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/Issues to Consider

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 is misleading and implies that HDF objects (SDS, images,…) can be converted to JPEG. This is not the current behavior of the hdf2jpeg tool. It would be beneficial to support a tool that can convert any HDF object to JPEG. We need to consider the impact of modifying hdf2jpeg to support all objects, or decide whether we should provide an entirely new tool with a new name that can convert any HDF objects to JPEG.
2. Hdf2jpeg uses H-level functions to extract the JPEG images while Abe’s addition uses DFR8 and DFR24 functions. The updated tool or new tool should use the high-level APIs instead.
3. The current code is not well organized and needs code refactoring and additional comments.
4. If a new tool that converts any HDF objects to JPEG is to be provided, what should be done with hdf2jpeg, besides item (iv) above, 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?
5. One last fact is that 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 that, 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 the following to Abe:
      1. Explain that hdf2jpeg was designed to extract JPEG images only.
      2. Ask Abe if a tool that extracts any HDF objects would be more attractive or if he would prefer that hdf2jpeg be modified to extract RIs and RI8s.
      3. Recommend that Abe update his version of hdf2jpeg to use the GR interface. He can copy that part of our code once it is in place.
2. Add hdf2jpeg to documentation for the 4.2.9 release as it is 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 input on:
   1. Whether hdf2jpeg is adequate as is or should be improved to support RIs and RI8s as well.
   2. Whether hdf2jpeg should be modified or a new tool should be developed to extract any HDF objects and store them in JPEG format.
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.