Long Term Land Data Record

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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

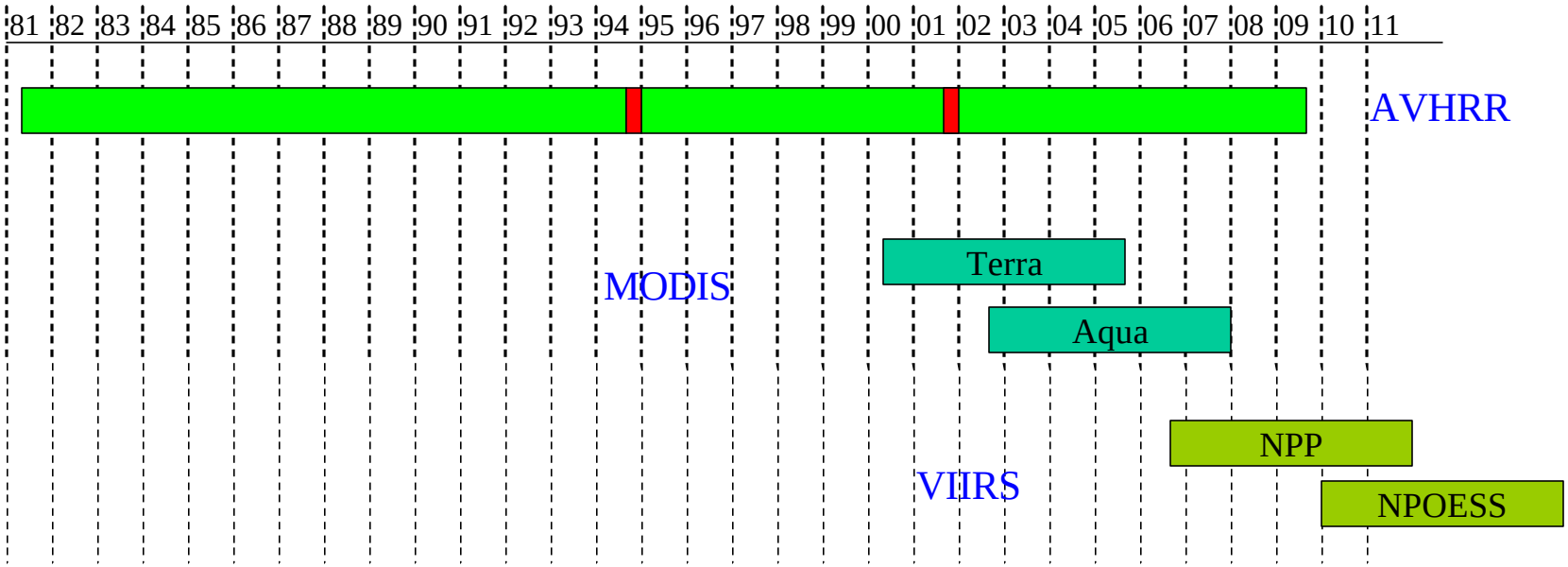
PI & Co-I's:

- *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.

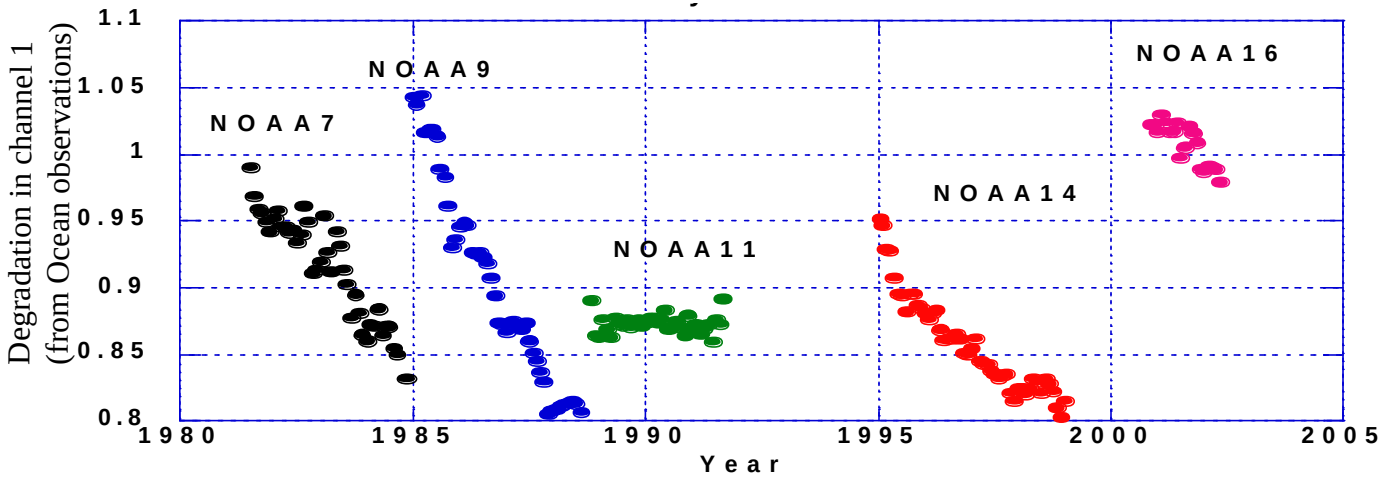
Generating Improved AVHRR products

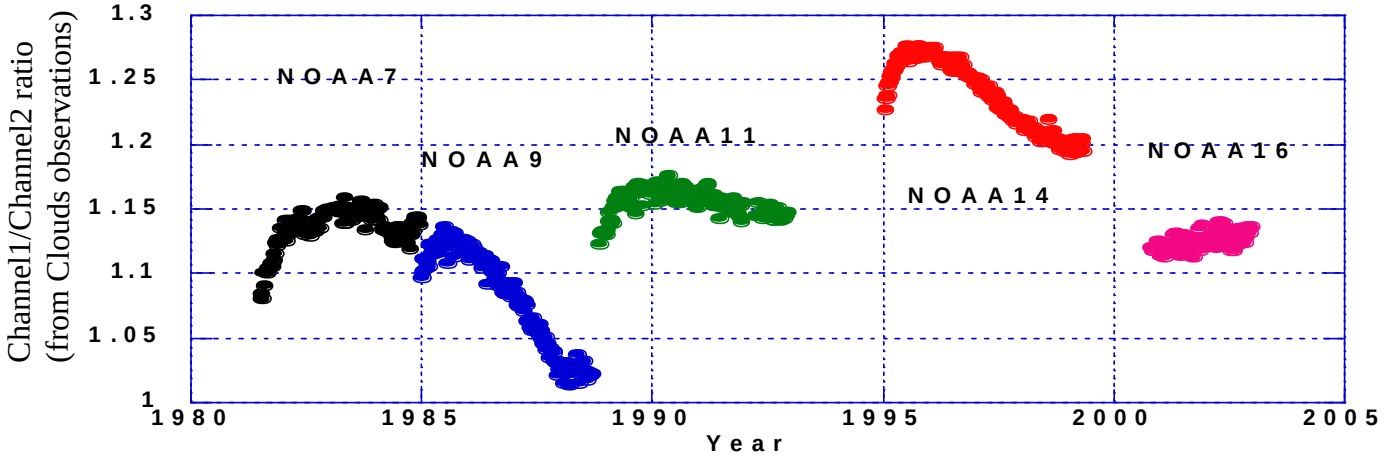
Goal to make the AVHRR data set temporally consistent and consistent with MODIS by using:

- 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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- Apply MODIS algorithms to AVHRR where possible, e.g.: the MODIS aerosol retrieval and atmospheric correction approach.

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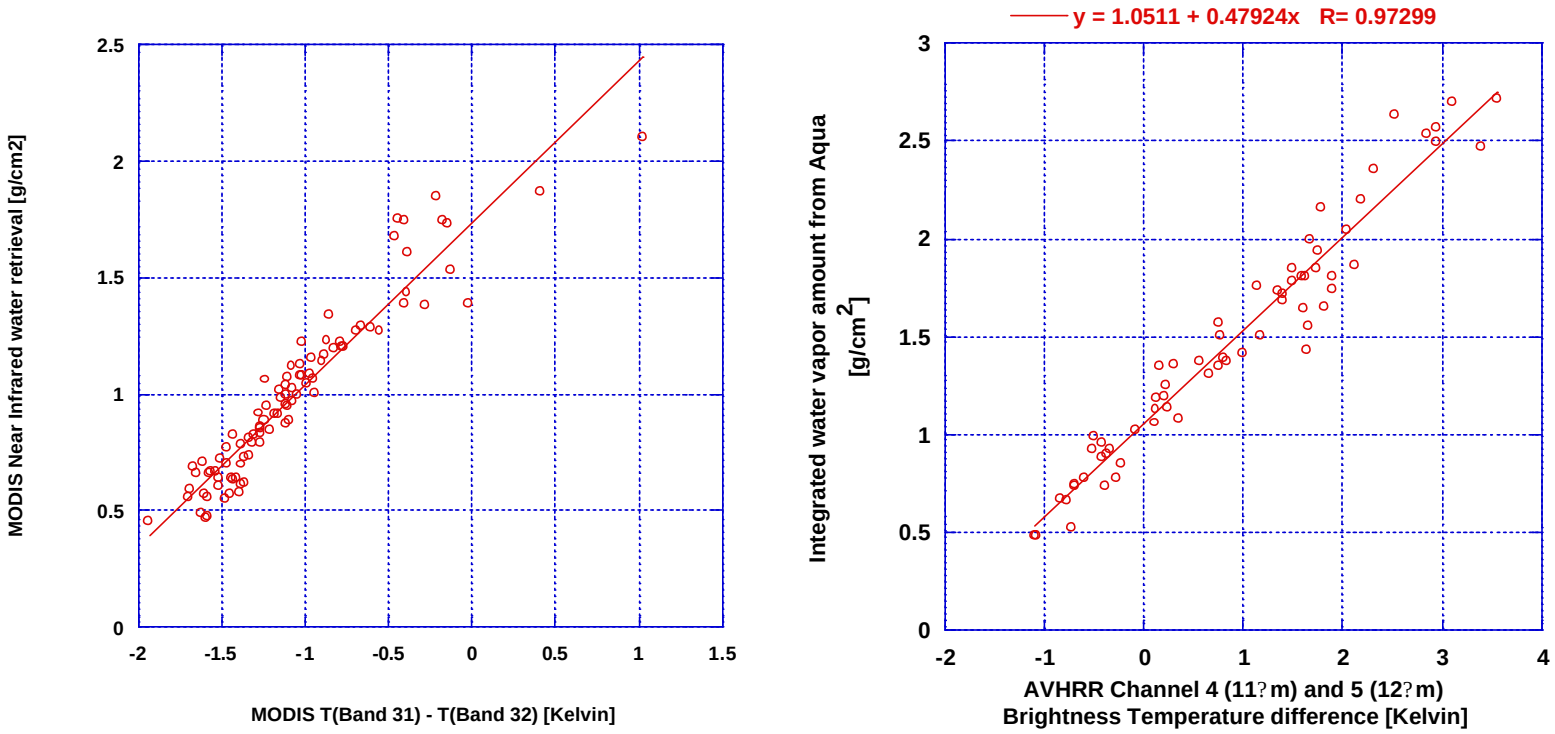
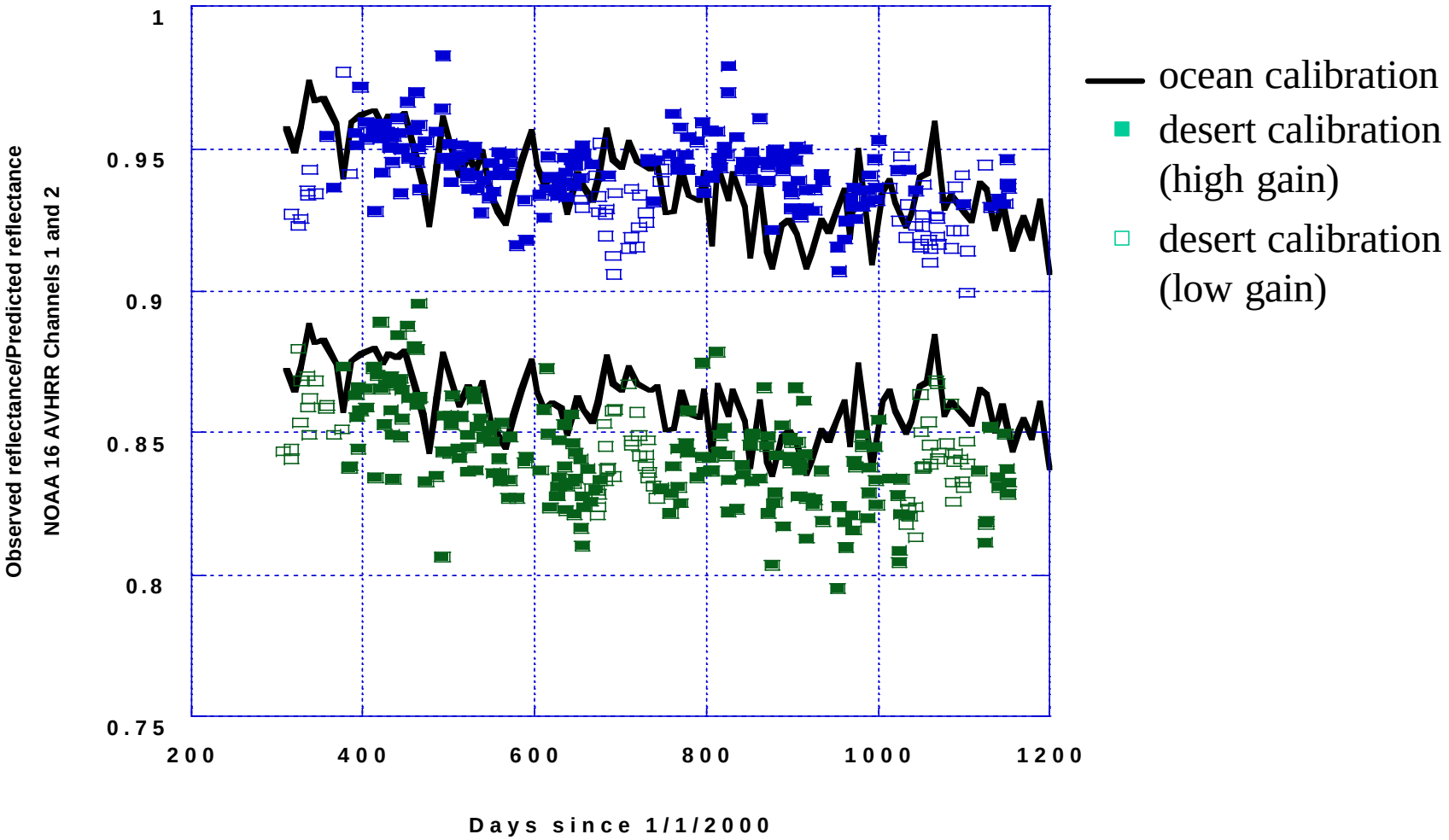
- BRDF correction to address differences in the solar and viewing geometry.
- Coincident AVHRR/MODIS to evaluate and improve AVHRR products and quantify accuracy.

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



Production and Distribution

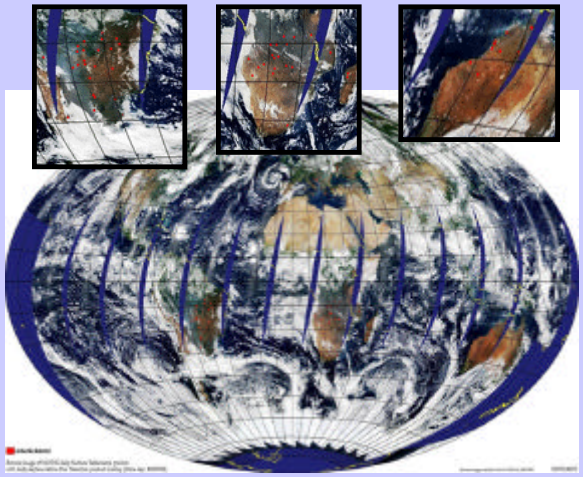
- Use a MODAPS-like environment for production.
- Benefit from the MODIS production experience.

-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.

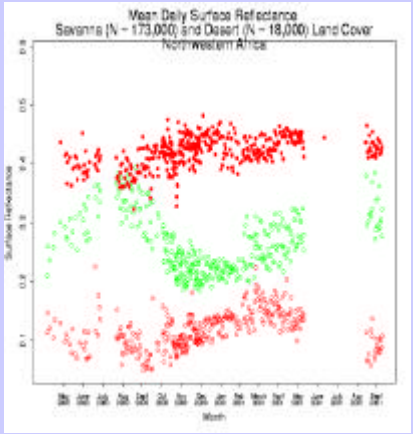
Quality Assessment

Known Issues Tracking

Global Browse



Time series analysis



Community Outreach

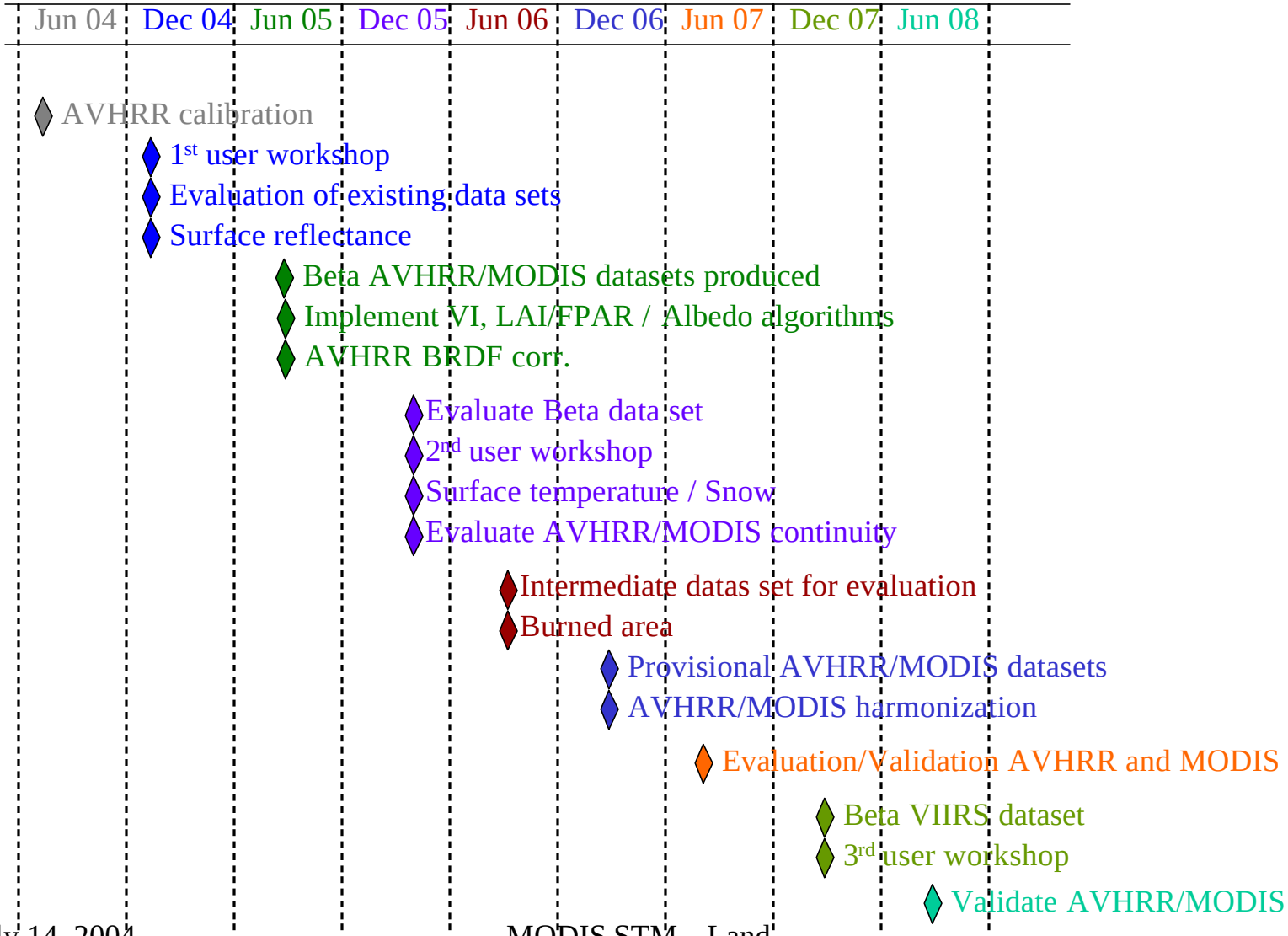
- Advisory panel: will include members from different disciplines and agencies (NOAA NESDIS, USDA, CRSC, …).

-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).