Real-time processing of Direct Broadcast MODIS data in Hungary

Aerosol optical depth at 550 nm
0.25

Cloud top pressure [hPa]
15.0

IV
IX
0.75

VI
NIR Integrated Water Vapor [mm]
IR Integrated Water Vapor [mm]
0.0
30.0

VII
VIII
100.0

V

775.0

X

IV
XI
7.5

II
IX
III

Foundation: 2002
Location: Budapest, Hungary
Geographical coordinates: 47.475°N, 19.062°E

Maintenance: Space Research Group, Eötvös Loránd University
Real-time processing: Department of Meteorology, Eötvös Loránd University

Data received:
- DB MODIS: Terra & Aqua
- HRPT: NOAA-15, -16, -17, -18, -19
- CHIRP: Fengyun-1G
- Other: KOMPS-2 (non-meteorological)

Number of received overpasses:
- MODIS: ~10,000 (since September of 2004)
- NOAA-series: ~21,000 (since April of 2003)
- MOD14 DB software, identification of fire

THE APPLIED MODIS RELATED SOFTWARE

1) SeaDAS MOD13 Level1B Software Package
   (developed by the SeaDAS group, NASA GSFC)
2) MODIS Destripe Direct Broadcast Software
   (developed by Lani Gumley and Kathy Strabala)
3) MODIS Level2 of the International MODIS/AIRS Processing Package (IAP)
   (developed by SSEC, University of Wisconsin)
4) Direct Broadcast CIHR5 Regional Assimilation System (DBCRA5) numerical weather prediction software
   (developed by Robert Aune, Kathy Strabala, Scott Lindstrom and Allen Huang)
5) Nested DBCRA5 (developed by R. Aune, K. Strabala, S. Lindstrom and A. Huang)
6) MOD14 D5 software, identification of fire
   (algorithm developed by Giglio and colleagues)
7) True Color software
   (developed by Lani Gumley, Jacques Desclaires and Jeffrey Schmaltz)
8) Direct Broadcast Google Earth software
   (developed by Lani Gumley and Amato Evan)

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Step 2. Atmspheric Level2 data
Using software #3
A few examples for Terra, 01.11.2009 09:56 UTC

Step 1. Calibrated and geolocated MODIS Level1B data
Using software #6
Direct Broadcast MODIS Level1B data

Step 3. DBCRA5 & NDBCRA5
Using software #4 and #5

DBCRA5: in every 3 hours for 72 hours with a horizontal resolution of 48 x 48 km
based on several ancillary data (e.g. HCEP QF5) and MODIS Level2 products
(mod07 integrated water vapor, mod06 cloud effective emissivity and cloud top pressure)

NDBCRA5: in every 3 hours for 48 hours with a horizontal resolution of 16 x 16 km,
based on the output data of DBCRA5.

Spin up forecast of DBCRA5 valid for 01.11.2009 12 UTC based
on the data of two Aqua and three Terra overpasses

Weather forecast of the smaller scale NDBCRA5 valid for 02.11.2009 00 UTC

Step 4. Fire detection
Using software #7

Fire detection for every overpass.
When fires are detected inside the area of Hungary, automatic
notification happens with the geographical coordinates of the
detected fires via e-mail.

Step 5. True Color images
Using software #8

MOD13 True color image gallery based on
selected pictures since 2004

Step 6. DBGE

Using software #8

After every new daytime overpass the automatically generated true
color MODIS picture is published on the Internet:
http://nimbus.elte.hu/kutatas/sat/modis_en_latest.pl

Example for other applications of the real-time received data

NDVI time series for a deciduous broadleaf forest for 2007 (when a
remarkeble heat wave occurred without any precipitation in July) based
on the official MOD13 (vegetation indices) products, and the NDVI derived
from the DB MODIS data. Aerosol optical depths (AOD, for 550 nm are also shown) to express it contribution to the values of DB NDVI.

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