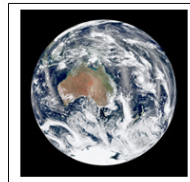


**Workshop on NASA's new Suomi NPP earth monitoring satellite and VIIRS sensor system**

**Melbourne 13 – 15 February 2012**



## The best way to access the data

- Inspect Part 1 of this document to get an idea of the layout of the various files on this memory stick
- Inspect Part 2 of this document for a more detailed description of the content of the files.
- Listen to the summary recordings by PaulMenzel (PaulMenzelSummary) and LiamGumley (LiamGumleySummary) for an overview of the workshop material. Inspect the associated PowerPoint presentations.
- Read the document “Installing HYDRA and accessing VIIRS data” to assist you in installing HYDRA and in viewing the VIIRS and MODIS data files. Listening to the “Lab1part1” and “Lab1part2” recordings will assist you in correctly loading the VIIRS data into HYDRA.
- Work through the set exercises “Lab1\_HYDRA2” and “Lab2\_HYDRA2”. Also listen to “Lab1DiscussionPart1” and “Lab1DiscussionPart2”, “VIIRSIandMchannelscompared”, “14thNightchannel” and “14thLabAfternoonDiscussionsMW” to assist you.
- Install HYDRA1.9.6 and listen to the FutureVIIRSinHYDRA recording. Try to duplicate some of the operations outlined in the recording, using the included AIRS and MODIS datasets.

## **Part 1: Structure of the files on the memory stick, and best way to access the data**

### **1- Introduction and Summary**

#### **Recordings (both in .wmv and .mp4 format)**

- PaulMenzelssummary (46 minutes)
- LiamGumleyssummary (26 minutes)

#### **PowerPoint presentations referenced in the above recordings**

- PaulMenzelPresentation
- PaulMenzelPresentationSummary
- LiamGumleyPresentation

#### **Other Topics folder**

#### **Recordings (both in .wmv and .mp4 format)**

- CloudTypesVIIRSMenzel (20 minutes)
- CrISandABIinstrumentsdescribed (16 minutes)
- MODISvsVIIRSswathGumley (5 minutes)
- VIIRSIandRchannelsVIIRSM15anomalies (6 minutes)

### **2- Laboratory Session 1**

#### **Recordings (both in .wmv and .mp4 format)**

- Lab1part1 (8 minutes)
- Lab1part2 (21 minutes)
- Lab1DiscussionPart1 (10 minutes)
- Lab1DiscussionPart2 (16 minutes)

#### **Word Documents**

- Installing HYDRA and accessing VIIRS data
- Lab1\_HYDRA2

#### **HYDRA2.3 folder**

- HYDRA2.3 for Windows

#### **Jan20 folder**

- MODIS data files
- VIIRS data files

#### **CaseStudies folder**

- PowerPoint presentations of various case studies developed by the participants during the Lab session

## **3- Laboratory Session 2**

### **Recordings (both in .wmv and .mp4 format)**

- VIIRSIandMchannelscompared (4 minutes)
- 14thNightchannel (9 minutes)
- 14thLabAfternoonDiscussionsMW (10 minutes)

### **Word Documents**

- Lab2\_HYDRA2

### **PowerPoint presentation referenced in the above recordings**

- VIIRSDaynightbandMiller

### **Feb07 day folder**

- VIIRS data files

### **Feb07 night folder**

- VIIRS data files

### **CaseStudies folder**

- PowerPoint presentations of various case studies developed by the participants during the Lab session

## **4- Future VIIRS**

### **Recordings (both in .wmv and .mp4 format)**

- FutureVIIRSinHYDRA (22 minutes)

### **Other files**

- Hydra 1.9.6 and AIRS and MODIS data files to perform the operations in the above recording

## Part 2: The content of key files, in greater detail

### Introduction and Summary

#### Paul Menzel summary recording (both in .wmv and .mp4 format) (46 minutes)

Professor Paul Menzel covers the following topics:

- Website of VIIRS resources
- Future transmission of VIIRS data
- Spectral distribution, sun and earth, its relevance to VIIRS channels.
- VIIRS channels in the VIS and NIR.
- VIIRS channels in the IR. Simplification of radiative transfer equation to determine quantitative evaluation of atmospheric constituents.
- VIIRS in combination with CrIS.
- Ocean and land regions in VIIRS, limitations and corrections.
- Atmosphere-solar radiation in VIIRS – cloud particle size etc..
- Atmosphere-thermal radiation in VIIRS.
- What the VIIRS instrument looks like.
- Characteristics of VIIRS.
- Day-night band in VIIRS.
- VIS-NIR sensor characteristics and response anomalies in VIIRS.
- Solar diffuser degradation in VIIRS.
- Spectral selections in VIIRS, and description of some of the channel characteristics on the VIIRS instrument (low gain / high gain).
- Pixel processing to obtain constant field of view in VIIRS.
- VIIRS pre-launch performance.
- Spectral selection of channels, M and I bands in VIS-IR and IR. High spatial resolution channels in VIIRS.
- MODIS vs VIIRS channels compared.
- Signal to noise of VIIRS and MODIS.
- List of products of VIIRS. Strengths and limitations.
- Status of the VIIRS products, re. issuing of this.
- Examples of VIIRS imagery. NADIR vs near NADIR view. VIIRS vs AQUA MODIS. Global coverage.
- MODIS vs VIIRS comparison. Algorithm adjustment – spectral bias adjustment. Spatial resolution comparison. 1.38 micron comparison between MODIS and VIIRS.
- Case studies applying VIIRS data. VIIRS channels 3.7 vs 11 micron channel comparison. 1.38 micron vs 11 micron channel comparison. 8.6 vs 11 micron channel comparison. 1.6 micron vs 11 micron channel comparison, 0.86 vs 0.67 micron channel comparison, 11 micron vs 12 micron channel comparison.
- Cloud masks tests.
- Dust storm example in 8.6 micron imagery using the SEVIRI instrument.
- Snow vs cloud discrimination using multiple spectral bands.

- Fire detection – VIIRS 3.75 vs 4.05 channels.
- High spatial resolution of VIIRS imagery 0.65 vs 11 micron imagery.
- M7 and M5 channels over Tasmania.
- Day night band described. Moonshadows.
- Conclusions
- Internet references for obtaining VIIRS data. VIIRS data vs MODIS and AIRS data.

## **LiamGumleysummary recording (both in .wmv and .mp4 format) (26 minutes)**

Liam Gumley covers the following topics:

- Overview of the NPP satellite.
- Future of algorithms, reprocessing of data.
- What is new about VIIRS compared to MODIS.
- Suomi NPP data archive: NOAA CLASS – ad hoc orders and subscriptions
- NASA GSFC Ocean Color website
- VIIRS Spectral Bands. Optics anomaly and degradation of signal.
- VIIRS Scan Details.
- Bowtie Deletion Zones in the scan. And how to deal with these.
- Aggregation zones in the scan.
- VIIRS calibration
- Data format, downlink format, packet formats, detailed description of algorithms website.
- Contents of VIIRS SDR files.
- Geolocation data. Bad geolocation data examples.
- HDF5 software web location.
- IDL code to read VIIRS SDR M15 examples.
- Re-projection / remapping of VIIRS data.
- NPP direct broadcast status. Downlink format, where it is described.
- Community Satellite Processing Package.
- CSPP for Suomi NPP
- Value added features for Suomi NPP.
- Near-term CSPP Milestones
- Questions and answers.
- Final summary by Professor Menzel, Liam Gumley, Dr John Le Marshall and Bodo Zeschke.

### **Other Topics folder**

## **CloudTypesVIIRSMenzel recording (both in .wmv and .mp4 format) (20 minutes)**

- Professor Paul Menzel describes analysis of different cloud types with VIIRS satellite imagery.

## **CrISandABIinstrumentsdescribed recording (both in .wmv and .mp4 format) (16 minutes)**

Professor Paul Menzel covers the following topics:

- Discussion of CrIS instrumentation on the NPP satellite.
- Comparison with AIRS and IASI instruments.
- CrIS data shown.
- ABI instrument discussed (GOES, Himawari 8)

## **MODISvsVIIRSswathGumley recording (both in .wmv and .mp4 format) (5 minutes)**

Liam Gumley discusses the difference between VIIRS and MODIS resolution at edge of swath.

## **VIIRSIandRchannelsVIIRSM15anomalies recording (both in .wmv and .mp4 format) (6 minutes)**

Liam Gumley discusses VIIRS M15 SDR Anomalies

## **Laboratory Session 1**

### **Lab1part1 recording (both in .wmv and .mp4 format) (8 minutes)**

Professor Paul Menzel and Liam Gumley cover the following topics:

- Using HYDRA to read VIIRS data.
- VIIRS and MODIS channels compared.
- Laboratory Session 1 worksheet examined

### **Lab1part2 recording (both in .wmv and .mp4 format) (21 minutes)**

Professor Paul Menzel covers the following topics:

- Using HYDRA to read VIIRS data.
- What to do if HYDRA crashes.
- Closing HYDRA windows.
- HYDRA and latitude / longitude grid.
- Generating RGB imagery in HYDRA.
- Saving HYDRA / VIIRS data.
- HYDRA operation and virtual memory.

### **Lab1DiscussionPart1 recording (both in .wmv and .mp4 format) (10 minutes)**

- Chris Davies from the Northern Territory Regional Forecasting Office will discuss the resolution of fire hotspots in VIIRS compared to MODIS.

- Professor Paul Menzel discusses differences between the 11 and 3.7 micron channel.

### **Lab1DiscussionPart2 recording (both in .wmv and .mp4 format) (16 minutes)**

Professor Menzel discusses VIIRS case studies from the Perth Workshop

### **Installing HYDRA and accessing VIIRS data (Word Document)**

Word Document with screen saves to assist you in installing HYDRA 2.3 and accessing VIIRS data

### **Lab1\_HYDRA2 (Word Document)**

Exercises for the first Laboratory session (Professor Paul Menzel)

## **Laboratory Session 2**

### **VIIRSIandMchannelscompared recording (both in .wmv and .mp4 format) (4 minutes)**

Liam Gumley and Professor Menzel demonstrate HYDRA on the Feb7 day data. In particular, the VIIRS higher resolution I band and low resolution M bands are compared.

### **14thNightchannel recording (both in .wmv and .mp4 format) (9 minutes)**

Liam Gumley uses HYDRA to produce useful enhancement of VIIRS night time imagery.

### **14thLabAfternoonDiscussionsMW recording (both in .wmv and .mp4 format) (10 minutes)**

Professor Paul Menzel chairs presentation of VIIRS imagery by a selection of participants. Pixel location issues, cumulus cloud resolution, moon shadows etc.

### **Lab2\_HYDRA2 (Word Document)**

Exercises for the second Laboratory session (Professor Paul Menzel)

### **VIIRSdaynightbandMiller PowerPoint presentation referenced in the above recordings**

“Dramatic Improvements to Nighttime Imaging with the VIIRS Day/Night Band”  
Steven Miller, Steve Mills, Chris Elvidge, Thomas Lee, Jeffrey Hawkins.

## **Future VIIRS**

### **FutureVIIRSinHYDRA recording (both in .wmv and .mp4 format) (22 minutes)**

Professor Paul Menzel covers the following:

- Using HYDRA v1.9.6 to interrogate MODIS and AIRS data. This as a demonstration of how future versions of HYDRA may interrogate VIIRS data.