Issues of hdf2jpeg and Proposed Solution

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The HDF4 tool hdf2jpeg extracts only JPEG images. The purpose of this RFC is to look into options to support extracting other images as well.

# Backgrounds

According to the code, hdf2jpeg was designed to extract JPEG images and store their data in the specified files. The tool’s Usage also implies that JPEG images were to be extracted. It does not have the specific purpose of the tool, but only lists the parameters, and one of which has a description:

“<input HDF file> : the HDF file to extract JPEG images from”

However, when searched on Google, many occurrences of hdf2jpeg manuals appeared and described hdf2jpeg as to “convert HDF images to JPEG.” This inconsistency and inaccuracy can lead to confusion and incorrect expectation of the tool.

Recently, Abe Taaheri informed Peter that he needed to convert non-JPEG images (specifically, RIs and RI8s,) and had added code to his version of hdf2jpeg to accomplish it. He suggested that we add support for RIs and RI8 if that would benefit general users.

This brought up the issue of what should be done for hdf2jpeg. The following sections present various facts and recommendations for the tool.

# Facts to Considered

We could simply add Abe’s addition to our version of hdf2jpeg, however, there are a few points we should consider.

1. The name of the tool misleads and implies that HDF objects (SDS, images,…) were to be converted to JPEG. This will be a good thing if we want to update hdf2jpeg to be able to convert any HDF objects to JPEG, using different flags, instead of only JPEG images. However, this approach will change the behavior of the tool. We need to consider that impact and decide whether we should provide an entirely new tool with a new name to convert any HDF objects to JPEG or update hdf2jpeg.
2. Hdf2jpeg is using H-level functions to extract the JPEG images while Abe’s addition is using DFR8 and DFR24 functions. The updated tool or new tool should use the high-level APIs instead.
3. If a new tool that converts any HDF objects to JPEG is to be provided, what should be done for hdf2jpeg, beside adding documentation to the User’s Guide and improving the Usage statement? Should it continue to convert only JPEG images, or should it be updated to include support for RIs and RI8s as Abe suggested?
4. The tool can benefit from some code factoring and additional comments.
5. One last fact, hrepack can be used to convert any HDF images to HDF JPEG images which can be stored in another HDF file. This file can then be fed into hdf2jpeg to extract the JPEG images’ data. One limitation with this approach is, currently, hrepack cannot convert any image that is not 8-bit or 24-bit. This limitation is due to the limitation of JPEG that HDF has been using. It might be eliminated by using JPEG 2000, which we need to investigate.

# Recommendations

1. Contact Abe and explain our findings and next steps.
   1. Provide Abe with the work around and its limitation.
   2. Present to Abe the followings:
      1. Hdf2jpeg was designed to extract JPEG images only.
      2. Will a tool that extracts any HDF objects be more attractive or will he prefer to append to hdf2jpeg the ability to extract RIs and RI8s only?
      3. Recommend that he would update the addition in his hdf2jpeg for RIs and RI8s to use GR interface instead of DFR8 and DF24. He can copy that part of our code once it is in place.
2. Add hdf2jpeg to documentation for the 4.2.9 release and provide example of the workaround to extract RIs and RI8s.
3. Reach out to the HDF community (FORUM, DAACs representatives, and other NASA users) for their inputs on:
   1. Whether hdf2jpeg is adequate as is or should be improved to support RIs and RI8s as well.
   2. A new tool to extract any HDF objects and store them in JPEG format versus the change of hdf2jpeg behavior
4. Learn about current JPEG capabilities and how they can be applied to HDF.
5. Based on the results from the steps above, provide recommendations for the tool.