IGARSS 2009 SC-4: MODIS Direct Broadcast Data For Enhanced Forecasting And Real-Time Environmental Decision Making

Day One Syllabus: Liam Gumley

Lecture Session

Review of Radiative Transfer Principles – Allen Huang
Introduction to Terra and Aqua
Introduction to the MODIS instrument
What is Direct Broadcast?
- Overview of Direct Broadcast Products

Level 1B MODIS products (1KM, HKM, QKM)
- What is Bowtie? How do I remove it?

Atmosphere DB Products
- What is IMAPP?
- Cloud Mask
- Atmospheric Profiles
- Cloud Top Products
- Aerosol Products
- Water Vapor Products

Land DB Products
- What is DRL?
- Active Fires
- Corrected Reflectance
- NDVI
- EVI
- Land Surface Temperature
- Land Surface Reflectance

Ocean DB Products
- What is SeaDAS?
- Water Leaving Radiance
- Sea Surface Temperature
- Chlorophyll Concentration

Image Products
- True Color Images
- Google Earth Images

How do I create DB products?
- What is Direct Broadcast Virtual Machine?
- How to install and run DBVM

How do I read the product files?
- What is HDF4?
- How do I read HDF4?
- What software is available? (Hydra, MRTSwath, HDFLook, ENVI, McV…)
- What can the software do?

How can I get products from NASA?
- What is LAADS?
- How do I order products from LAADS?

Lab Session

1. Introduction to Hydra
2. Exploring MODIS Level 1B data in Hydra
3. Exploring MODIS Cloud Mask in Hydra
4. Exploring MODIS Water Vapor Product in Hydra or Freelook
5. Exploring MODIS Active Fire and NDVI Product in Hydra or Freelook
6. Exploring MODIS SST and Chlorophyll Product in Hydra or Freelook
7. Exploring MODIS true color and other products in Google Earth

Day Two Syllabus: Kathleen Strabala MODIS Applications 8 July 2009

Lecture Session

Introduction to Meterology - Jordan Gerth
Weather Observation and Forecasting

- Complimentary to Geostationary
  - Improved spatial resolution
  - Improved spectral resolution
  - Unique products
- Public Safety
  - Fog detection
  - Snow/ice detection
  - Fire detection
  - Severe weather
- Aviation
  - Cloud height, cloud composition, cloud temperature
  - Turbulence
  - Ash detection
- Numerical Weather Prediction (NWP) DBCRAS applications
  - Direct Broadcast CIMSS Regional Assimilation System (DBCRAS) NWP
    - Freely distributed, globally configurable 72 hour forecasts of meteorological fields centered on user supplied lat/lon
    - Improved depiction of cloud and moisture using MODIS products in assimilation
    - Unique forecast satellite imagery

Air Quality

- Aerosol detection
- IDEA – Infusing satellite Data into Environmental Applications

Others

- Use of sun glint patterns
- Land Surface Temperature case study of infestation

Lab Session

1. Fog detection case study using HYDRA and Google Earth
2. Investigation of Strong Thunderstorms using HYDRA
3. Estimating MODIS Aerosol Optical Depth using HYDRA
4. Using MODIS to determine cloud phase, atmospheric turbulence and discrimination of snow and ice using HYDRA
5. DBCRAS investigation of deep low pressure system using McIDAS-V

Day Three Syllabus: Philip Frost, Karen Steenkamp and Willem Marais

Remote Sensing and Fire 9 July 2009

Lecture Session

Lecture 1: Philip Frost

The role Remote Sensing in Wildfire Management

- Impact of National Disasters worldwide
- Wildfire Management and Information needs
- Remote Sensing basics
- Remote Sensing fire products
    - Active fire product
    - Burned Area product
- Future fire satellites
- Kruger Park fire disaster
- Botswana Fire Information System

Lecture 2: Philip Frost

Fire Danger Estimation

- Background on Fire Danger modeling
- FDI basics
- Current FDI models

Lecture 3: Karen Steenkamp

Plant phenology and fuel biomass

- Basics of plant phenology
- Long term vegetation datasets
- Role of Remote Sensing in mapping plant condition
- Relationship between fuel load and fire
- Mapping vegetation fire risk

Lecture 4: Willem Marias

MODIS Burned Area products

- History of Burned Area products
- Burned Area mapping: problems, limitations
- Description of official MODIS BA product
- Description of Lewis Giglio product

Lab Session

6. Students will compare the 7 MODIS reflectance bands in relation to each bands ability to characterize active fire, burned area and smoke plumes
7. Students will have the opportunity to manually map a large forest fire from high resolution Spot data. Their product will then be compared to two automated MODIS burned area products
8. If time remains students will have the opportunity to learn more about the AFIS viewer and how to use it