

Geodata/Management

Contact

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PRODUCT: HYPERSPECTRAL INFRARED CORE IMAGING DATA (UNPROCESSED, LEVEL 0)

Short description

The data comprise unprocessed raw data (level 0 data) containing image and spectral data acquired by scanning of drillcores at SGU. Level 0 is typically the level at which raw hyperspectral data is captured during the scanning campaign and the data has not been processed i.e. no data correction, normalization or band subsetting has been performed on this data.

The cameras in the scanner cover the visible-near infrared and short-wave infrared (VNIR-SWIR) and the long-wave infrared (LWIR). The combination of different infrared wavelength ranges increases the mineral detection capability. Objective information about the mineralogical composition of the drillcores is fundamental basics for interpretation and modeling of the rock and the geological evolution.

Data format: RAW (BIL), JPEG, ASCII, TXT, XML, XSL

Contents of the delivery

Level 0 data includes metadata, calibrations, images from optical camera (RGB) and image files from the visible-near infrared and short-wave (VNIR-SWIR) – and long-wave (LWIR) infrared cameras.

The folder structure, including the subfolders and files of the delivery is explained below.

Background

During 2014, SGU started a project to scan 200 000 meters of drillcore at the drillcore archive in Malå. The drillcores to be scanned in the project are from Norrbotten and Västerbotten. The scanning project aims at creating a database of optical and infrared data that can be used as for virtual drill core mapping and will be a compliment to the physical core that is stored at the national drill core archive in Malå. Scanning is performed by the companies SPECIM, Spectral Imaging Ltd. and GeoSpectral Imaging Ltd. Included in the assignment is high resolution optical photography and hyperspectral infrared imaging.

Hyperspectral infrared core imaging is a passive non-destructive technique that measures reflected infrared light from the drillcore surface. The cameras in the scanner cover the visible-near infrared and short-wave infrared (VNIR-SWIR) and the long-wave infrared (LWIR). The combination of different infrared wavelength ranges increases the mineral detection capability. Different minerals have characteristic features across different wavelength ranges of the electromagnetic spectrum. The infrared is considered as a good detection technology because a wide range of minerals have characteristic signatures in these wavelength ranges. A high resolution optical photo is also produced.

The scanner that is used in the project is sisuRock which is a fully automated hyperspectral imaging instrument for high speed scanning of drill cores and other geological samples. Raw data is image and spectral data acquired during the scanning process. It usually does not involve any data processing;



however fundamental quality control steps are taken at this stage in order to ensure a complete and comprehensive data set.

Raw data can be processed further to generate products to be used in the interpretation of the composition of the drill cores. Information about the mineralogy of the drillcores is fundamental basics for interpretation and modeling of the rock and the geological evolution. The results may increase the knowledge about mineral forming processes which in turn may facilitate a better use of Sweden's mineral resources. Data from the project may also have other uses, e.g. in mineral related research.

Potential users of the data are exploration and mining companies, consultants, researches and students.

Data quality

Although level 0 data usually does not involve any data processing, fundamental quality control steps are taken at this stage in order to ensure a complete and comprehensive data set. Typical tasks include:

- Ensuring image data is complete and correct
- Image data and quality review, including calibration files
- Filename and file format quality control
- Metadata review ensuring captured data is correct and accurate

Structure

Data from each drillcore is stored in a top level folder that is named with a unique ID that identifies the drillcore. This ID is similar to the IDCODE used in the SGU drillcore database, for example "BJT72222". Each drillcore folder further contains several subfolder and files. Directly under the top-folder there are three subfolders i.e. one folder for each of the sensors RGB, LWIR, and VNIR-SWIR. For each of these three sensors, each individual corebox that make up the drillcore is stored in its own subfolder designated with a numeric suffix that increases downhole, e.g. "BJT72222_1" is the first corebox of the drillcore "BJT72222".

RGB

Each corebox folder contains two subfolders (named "capture" and "metadata").

The "capture" folder contains the raw image file of the corebox. Raw data is delivered as BIL files compatible with ENVI. The raw image file is accompanied by a header file in ASCII format.

Example of level 0 data files included in the "capture" folder of the RGB camera.

Filename	Format	Content
BJT72222_2_8m37_16m61_2014-10-30_10-32-26.hdr	ASCII	Headerfile of BIL file with the same name.
BJT72222_2_8m37_16m61_2014-10-30_10-32-26.raw	BIL	ENVI compatible image containing raw data
DARKREF_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.hdr	ASCII	Headerfile of BIL file with the same name.
DARKREF_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.raw	BIL	ENVI compatible image containing raw data
WHITEREF_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.hdr	ASCII	Headerfile of BIL file with the same name.
WHITEREF_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.raw	BIL	ENVI compatible image containing raw data

Example of level 0 data files included in the "metadata" folder of the RGB camera.

Filename	Format	Content
BJT72222_2_8m37_16m61_2014-10-30_10-32-26.xml	XML	Metadata
BJT72222_2_8m37_16m61_2014-10-30_10-32-26.xsl	XSL	Stylesheet

LWIR and VNIR- SWIR

Each corebox under LWIR and VNIR-SWIR contain four subfolders (named “calibrations”, “capture”, “jpegs”, “metadata”). The folder structure and filenames for the LWIR and VNIR-SWIR cameras are identical:

- The “calibrations” folder is empty for level 0 data.
- The “capture” folder contains the raw data files for the corebox. Raw data is delivered as BIL files, compatible with other data viewing and querying software packages such as ENVI. The raw image file is accompanied by a header file in ASCII format.
- The “jpegs” folder contains QAQC image from scanning
- The “metadata” folder contains a XML metadata file

Example of level 0 data files included in the “capture” folder of the LWIR and VNIR-SWIR camera.

Filename	Format	Content
BJT72222_2_8m37_16m61_2014-10-30_10-32-26.hdr	ASCII	Headerfile of BIL file with the same name.
BJT72222_2_8m37_16m61_2014-10-30_10-32-26.raw	BIL	ENVI compatible image containing raw data
DARKREF_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.hdr	ASCII	Headerfile of BIL file with the same name.
DARKREF_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.raw	BIL	ENVI compatible image containing raw data
WHITEREF_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.hdr	ASCII	Headerfile of BIL file with the same name.
WHITEREF_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.raw	BIL	ENVI compatible image containing raw data

Example of level 0 data files included in the “jpegs” folder of the LWIR and VNIR-SWIR camera.

Filename	Format	Content
QAQC_REPORT_BJT72222_2_8m37_16m61_2014-10-30_10-32-26.jpg	JPEG	QAQC image from scanning

Example of level 0 data files included in the “metadata” folder of the LWIR and VNIR-SWIR camera

Filename	Format	Content
BJT72222_2_8m37_16m61_2014-10-30_10-32-26.xml	XML	Metadata
BJT72222_2_8m37_16m61_2014-10-30_10-32-26.xsl	XSL	Stylesheet