

**MODIS
AND
CLIMATE DATA RECORDS**

HQ Code YS/Diane Wickland, et al. Site Visit

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Presented by

**Vincent V. Salomonson
NASA/GSFC
MODIS Science Team Leader**

- **Presentation is a set of summary of thoughts concerning challenges/issues that relate to MODIS products**
- **Underlying observations:**
 - **A challenge for most MODIS products is and will be the addition of those products to existing product/parameter data bases from “heritage” sensors that have already produced data bases contributing to climate studies; e.g., AVHRR, SeaWiFS/CZCS as well as international sensors; e.g., Vegetation, MERIS, ATSR, POLDER, etc.**
 - **Most MODIS efforts also need to viewed with anticipation of them eventually merging with NPP/NPOESS/VIIRS efforts**
- **Presentation will touch on product development activity relative to producing to “Climate-Data-Record (CDR) quality” data bases in each of the major disciplines to which MODIS contributes**

OCEANS

- **Ocean color is a major effort in MODIS contributing to or achieving “climate data record quality” results**
 - **Merging Terra and Aqua MODIS ocean color and related products with multi-year SeaWiFS results has proven problematic.**
 - **recent (Feb 11 and 12) Ocean Color Review Team (J. Mueller/chair) reviewed efforts to date and is concluding that Terra MODIS efforts are generally on the right track, CDR-quality is achievable, but will require substantial, continuing effort**
 - **Aqua MODIS seems to be performing better than Terra MODIS so far**
- **MODIS Sea Surface Temperature (SST) is achieving validated CDR-quality results.**
 - **merging with AVHRR, ATSR, etc. efforts will need to continue**
 - **comparisons with AIRS/AMSU and AMSR/SSM/I, etc. will need to continue to decide the relative roles of each and effects of data fusion, etc.**
- **MODIS sea ice cover and ice surface temperature has CDR quality to be merged with AVHRR. Also fusion with microwave data sets.**

ATMOSPHERES

Cloud Cover (I.e., Ackerman product) is a major CDR possibility

-needs to be merged or collaborated with ISCCP

-lots of questions about what is a “cloud”, etc. to be discussed

MODIS also produces several other cloud products that can complement the ISCCP efforts (See BAMS-Feb 2004 article), but early comparisons show interesting differences that will need to be resolved, e.g.,

-optical depth, cloud droplet phase (liquid or ice), water vapor, cirrus fraction, etc.

Aerosols CDR is another major product of great importance

-lots of other sensors with which to compare and merge to get an aerosol climatology over land and oceans; e.g.,

-AVHRR, SeaWiFS, TOMS, etc.

Because of the similarity of MODIS and VIIRS the results from the MODIS need to be carefully utilized in the NPP/NPOES efforts

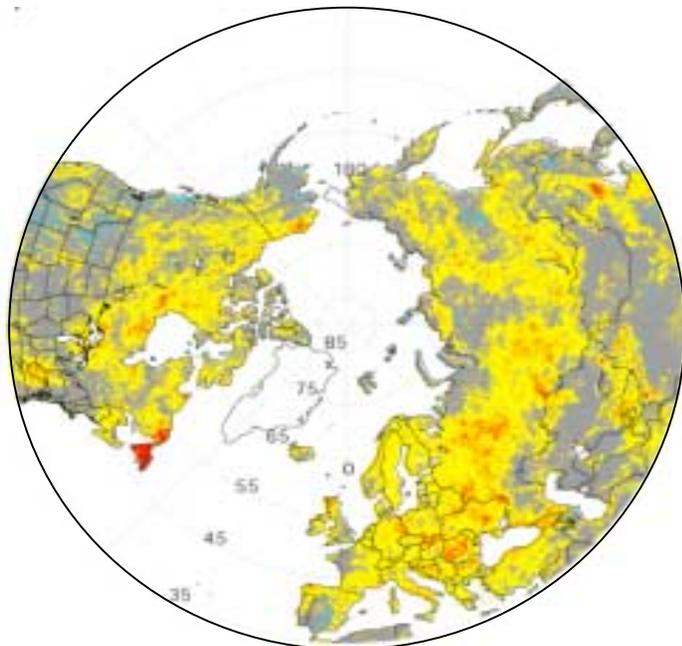
LAND

MODIS produces several products that have CDR-quality, but will need to continue the merging with products from AVHRR, SeaWiFS, etc. to produce CDR for science and applications

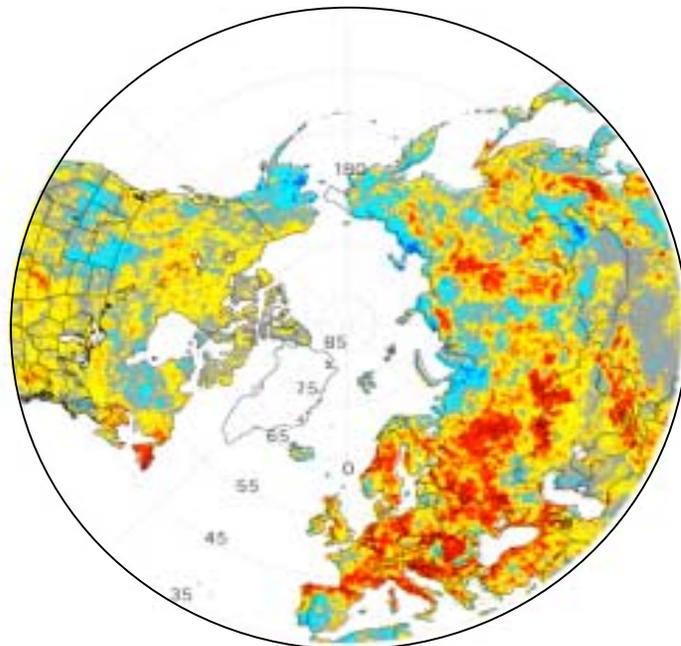
- NDVI: major product with long history with AVHRR and widely used. What about EVI or other such variations?? GIMMS (empirical) efforts successfully on-going as well as Masuoka, et al., REASON CAN (first principles) efforts leading to long-term land data record with community and collaboration**
- snowcover: goes back to 1966 for satellite-derived CDR. D. Hall is working with D. Robinson/Rutgers on CDR. NOAA/IMS usage now or when VIIRS occurs?? Fusion with microwave data sets is good.**
- Albedo-has reached a new, valuable level of accuracy, etc.**
- Fire climatology and burned areas is gaining wide usage and acceptance for science and applications**
- LAI and FPAR—again merging with AVHRR record**
- Land Cover and related products (e.g., tree cover, VCC)**
- Land surface temperature**

Decadal trends in *terrestrial* vegetation

1992-2002

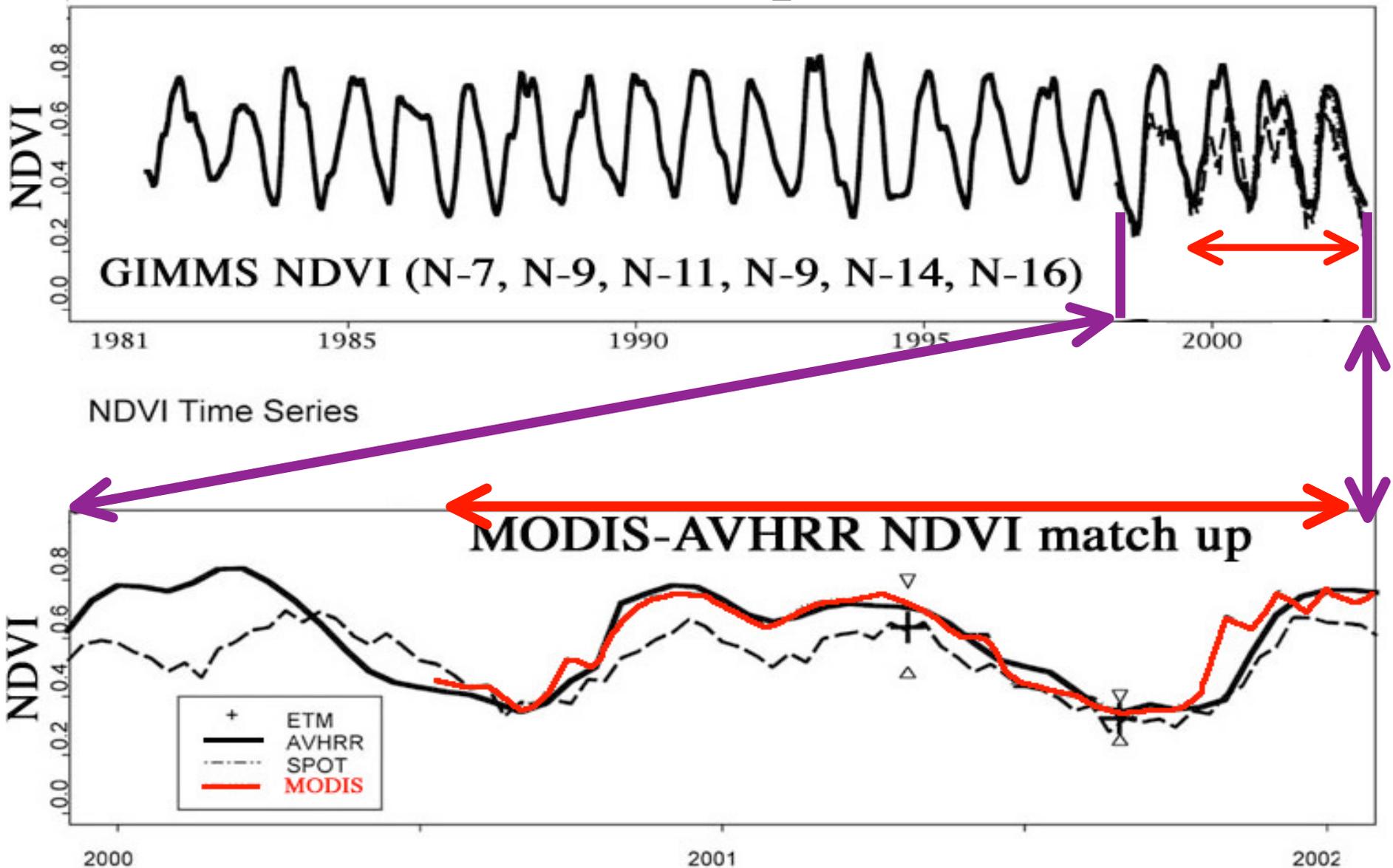


1982-2002



Ready for Prime time:

AVHRR NDVI match up to MODIS NDVI



SUMMARY

- **MODIS efforts have made considerable progress in producing CDR-quality data sets for oceans, atmospheres, and land science and applications efforts**
- **In many obvious cases, MODIS products need to be merged with existing satellite-derived data records to extend, and improve CDR's**
- **New MODIS products, as well as those above, need to look toward and be used to contribute to the production of CDR-quality results from the NPP/NPOESS VIIRS efforts**