

# Long Term Land Data Record

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NASA GSFC Code 922, Raytheon ITSS

July 14, 2004

MODIS STM - Land

# Long Term Land Data Record

- NASA REASoN CAN supported activity.
- Uses state of the art algorithms.
- Provides the link between AVHRR, MODIS and VIIRS.
- Pathfinding a long term land data record  
AVHRR => EOS.

# REASoN CAN project members

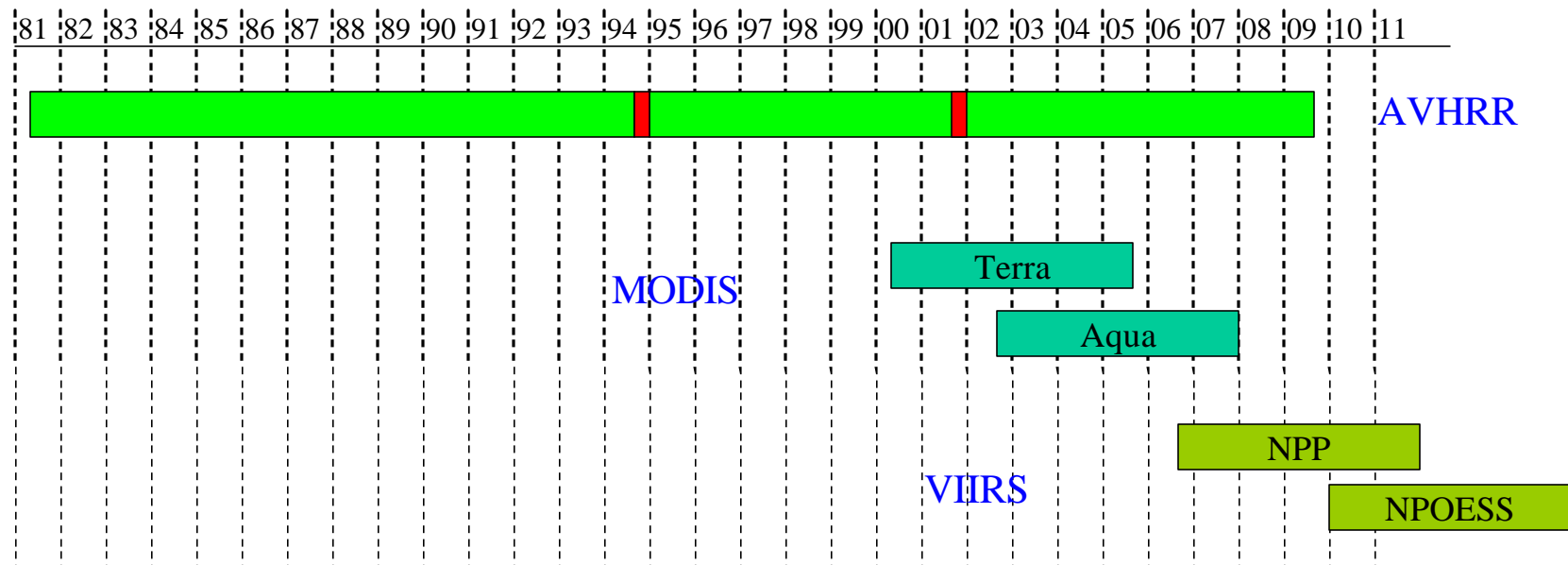
## *PI & Co-I's:*

- *NASA GSFC:* Ed Masuoka (PI), Nazmi Saleous, Jeff Privette, Jim Tucker & Jorge Pinzon.
- *UMD:* Eric Vermote, David Roy & Steve Prince.

*Collaborators:* Chris Justice (UMD) and NOAA in advisory capacity.

*NASA Study Manager:* Dr. Diane Wickland.

# Data Sources



# Proposed Activities

- Develop and produce a global long term coarse spatial resolution (0.05deg) data record from AVHRR, MODIS and VIIRS for use in global change and climate studies.
  - The data record will help answer questions related to variation of some elements such as length of growing season and aerosol emission in the last three decades (1981-2007).
- Set up an advisory panel comprised of scientists / users of coarse resolution remote sensing data.
- Hold community workshops for outreach and feedback.

# Proposed Products

AVHRR, MODIS, VIIRS:

Surface reflectance

Vegetation Indices

Surface temperature and emissivity

Snow

LAI/FPAR

BRDF/Albedo

Aerosols

Burned area

Products and formats will be modified based on feedback from the Advisory Panel and the User Community Workshops.

# Land Product Heritage

- MODIS full resolution products.
- Coarse resolution products:
  - GIMMS NDVI from AVHRR.
  - MODIS Climate Modeling Grid (CMG) products.
  - A preliminary MODIS Multidisciplinary Data Set (MMDS) released in January 2003:
    - 0.25 and 0.05 degree resolution.
    - Monthly composites.
    - Global geographic projection.

## AVHRR data set

- AVHRR offers the longest record.
- Lacks onboard calibration.
- Limited set of spectral bands reduces the accuracy of atmospheric parameters retrieval and correction (water vapor and aerosols).
- Orbital drift leads to substantial variation in the solar geometry throughout the mission.



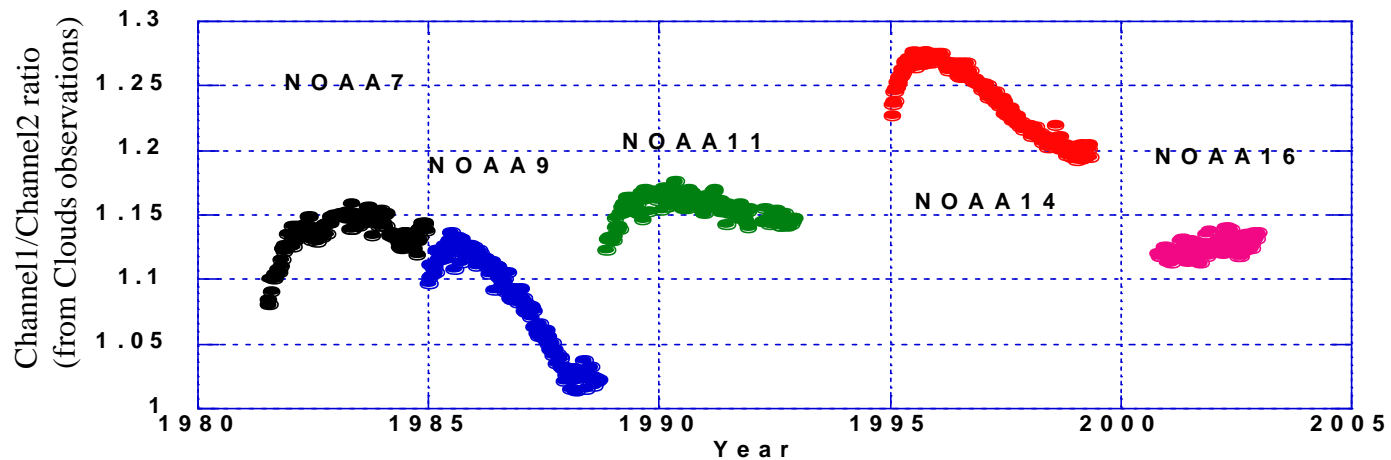
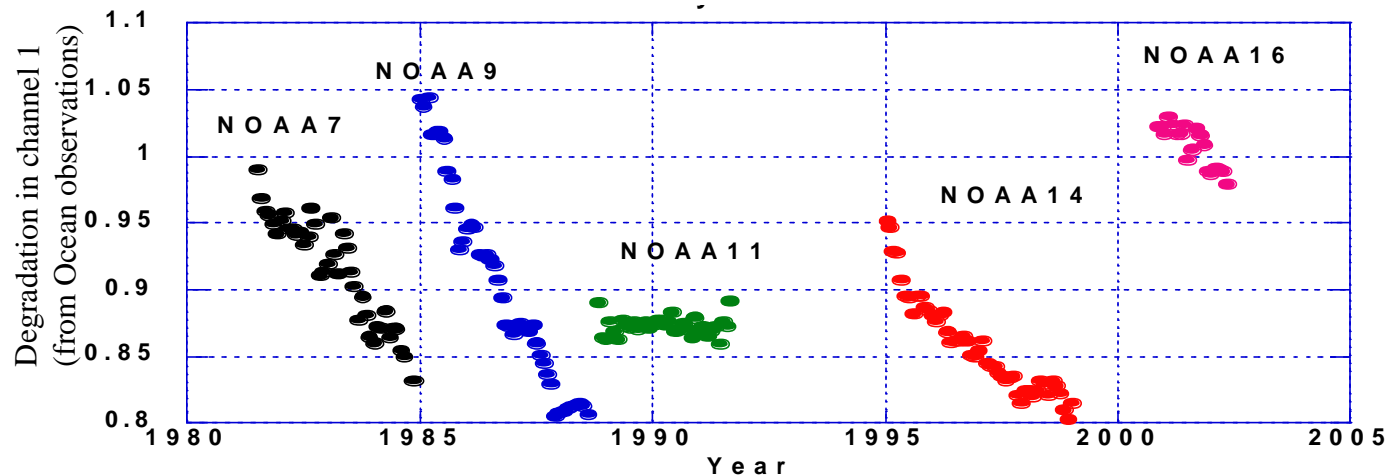
# Generating Improved AVHRR products

Goal to make the AVHRR data set temporally consistent and consistent with MODIS by using:

- Reliable and consistent calibration across the different NOAA platforms.

# Consistent AVHRR calibration across platforms

- Use the Vermote/Kaufman calibration approach (Pathfinder 2)



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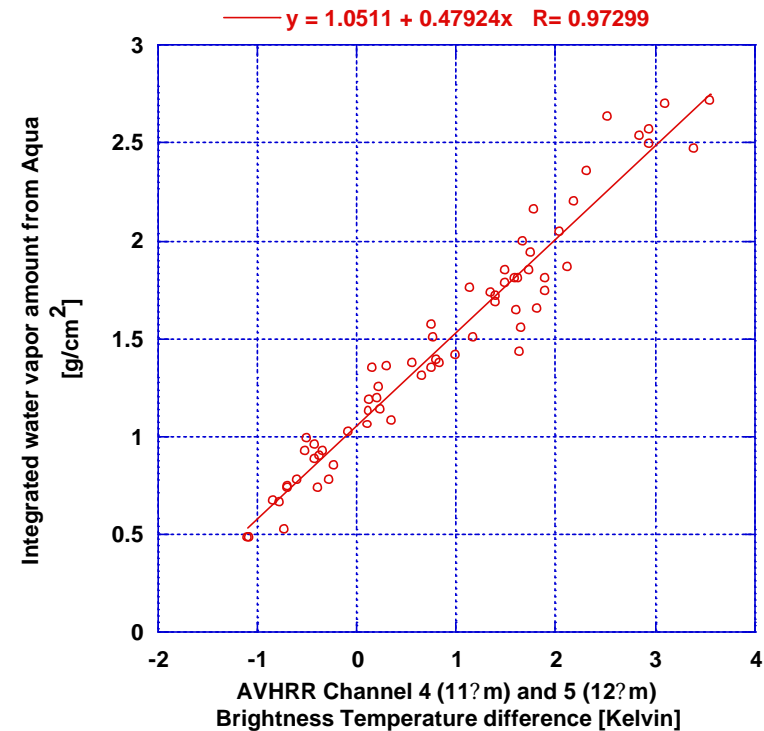
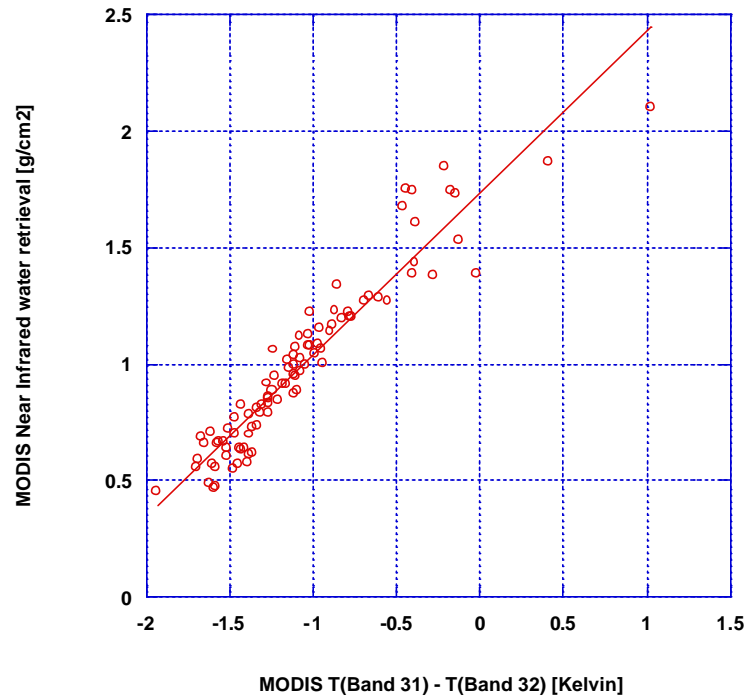
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- BRDF correction to address differences in the solar and viewing geometry.

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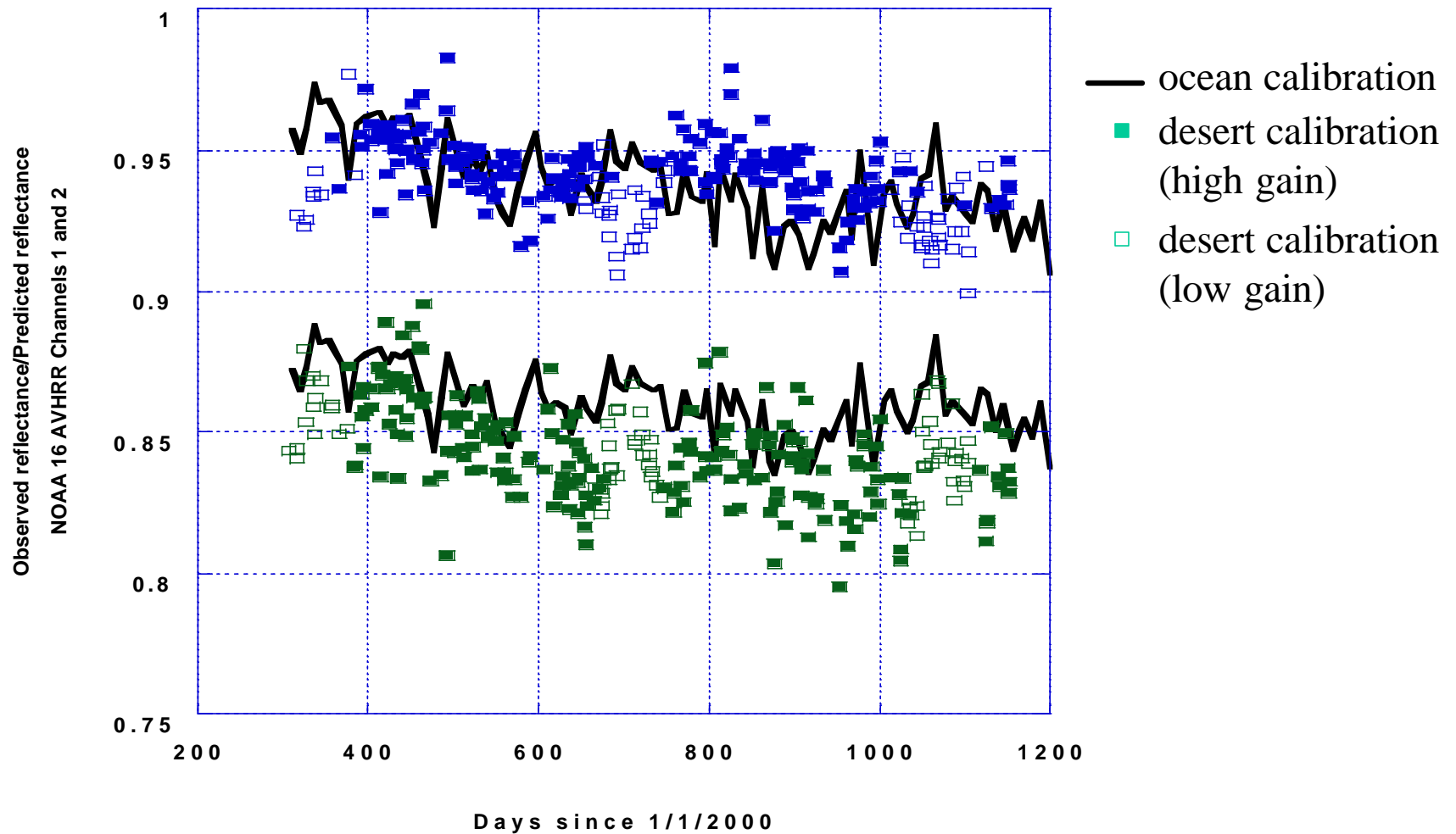
- Reliable and consistent calibration across the different NOAA platforms.
- Apply MODIS algorithms to AVHRR where possible, e.g.: the MODIS aerosol retrieval and atmospheric correction approach.
- BRDF correction to address differences in the solar and viewing geometry.
- Coincident AVHRR/MODIS to evaluate and improve AVHRR products and quantify accuracy.

# Use of MODIS to improve AVHRR atmospheric corrections



Use coincident MODIS/AVHRR data to develop an approach for water vapor retrieval from AVHRR.

# Use of MODIS to evaluate calibration approach



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## Production and Distribution

- Use a MODAPS-like environment for production.
- Benefit from the MODIS production experience.
- Data products will be kept online and distributed by ftp and through a web page.
- Make intermediate data sets available for evaluators.
- Transition the data sets to the DAAC later in the project when the datasets are validated.



# Quality Assessment

## Known Issues Tracking

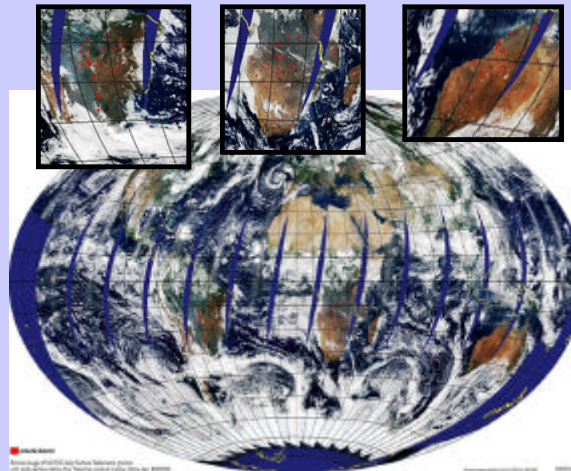
**Known Issues in MODIS product (Surface reflectance)**  
Subset files: FILE PATHS (3), FILE DESCRIPTIONS, VERSIONS, HISTORY, METADATA

The information listed in this table is for the purpose of information only. For details, see the MODIS User Guide.

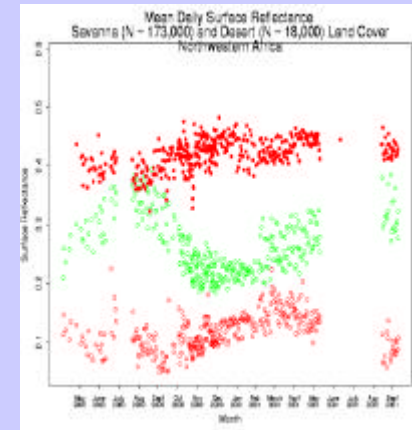
**Summary**

Issue No.	Issue Path	Issue Title	Issue Type	Change Log
01_000001_0001	01_000001_0001	MODIS surface reflectance data error	Data	
01_000001_0002	01_000001_0002	MODIS surface reflectance data error (continuation)	Data	
01_000001_0003	01_000001_0003	MODIS surface reflectance data error (continuation)	Data	
01_000001_0004	01_000001_0004	MODIS surface reflectance data error (continuation)	Data	
01_000001_0005	01_000001_0005	MODIS surface reflectance data error (continuation)	Data	
01_000001_0006	01_000001_0006	MODIS surface reflectance data error (continuation)	Data	
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01_000001_0050	01_000001_0050	MODIS surface reflectance data error (continuation)	Data	

## Global Browse



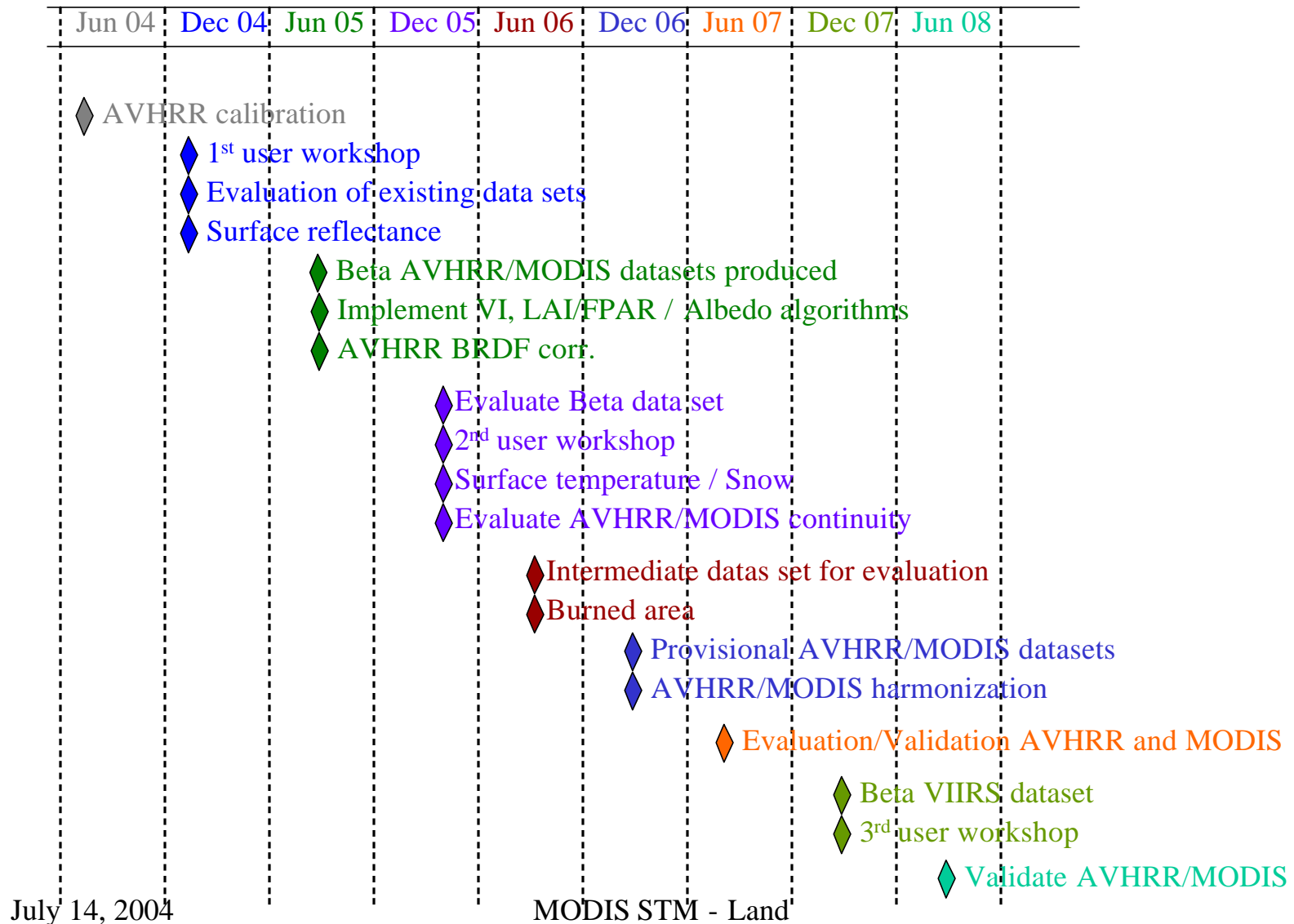
## Time series analysis



# Community Outreach

- **Advisory panel: will include members from different disciplines and agencies (NOAA NESDIS, USDA, CRSC, ...).**
- **Three community workshops held throughout the project to refine requirements and provide feedback on products.**
- **Publish team's evaluation of existing and intermediate datasets on the web and request input and comments from users.**
- **Participation in scientific conferences and peer reviewed publications.**

# Project timeline



# Summary

- Create a Long Term Land Surface Data record.
- The user community involved in the definition and evaluation of the data sets (Pathfinder approach).
- Incremental release of the products (Beta => Provisional => Validated) as they are generated (MODIS approach).