SUBTASK I: SST EDRS

GOAL:
(1) Reduce SST error by:
a) improve cloud masking
b) generate routine RTM based algorithms
c) correct for aerosol
d) improve match up validation through inclusion of NCEP analyses.
(2) Prepare for future SST missions (MetOp, NPP, NPOESS, GOES-R).

- **Operational SST Satellite EDRS validated to IORD II specifications.**
- **Best value blended SST products**

KNOWLEDGE BASE

GOES-R RISK REDUCTION
- Include upper air analysis in retrieval
- Probability based cloud detection
- Resolve midnight effect
- Cloud probability distributions
- OPTRAN modeled

NPP/NPOESS RISK REDUCTION MISSIONS
- Explore MODIS SST data for NPP RR
- Explore MODIS SST data for NPOESS RR
- RSMAS vs. SeaWiFS process
- Explore VIIRS NPP data for NPOESS
- Inst. Cal
- Error analysis

PASSIVE MW
- Generate AQUA/AMSRE MW SST
- Generate WindSAT SST
- Influence of RFI
- Coastal side lobe issues
- Noise reduction

BEST VALUE
- M/W IR estimate of cloud removal biases
- Operational validation
- Error characterization

IR,M/W BLEND
- Algorithm Dev
- Diurnal SST signal
- Validate GOES/POES blend
- Trans cloud removal

IR

05 06 07 08 09 10 11 12

Fiscal Year

CONTRIBUTIONS
- GENERATE SST ANALYSIS USING PC RTM FROM MODIS/ AIRS
- ASSIMILATE MODIS/GOES SST INTO 2D MODEL
- GENERATE SST ALGORITHMS FOR MODIS & VALIDATE
- GENERATE RTM ALGORITHMS FROM MODIS RADIANCE DATA ±0.5°C
- IR MW BLEND
- GENERATE RTM ALGORITHMS ±0.6°C.
- IR SST

SUBTASK 2: SST CDRS

GOALS:
(1) Acquire calibrated characterized radiances from GOES and POES platforms.
(2) Apply cloud mask to characterized radiances.
(3) Apply aerosol correction
(4) Generate RTM based algorithms to generate climate quality SSTs.

Climate quality global SST CDRs within 0.1° C

KNOWLEDGE BASE

POES BASED

Merge with NCEP re-analysis

Construct atmospheric correction model S/B conversion

Radiometric quality control

Cloud screening

Aerosol correction

Time-series analysis to established temp. stability

Reprocess new data

GOES BASED

Merge with NCEP re-analysis

Radiometric quality control

Cloud screening

Aerosol correction

Time-series analysis to established temporal stability

Reprocess new data

GROUND BASED

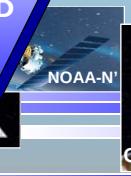
Acquire/compare difference of ground-based climatologies

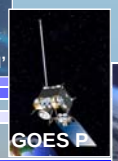
Select best SST climatology. Mean and standard deviation with space -time days

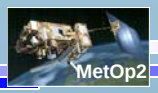
CONTRIBUTIONS

- REPROCESS CLIMATE QUALITY POES SSTS
- REPROCESS CLIMATE QUALITY GOES SSTS
- SELECT BEST OCEANOGRAPHIC CLIMATOLOGIES

LAUNCH DATES







HES

VIIRS

VIIRS

Fiscal Year

05 06 07 08 09 10 11 12

SUBTASK 3: SST CALIBRATION/VALIDATION

GOALS:

(1) Develop a validation system to maintain and monitor the quality of SST products.
(2) Identify uncertainties in the SST products based on validation results.
(3) Correct the uncertainties in SST products and regenerate.

SST Cal/Val system to reduce uncertainties in SST measurements for skin/bulk

KNOWLEDGE BASE

Quality assure ground-based data

Explore bulk to skin conversion using NCEP data

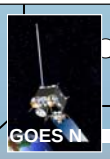
Produce bulk to skin conversion using NCEP data

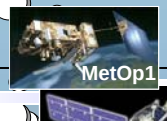
Reduce cross platform and cross sensor biases

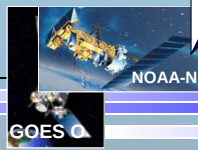
ACTIVE PHASE

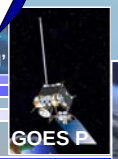
MAINTENANCE PHASE

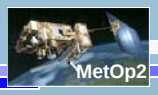
Reduce artificial SST dependences
(i.e. aerosols, vie w angle, ambient clouds, glintage)











HES

VIIRS

VIIRS

LAUNCH DATES

Fiscal Year

05 06 07 08 09 10 11 12

CONTRIBUTIONS

SATISFY RESEARCH/ MONITORING REQUIREMENTS

PRODUCTION OF DIFFERENT CROSS-CONSISTENT SST PRODUCTS

SELF CONSISTENT SST PRODUCTS

Subtask 4: SST Applications

Ability to generate high quality satellite-only SST products in areas lacking *insitu* data

Goals:
(1) Identify user needs.
(2) Develop SST products to suit user needs.
(3) User validation.
(4) High quality satellite-only SSTs

Knowledge Base

Improve GOES/POES blended SST products → **Coastal/Ocean Users**

Improve GOES/POES blended SST products
Bulk SST at Depth (TaD) → **CRW Users**

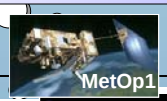
Improve GOES/POES blended SST products
Merge SST and forecast fields → **NCEP JCSDA**

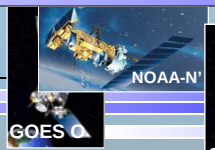
Improve GOES/POES blended SST products
Frontal products
Ocean currents
Extend to entire GEO global domain, i.e., GOES, MSG, MTSAT, GOES 10 → **Ocean Dynamics Users**

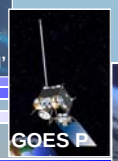
Contributions

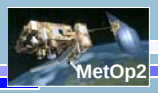
- Generate blended SST products at variable resolutions
- Generate high resolution blended SST products for shallow coastal waters
- Validate models with blended SST products
- Generate SST based products to identify dynamic features e.g. fronts/currents

Launch Dates









HES

VIIRS

VIIRS

Fiscal Year

05 06 07 08 09 10 11 12

Task I: Altimeter Data Sets

CONSIDER ALTIMETER CDRS TO IORD II SPECIFICATIONS

GOALS:
1) REDUCE SSH UNCERTAINTY
2) IMPROVE TIMELINESS AND EXPAND APPLICATIONS

KNOWLEDGE BASE

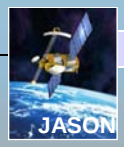
Evaluate delayed Doppler data for ocean dynamics and bathymetry — CRYOSAT

Install, test, integrate in OSDPD; Automated quality assessment — JASON 2

Improve algorithms, corrections; Increase length of data set to 22 years — RADS

Improve accuracy to 4cm (new orbits and corrections); Create merged comprehensive GDR — GEOSAT

Integrate NPOESS altimetry flow in OSDPD system — NPOESS



CONTRIBUTIONS

- MAINTAIN OPERATIONAL CONTINUITY OF SSH DATA SET
- IMPLEMENT OPERATIONAL EXACT REPEAT, NEAR-REAL-TIME ALTIMETRY
- CREATE WEB-BASED, USER-DRIVEN ARCHIVE
- CREATE 6-YR ARCHIVE FOR CLIMATE STUDIES
- CREATE ARCHIVE SUITABLE FOR RETRACKING

LAUNCH

International Polar Year

Fiscal Year

05 06 07 08 09 10 11 12

REVISED 7/18/05

Task 2: Ocean Dynamics

Goals:
1) Reduce uncertainty in surface currents from altimetry
2) Apply satellite altimetry to research problems and operational applications in areas of ocean circulations and climate

Operational monitoring of absolute dynamic topography and global sea level to IORD II specifications

Knowledge Base

Evaluate GRACE, GOCE, CRYOSAT for arctic gravity & geoid

Arctic Absolute Dynamic Topography

Data Fusion: OSCAR w/ CODAR

Coastal Currents

Expand to Tropical Atlantic & Pacific

Expand to mid-latitudes

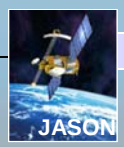
Increase spatial resolution to improve coastal coverage

Transfer to OSDPD for operational use

OSCAR

Contributions

- Established improved arctic geoid & dynamic topography
- Create high resolution coastal current data set
- Implement global surface currents for climate & operational applications



Launch Dates

International Polar Year

05 06 07 08 09 10 11 12

Fiscal Year

REVISED 7/18/05

Task 3: Gravity and Bathymetry (G&B)

Goal:
Reduce uncertainty and improve resolution of global ocean gravity and bathymetry (G&B) products

Global, average SSH slopes on a 1 nautical mile grid accurate to 1 microradian.

Knowledge Base

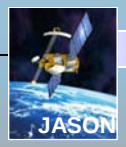
Evaluate delay Doppler ocean altimeter

CRYOSAT

Evaluate GRACE, GOCE, CryoSAT, ArcGP data for geoid & sea level in the Arctic Ocean

Ocean bottom roughness products for modeling, ocean mixing, and energy dissipation

Products & Applications



Launch Dates

International Polar Year

05 06 07 08 09 10 11 12

Fiscal Year

Contributions

- Improved along-track resolution G&B
- Improved Arctic geoid & dynamic topography
- Improved G&B to incorporate in GEBCO maps

Revised 7/18/05

Task 4: Climate

GOALS:
1) REDUCE UNCERTAINTY TO GLOBAL SEA LEVEL RISE (GSLR)
2) APPLY SATELLITE ALTIMETRY TO RESEARCH PROBLEMS & OPERATIONAL APPLICATIONS IN AREAS OF GSLR CLIMATE VARIABILITY AND CHANGE

OPERATIONAL MONITORING OF GLOBAL SEA LEVEL TO IORD II SPECIFICATIONS

KNOWLEDGE BASE

CDR Development

SSH climate products: PDO, UAO, etc.

Analyze ARGO profiler and altimetry SSH data for volume and mass change

GSLR CAUSES

Develop high precision tide gauge calibration

Monitor vertical land motion

GSLR RATE

Develop systems for routine and automatic calibration

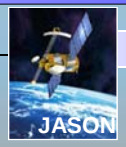
Develop systems for data quality assessment

Oversee production of NOAA/ Jason2 near-real-time data set

DATA

CONTRIBUTIONS

- SSH DATA SET???
- CREATE NEW ??? BASED ON CLIMATE INDICES
- IDENTIFY CONTRIBUTIONS TO GSLR
- INCREASE CONFIDENCE IN GSLR TO ???
- IMPROVE ALTIMETER CALIBRATIONS
- PERFORM DATA QUALITY ASSESSMENTS



LAUNCH DATES

International Polar Year

Fiscal Year

05 06 07 08 09 10 11 12

REVISED 7/18/05

Ocean Surface Winds Tasks

Goals:
Improve marine forecasting
1) Numerical weather model input
2) Utilization by human forecasters (i.e. OPC, TPC, CPHC, WFOS)

Operational surface wind vectors validated to IORD II specifications

Knowledge Base

Applications

- Implement & validate new land mask to allow for QuikSCAT wind vector retrievals closer to coastal regions
- Investigate, develop and validate other WindSAT EDRs (i.e. SST, rain rate, TPW, sea ice)
- Validate QuikSCAT high wind speed model
- Develop & validate finer spatial resolution ASCAT wind products and NRCS imagery products similar to QuikSCAT
- Wind products into NWS operational environments
- Comparison of active and passive wind vector retrievals
- Evaluation & development of satellite wind vector retrievals in limiting environmental conditions

Radiometry

- Develop & validate WindSAT wind vector retrievals
- Ocean winds aircraft experimental program
- Preparation for CMIS processing and validation
- Extend aircraft experimental program to cover CMIS
- Calibration and validation of CMIS wind vectors

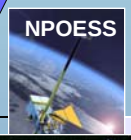
Scatterometry

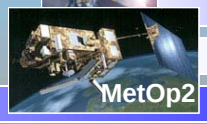
- Ocean winds aircraft experimental program
- Sustain ops QuikSCAT wind vector retrievals
- Validate high resolution scatterometry products
- ASCAT operational processing preparations
- Extend experimental program to cover ASCAT cal/val
- ASCAT wind product to AWIPS
- ASCAT Calibration & product validation

Contributions

- Assess impact in operational marine forecasting
- Best WindSAT wind vector retrievals: Characterize retrieval performance in limiting conditions
- Best QuikSCAT ocean wind retrievals: characterize retrieval in limiting conditions

Launch Dates





Fiscal Year

05 06 07 08 09 10 11 12

Revised 7/18/05

Task 1: Ocean Color Marine Optical BuoY (MOBY)

- Provide absolute radiometric standard and maintain a reference for intercomparison of ocean color satellite missions, accurate to IORD II specifications.
- Develop ocean color climate quality data products.

Goals:
Operational vicarious calibrations of satellite ocean color sensors to reduce uncertainties in satellite ocean color measurements.

Knowledge Base

Satellite Calibration
- NPOESS/VIIRS initialization
- NPOESS/VIIRS calibration
- NPP/VIIRS initialization
- NPP/VIIRS calibration
- Develop MOBY East
- GOES-R initialization

MOBY II/COBY
- Develop MOBY II technology
- MOBY II implementation (Case 1 Waters)
- MOBY II implementation (Case 2 Waters)

End-to-End Characterization
- Stray light characterization
- Test & Implement blue-rich light sources for radiometric calibration
- Thermal characterization
- Instrument shadow corrections
- BDRF Models for satellite match ups

Contributions
- Temporal continuity between satellite missions
- Reduction in size and cost for multiple deployments
- Hyperspectral vicarious calibration for all ocean color sensors
- Reduce uncertainties

Terra
Aqua
Dates
Launch
SeaWiFS
MODIS
NPP
VIIRS
NPOESS
VIIRS
GOES-R
HES

Fiscal Year
05 06 07 08 09 10 11 12

Task 2: Ocean Color Marine Optical Characterization Experiment (MOCE)

Goal:
Develop and validate new and heritage ocean color algorithms for ocean bio-optical properties

Operational ocean color measurements validated to IORD II Specifications

Knowledge Base

Shipboard initialization and validation of NPP

Shipboard initialization and validation of NPOESS

Shipboard initialization and validation of GOES-R

Ocean Color Retrieval

Atmospheric correction, change in BDRF

New product transition to operational

New product validation

Hyper/multispectral algorithm development

Geostationary

Hyper/mutlispectral geostationary characterization with increased satellite temporal, spatial, and spectral resolution

Coastal Application development | Coastal Application validation | Coastal Application transition to operations

CDOM development | CDOM validation | CDOM transition to operation

POC development | POC validation | POC transition to operation

Characterize Inherent Optical Properties

pigments transition to operations

Chlorophyll transition to operations

K490 transition to operations

TSM transition to operations

Current Products

Contributions

- Continuity of bio-optical measurements
- Hyper/ Multispectral Geostationary Characterization
- New IOP Product development and error analysis
- Validate Operational Ocean Color products

Terra

Aqua

Dates

Launch

SeaWiFS

MODIS

NPP

VIIRS

POESS

VIIRS

GOES-R

HES

05 06 07 08 09 10 11 12

Fiscal Year

Task 3: Ocean Color Validation

Goal:
To develop quantitative accuracy estimates to assess data quality

Operational ocean color measurements validated to IORD II Specifications

Knowledge Base

Utilize MQABI to establish accuracies and monitor process and performance

Add in situ match-up capabilities to MQABI

Implement MODIS ocean Quality Assurance Browse Imargy (MQABI) tool into NOAA processing system

Independent validation of acquisition program for operational products

Evaluate accuracy of new NOAA-unique operational products

Validate NPP products

Validate NPOESS products

Validate GOES-R products

Contributions

- Quality assurance of products
- Validation
- Improve QA capabilities
- Reduce uncertainties

Terra

Aqua

Dates

Launch

SeaWiFS

MODIS

NPP

VIIRS

NPOESS

VIIRS

GOES-R

HES

Fiscal Year

05 06 07 08 09 10 11 12

Task 4: Ocean Color Products and Applications

Goal:
To develop and maintain coastal and oceanic ocean color applications.

Develop ocean color applications that address NOAA Mission Goal Requirements.

Knowledge Base

- Validate and implement new ocean color products
- Water Mass Classification (WMC) for coastal ocean color
- Implement primary production and maximum quantum yield products into CoastWatch processing system.
- Evaluate product
- Transition to operations
- Develop coastal and oceanic ocean color applications utilizing increased temporal, spatial, and spectral resolutions
- Participate in Coastal Ocean Applications and Science Team to identify coastal applications and requirements for GOES-R CWI
- Multi/hyperspectral geostationary product development

Contributions

- Application Implementation
- Application Evaluation
- Application Development
- Product Development
- Identify User Requirements

Dates

Terra

Aqua

SeaWiFS (Launch)

MODIS

NPP

VIIRS

NPOESS

VIIRS

GOES-R

HES

Fiscal Year

05 06 07 08 09 10 11 12

Task 1: Sea Ice Product Research and Development

Goal:
Develop operational algorithms and products that provide required measurements of sea ice and other cryospheric parameters from available active and passive microwave, IR, and visible data.

Complete Sea Ice IORD II EDR Algorithms

Knowledge Base

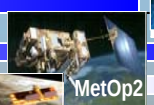
Present Algorithm Improvement
- Marginal ice zone characterization
- Ice mask
- Iceberg detection
- High resolution sea ice imagery

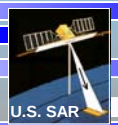
Seasonal Products Enhancement
- Marginal ice zone characterization
- Ice mask
- Iceberg detection
- High resolution sea ice imagery

Sea Ice Classification Improvement
- Marginal ice zone characterization
- Ice mask
- Improved ice classification

Ice Dynamics
- Sea ice vectors
- Glacial monitoring

Contributions
- Ice dynamics algorithms & products based on available interferometric & RGPS data
- Enhanced seasonal & classification algorithms & multiband active & passive obs
- Enhanced seasonal algorithms & products based on additional SAR bands & new MetOp ASCAT scatterometers obs
- Algorithms & products based on existing single polarization SAR C-Band & QuikSCAT obs



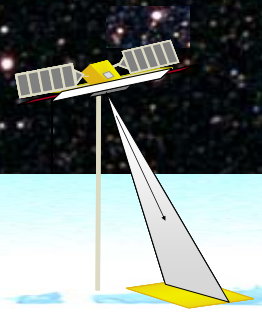


Launch Dates

Fiscal Year

05 06 07 08 09 10 11 12

Task 2: Sea Ice Altimetry



Goal:
Provide validated capability to estimate sea ice thickness from microwave altimeters satellites

Develop sea ice freeboard estimation capability for climate research

Knowledge Base

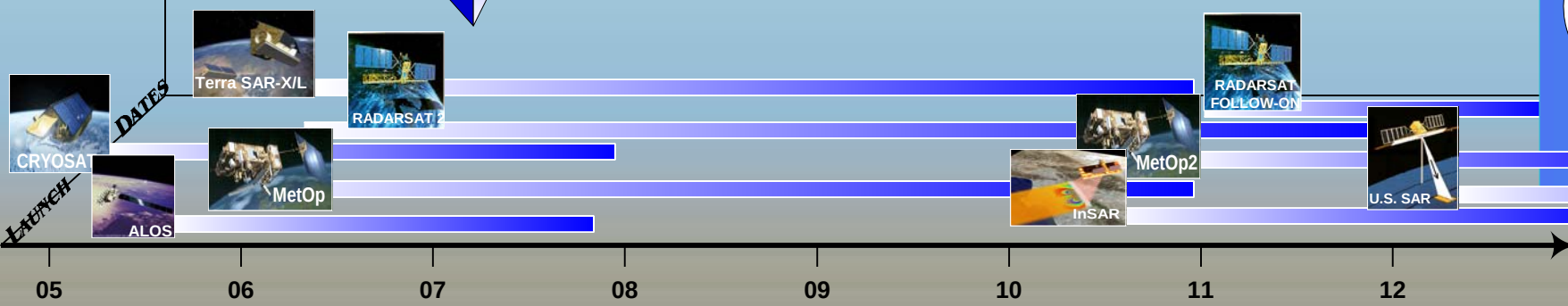
Freeboard connection to waning sea ice, age, and tracking → Climate Change Links

Develop more accurate geoid from GRACE
CryoSAT sea ice height (freeboard)
ENVISAT altimeter sea ice height
→ Sea Height Estimation Algorithms → Pending sensor availability

ENVISAT & CryoSAT Cal/Val
ERS-2 altimeter sea ice height
→ Altimeter Cal/Val

Contributions

- Provide improved understanding of the impact of climate change on the Arctic & Southern Oceans
- Isolate the dynamic oceanography height component & develop new satellite sea ice height algorithms
- Validate techniques for deriving freeboard estimates from satellite altimeters



Task 3: National Ice Center (NIC) Polar Research

Goals:
1) Reduce sea ice detection & characterization uncertainty
2) Sustain & develop operational sea ice products, models, & forecasts to meet NIC requirements as NOAA's operational ice services activity

Reduce uncertainty in the accuracy of sea ice products & forecasts

Knowledge Base

- Improve global short-term forecast accuracy
- Improve accuracy of regional climate forecasts
- Improve coupled ice-ocean models through satellite data assimilation
- Develop accurate nowcast sea ice concentration and edge all-weather products

→ Ice-ocean Models & Forecasts

- Improve user accessibility of product via GIS
- Update and develop sea ice products as new sensors become available

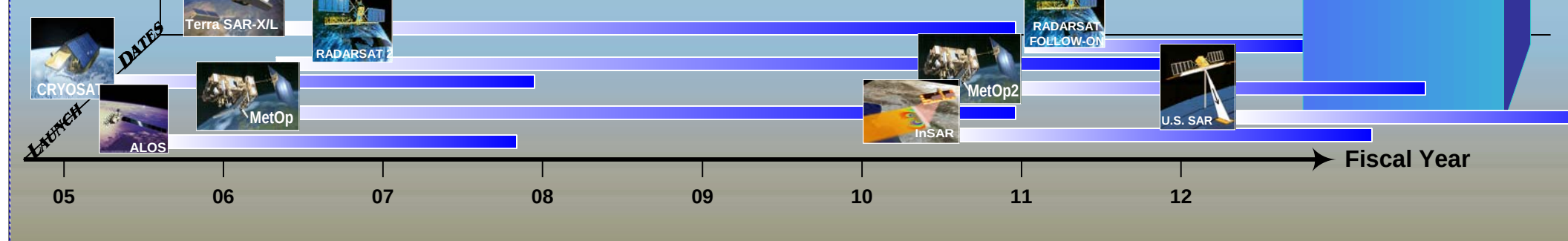
→ Sea Ice Product Updates

- Develop near-real-time access to Antarctic SAR data
- Maintain access to Arctic SAR, IR, visible , and other microwave data

→ Real-time Data Access → Pending sensor availability

Contributions

- Provide improvements through integration of satellite observations
- Maintain operational capability with available sensors
- Assure access to required satellite data



SUBTASK I: SST EDRS

GOAL:
(1) Reduce SST error by:
a) improve cloud masking
b) generate routine RTM based algorithms
c) correct for aerosol
d) improve match up validation through inclusion of NCEP analyses.
(2) Prepare for future SST missions (MetOp, NPP, NPOESS, GOES-R).

- **Operational SST Satellite EDRS validated to IORD II specifications.**
- **Best value blended SST products**

KNOWLEDGE BASE

GOES-R RISK REDUCTION
- Include upper air analysis in retrieval
- Probability based cloud detection
- Resolve midnight effect
- Cloud probability distributions
- OPTRAN modeled

NPP/NPOESS RISK REDUCTION MISSIONS
- Explore MODIS SST data for NPP RR
- Explore MODIS SST data for NPOESS RR
- RSMAS vs. SeaWiFS process
- Explore VIIRS NPP data for NPOESS
- Inst. Cal
- Error analysis

PASSIVE MW
- Generate AQUA/AMSRE MW SST
- Generate WindSAT SST
- Influence of RFI
- Coastal side lobe issues
- Noise reduction

BEST VALUE
- M/W IR estimate of cloud removal biases
- Operational validation
- Error characterization

IR,M/W BLEND
- Algorithm Dev
- Diurnal SST signal
- Validate GOES/POES blend
- Trans cloud removal

IR

05 06 07 08 09 10 11 12

Fiscal Year

CONTRIBUTIONS
- GENERATE SST ANALYSIS USING PC RTM FROM MODIS/ AIRS
- ASSIMILATE MODIS/GOES SST INTO 2D MODEL
- GENERATE SST ALGORITHMS FOR MODIS & VALIDATE
- GENERATE RTM ALGORITHMS FROM MODIS RADIANCE DATA ±0.5°C
- IR MW BLEND
- GENERATE RTM ALGORITHMS ±0.6°C.
- IR SST

SUBTASK 2: SST CDRS

GOALS:
(1) Acquire calibrated characterized radiances from GOES and POES platforms.
(2) Apply cloud mask to characterized radiances.
(3) Apply aerosol correction
(4) Generate RTM based algorithms to generate climate quality SSTs.

Climate quality global SST CDRs within 0.1° C

KNOWLEDGE BASE

POES BASED

Merge with NCEP re-analysis

Construct atmospheric correction model S/B conversion

Radiometric quality control

Cloud screening

Aerosol correction

Time-series analysis to established temp. stability

Reprocess new data

GOES BASED

Merge with NCEP re-analysis

Radiometric quality control

Cloud screening

Aerosol correction

Time-series analysis to established temporal stability

Reprocess new data

GROUND BASED

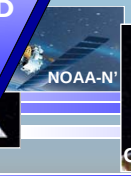
Acquire/compare difference of ground-based climatologies

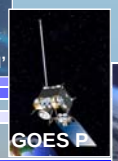
Select best SST climatology. Mean and standard deviation with space -time days

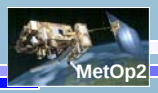
CONTRIBUTIONS

- REPROCESS CLIMATE QUALITY POES SSTS
- REPROCESS CLIMATE QUALITY GOES SSTS
- SELECT BEST OCEANOGRAPHIC CLIMATOLOGIES

LAUNCH DATES







HES

VIIRS

VIIRS

Fiscal Year

05 06 07 08 09 10 11 12

SUBTASK 3: SST CALIBRATION/VALIDATION

GOALS:

(1) Develop a validation system to maintain and monitor the quality of SST products.
(2) Identify uncertainties in the SST products based on validation results.
(3) Correct the uncertainties in SST products and regenerate.

SST Cal/Val system to reduce uncertainties in SST measurements for skin/bulk

KNOWLEDGE BASE

Quality assure ground-based data

Explore bulk to skin conversion using NCEP data

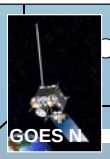
Produce bulk to skin conversion using NCEP data

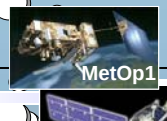
Reduce cross platform and cross sensor biases

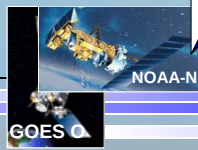
ACTIVE PHASE

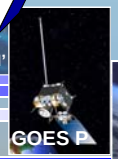
MAINTENANCE PHASE

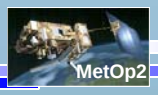
Reduce artificial SST dependences
(i.e. aerosols, vie w angle, ambient clouds, glintage)











HES

VIIRS

VIIRS

LAUNCH DATES

Fiscal Year

05 06 07 08 09 10 11 12

CONTRIBUTIONS

SATISFY RESEARCH/ MONITORING REQUIREMENTS

PRODUCTION OF DIFFERENT CROSS-CONSISTENT SST PRODUCTS

SELF CONSISTENT SST PRODUCTS

Subtask 4: SST Applications

Ability to generate high quality satellite-only SST products in areas lacking *insitu* data

Goals:
(1) Identify user needs.
(2) Develop SST products to suit user needs.
(3) User validation.
(4) High quality satellite-only SSTs

Knowledge Base

Improve GOES/POES blended SST products → **Coastal/Ocean Users**

Improve GOES/POES blended SST products
Bulk SST at Depth (TaD) → **CRW Users**

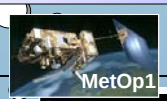
Improve GOES/POES blended SST products
Merge SST and forecast fields → **NCEP JCSDA**

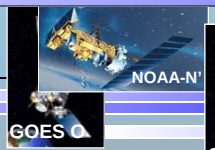
Improve GOES/POES blended SST products
Frontal products
Ocean currents
Extend to entire GEO global domain, i.e., GOES, MSG, MTSAT, GOES 10 → **Ocean Dynamics Users**

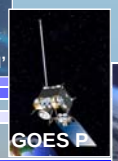
Contributions

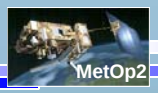
- Generate blended SST products at variable resolutions
- Generate high resolution blended SST products for shallow coastal waters
- Validate models with blended SST products
- Generate SST based products to identify dynamic features e.g. fronts/currents

Launch Dates









HES

VIIRS

VIIRS

Fiscal Year

05 06 07 08 09 10 11 12