pages was conducted to create an initial outline of the future combined AVHRR Pathfinder SST web site, to be consolidated under <http://pathfinder.nodc.noaa.gov>.
3. While the transition work continues, UMiami was able to provide finalized data under the existing Version 5 framework for 2002, and 2004-2006. NODC responded by ingesting these new data, performing the standard Pathfinder quality assurance steps, and creating FGDC metadata records. These records are now being reviewed prior to formal archive of the data.
4. The Rich Inventory Markup Language, or RIML, under development by NOAA's National Geophysical Data Center, has been examined for its applicability to the Pathfinder SST framework. NODC believes this system will work well for our needs and has begun experimenting with the XML-based system.

Archive and Access

1. The NODC Pathfinder web site continues to be maintained, including updates to the User Guide and associated metadata tables.
2. A Really Simple Syndication (RSS) feed was also added to the Pathfinder site. Users can subscribe to this feed to receive updates any time NODC adds news items to the feed.
3. Data access via http and ftp protocols continues. OPeNDAP access remains offline due to IT security restrictions but progress is being made to implement the latest OPeNDAP server.
4. Preparations have been made to archive the formal Version 5 data for 2002-2006. The FGDC records mentioned above are being reviewed and finalized prior to insertion of the data into the archive.

Budget

After receiving notice we'd receive \$63,700 for Year 1 (instead of the proposal's original \$73,700), NODC put together a spending plan that called for \$8000 in travel, \$3000 in equipment, and \$1000 in supplies, and \$51,700 in personnel. We were able to stick very closely to that budget, with \$8131.05 in travel, \$2821.14 in equipment, \$991.00 in supplies, and \$51,700 in personnel.

Please do not hesitate to contact me with any questions or comments about the above.

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