

NOAA'S NATIONAL CLIMATIC DATA CENTER

# THE VIIRS CLIMATE RAW DATA RECORD

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# What is a Climate Raw Data Record?

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- Climate Raw Data Record (C-RDR) is the name given by the Climate Data Record Program (CDRP) at the National Climatic Data Center (NCDC) to designate a NOAA level 1b dataset that is optimized for use in producing Climate Data Records.
- C-RDRs are designed with reprocessing and long-term preservation in mind.



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# Why create a C-RDR?

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- Climate Data Records (CDRs) are different than real-time mission data products
  - Use different algorithms and processing patterns
  - Require periodic reprocessing of the period of record
  - Generally use the raw sensor data as input
- Suomi National Polar-orbiting Partnership (SNPP) Sensor Data Records (SDRs) and Environmental Data Records (EDRs) are processed beyond the point most appropriate for use as CDR inputs.



# Why create a C-RDR?

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- The Science Raw Data Records (RDRs) for the SNPP instruments are non-optimal for CDR purposes
  - Significant software framework or detailed knowledge of the satellite downlink packet formats is required for use
  - Portions of the raw data are compressed, encoded, and/or not byte-aligned
  - RDR contents are not platform independent (byte order)
- SNPP Science RDRs are not good candidates for long-term preservation efforts



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# The VIIRS C-RDR

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- The NCDC CDRP made a decision to produce C-RDRs for the SNPP mission to provide datasets appropriate for climate science processing and long-term preservation.
- Applications developed using the Application Development Library (ADL)
- Development of the VIIRS C-RDR has been completed, and it has been in operational production since October 19, 2013, with plans to extend the record back to February 2012.



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# The VIIRS C-RDR

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- The VIIRS C-RDR is well-suited for climate science and long-term preservation
  - netCDF-4 data format, Climate and Forecast (CF) Metadata Conventions, and Attribute Convention for Dataset Discovery (ACDD)
  - Raw data is decompressed, decoded, and byte-aligned
  - Each unique quantity stored as a separate variable
  - Each quantity is annotated with provenance and usage metadata
  - Each file annotated with 70 elements of metadata, including ones from the SNPP RDR/SDR set



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# What does a VIIRS C-RDR contain?

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- The VIIRS C-RDR contains
  - 242 engineering variables
  - 38 image variables
    - 4 groups – 375m, 750m Dual-gain, 750m Single-gain, DNB
    - Earth and calibration views stored as multi-band image arrays
  - 19 spacecraft diary variables
    - Includes satellite position, velocity, and attitude vectors
  - 4 quality measure variables
- VIIRS-specific IDPS coefficients and LUTs also stored in grouped variables with metadata



# Reading a VIIRS C-RDR variable

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- VIIRS C-RDR files readable by many packages
  - IDL, MATLAB, etc
  - Packages that read HDF5 files (e.g. HdfView)
- netCDF-4 and HDF5 libraries available for many programming languages



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# Reading a VIIRS C-RDR variable

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```
import ucar.nc2.*;
import ucar.ma2.*;

...
// Open the VIIRS C-RDR file.
//
NetcdfFile oDataFile = NetcdfFile.open(sInputFilePath, null);

// Find the calibration view variable for the 750 m dual-gain
// image group. This variable has dimensions of band, calibration
// source, line number, and number of samples.
//
Variable oVar = oDataFile.findVariable("Image_750m_DualGain/calibview");

// Get the dimensions of the variable.
//
int[] anCounts = oVar.getShape();

// Create an array of start indices. They all have the value
// index value of zero.
//
int[] anStarts = new int[anCounts.length];

// Read the values from the variable.
//
Array oValues = oVar.read(anStarts, anCounts);

...
```



# How to access VIIRS C-RDR files

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- VIIRS C-RDR files are available from the NCDC HDSS Access System (HAS)
  - [http://has.ncdc.noaa.gov/pls/plhas/HAS.FileAppSelect?datasetname=3658\\_01](http://has.ncdc.noaa.gov/pls/plhas/HAS.FileAppSelect?datasetname=3658_01)
- Currently have coverage from October 19, 2013
- Working to extend coverage to the beginning of VIIRS Science Operations (February 2012)
- Data product home page
  - <http://www.ncdc.noaa.gov/data-access/satellite-data/satellite-data-access-datasets/c-rdr-viirs>

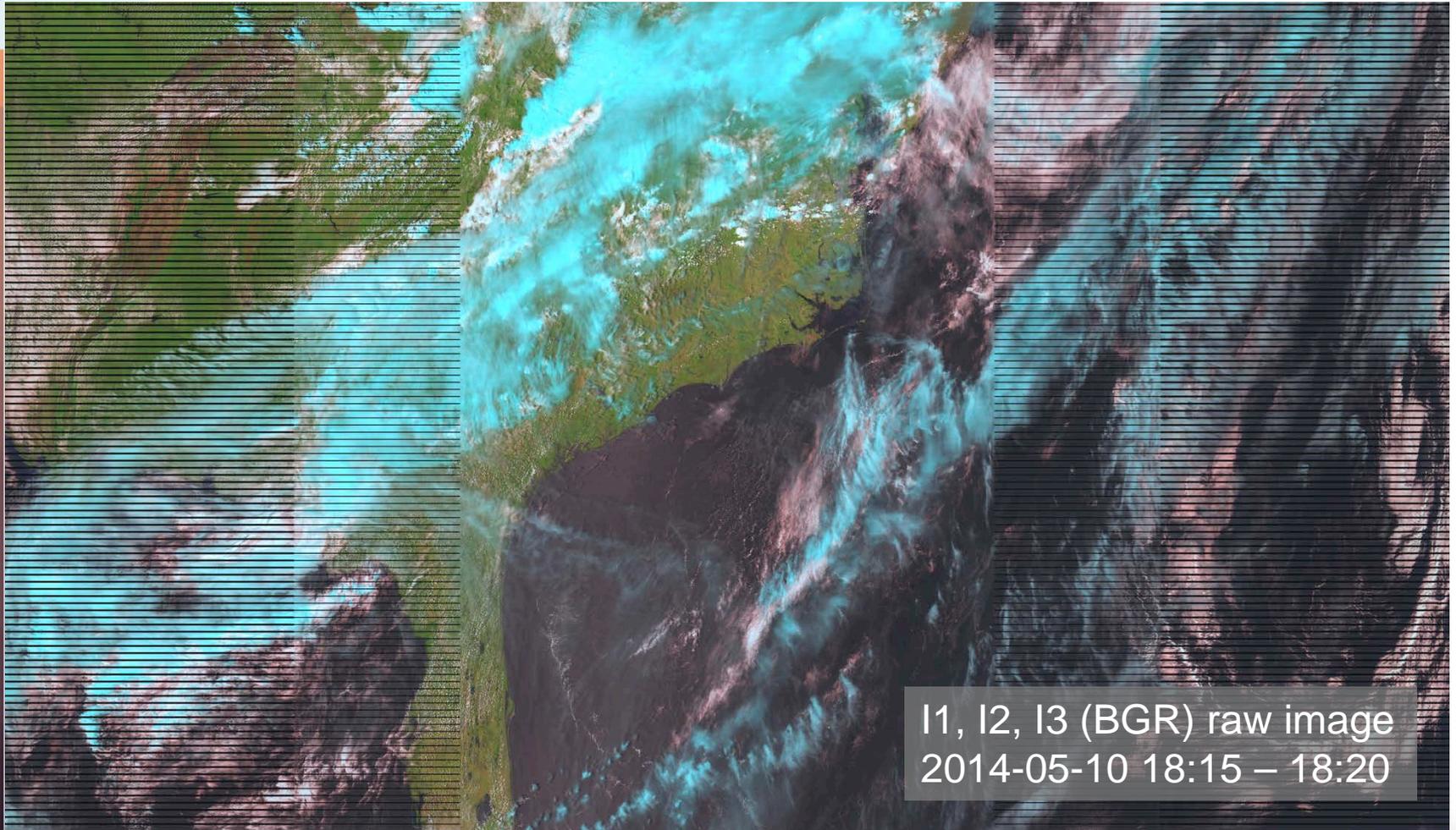


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# How to access VIIRS C-RDR files

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11, 12, 13 (BGR) raw image  
2014-05-10 18:15 – 18:20



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THANK YOU

Questions?



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