STAR Center for Satellite Applications and Research
formerly ORA — Office of Research and Applications

6th Annual Symposium on Future National Operational Environmental Satellite System-NPOESS and GOES-R

"*GOES-R Satellite Mission: Land Product Development, Validation and Applications*"

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Baseline Products:

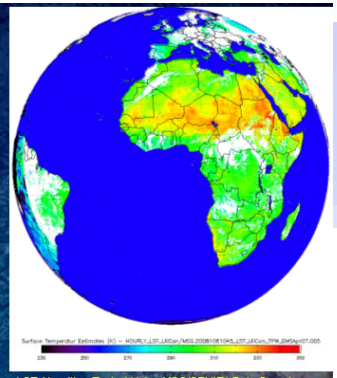
- Land Surface Temperature (LST)
- Fire Detection and Characterization (FDC)

Option 2 Products:

- Normalized Difference Vegetation Index (NDVI)
- Surface Albedo
- Flood and Standing Water (FSW) monitoring
- Green Vegetation Fraction (GVF)

Current status
- A TIR split window, explicit emissivity application algorithm was developed for the LST retrieval.
- Examined using a comprehensive simulation dataset.
- Tested using current GOES Imager and SEVIRI datasets.
- Evaluated using *in situ* LST estimation from SURFRAD stations.
- Critical design review, test readiness review have been done
- 80% readiness ATBD and software have been delivered, and received approval comments

Planned accomplishment
- Collecting more ground LST and satellite data for comprehensive *in situ* validation
- 100% readiness ATBD and software delivery in 2010.
- Development for validation system/tools



LST Algorithm Tested Using MSG/SEVIRI Data Sample data time: April 15, 2008, 10:45 UTC

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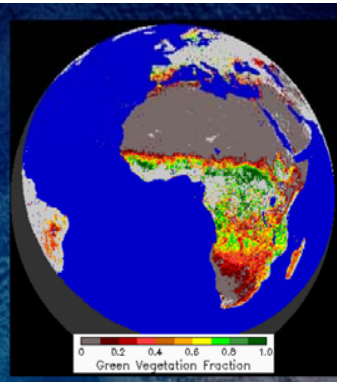
Current status
- The algorithm will use NDVI product with pre-determined maximum and minimum NDVI values as references of full and zero vegetation fractions, respectively.
- Algorithm for determining global maximum and minimum NDVI values have been tested using 4-year SEVIRI data (as proxy)
- Impact of anisotropic effect in NDVI data is analyzed, resulting that surface BRDF information will significantly improve the GVF product.
- Algorithm is primarily tested using MODIS data and SEVIRI data.
- Algorithm design review has been done
- Draft ATBD has been delivered in 2009.

Planned accomplishment
- Develop a approach for the BRDF correction
- Conduct the algorithm critical design review
- 80%, 100% readiness ATBD and software delivery in 2010 and 2011, respectively
- Development for validation system/tools



GOES-R GVF tested using SEVERI data, in the week of 2007155-2007161

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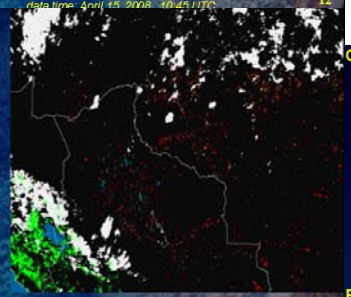
- Adapted wildfire automated biomass burning algorithm (WA_ABBA): a dynamic, multi-spectral, thresholding contextual algorithm using visible and infrared bands to locate fires and characterize sub-pixel fire characteristics.
- Examined using a comprehensive simulation dataset from proxy satellite data via a point spread function (PSF)
- Tested using MODIS data and SEVIRI data.
- Critical design review, test readiness review have been done
- 80% readiness ATBD and software have been delivered, and received approval comments

Planned accomplishment
- Collecting ground Fire and satellite data for comprehensive *in situ* and multi-satellite validation
- 100% readiness ATBD and software delivery in 2010.
- Development for validation system/tools



GOES-R WF_ABBA Fire Mask tested using MODIS data on Sept. 7, 2004, at 17:50 UTC

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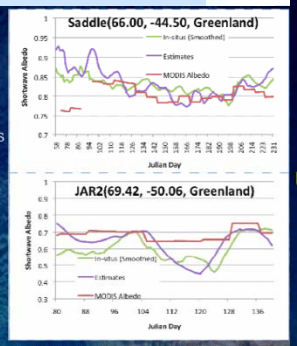
Current status
- A regression analysis approach is determined for estimating the surface albedo from TOA radiances.
- Three-kernal model is applied for determining the surface BRDF characters.
- The broad band albedo is estimated from narrow band albedos from visible to short wave infrared channels), through a pre-determined linear combination formula, which is inherited from MODIS and VIIRS approaches.
- Surface reflectance determined from the BRDF characters is available as bypass product.
- The algorithm is tested using MODIS data and SEVIRI data.
- Algorithm design review has been done
- Draft ATBD has been delivered in 2009.

Planned accomplishment
- Cross comparison using different satellite data
- More simulation and proxy data analyses for improving the regression coeffs
- Conduct the algorithm critical design review
- 80%, 100% readiness ATBD and software delivery in 2010 and 2011, respectively
- Development for validation system/tools



GOES-R Albedo Product Tested using SEVIRI data, compared to MODIS data and in situ data

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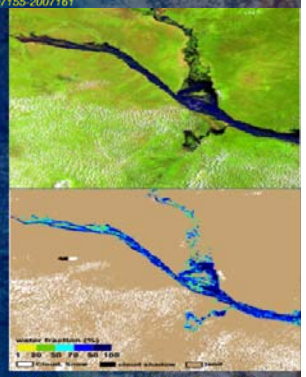
Current status
- A decision tree algorithm is determined for detecting the flood/standing water area
- A ratio (visible and short wave infrared bands) comparison algorithm is applied for estimating sub-pixel water fraction.
- Algorithm is primarily tested using MODIS data and SEVIRI data.
- Algorithm design review has been done.
- Draft ATBD has been delivered.

Planned accomplishment
- Collecting/generating ground database for *in situ*, multi-satellite comparisons.
- Further testing the decision tree algorithm/ procedure and optimizing threshold values applied
- Conduct the algorithm critical design review
- 80%, 100% readiness ATBD and software delivery in 2010 and 2011, respectively
- Development for validation system/tools



Top: SEVIRI RGB image in Namibia on Feb. 4, 2008
Bottom: water fraction calculated using the FSW algorithm

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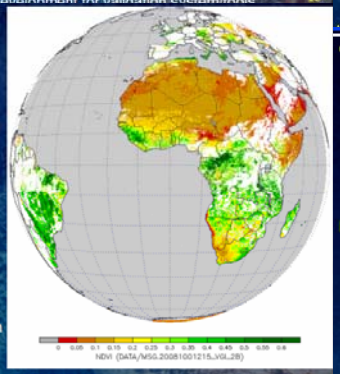
Current status
- A maximum-value composite algorithm is determined for the NDVI generation.
- Examined cloud contamination effect
- Tested using a comprehensive proxy satellite dataset including MODIS and SEVIRI datasets
- Critical design review, test readiness review have been done
- 80% readiness ATBD and software have been delivered, and received approval comments

Planned accomplishment:
- Analyzing anisotropic effect and its impact to the NDVI product
- Perform multi-satellite data comparison
- Collecting and perform *in situ* data comparison
- 100% readiness ATBD and software delivery in 2010.
- Development for validation system/tools



GOES-R NDVI Product: example NDVI map from 12:15 UTC April 9, 2008 produced from SEVIRI on Meteosat-8

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Current status
- A satellite-ground data match up tool has been developed, which includes a stringent cloud filtering processes.
- A large set of *In situ* data has been collected covering areas in the U.S. and Europe.
- A site characterization model is developed for estimating measurement difference between the satellite pixel and the *in situ* spot.
- Validation plans for LST, NDVI and FDC products have been set up.

Planned accomplishment
- Collecting more *in situ* data and corresponding satellite data for better temporal and spatial representativities.
- Selecting proper *in situ* sites for high quality validation process.
- Set up and conduct validation plans for Albedo, FSW and GVF products.
- Development for validation system/tools