JAXA/MOS Earth Observation Data Format

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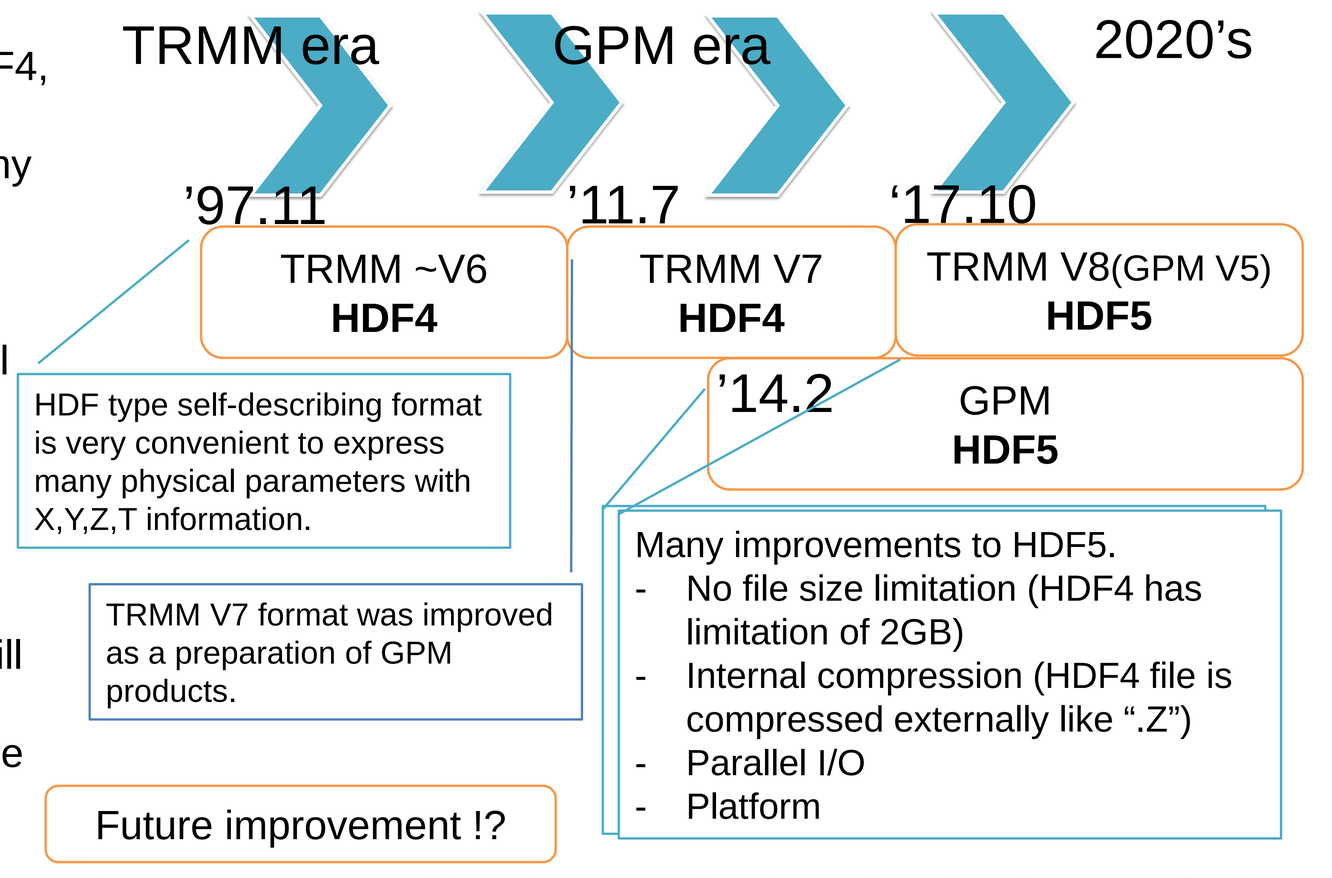
1. Issue & Purpose

<Background & Issues>
Earth Observation data from the satellites has been increasing rapidly in data volume and format types as well as variety of physical quantities. In addition, the diversity of users has also increased greatly.
The satellite data formats are different by satellite/mission like HDF4, HDF5, NetCDF4, CEOS, GeoTIFF etc. Some of them are for experts and it is often hard for general users to use. However, many application software tools have been developed to enable reading/editing satellite data without knowledge of the format specification. It makes it very convenient and easy to use satellite data, but on the other hand it may not be able to read the essential meaning of the data correctly or it may lead to erroneous analysis results. Many general users are going to treat satellite data as big data, but this might increase the misinterpretation risks!

<Purpose>
- Reviewing the evolution of the TRMM / GPM data format, we will inform users of key issues, available services, etc.
- In future, in order to make it easier for more general users to use satellite data such as TRMM / GPM, we will consider which formats in addition to the archival format it should possess and provide, and collect user views.

2. Evolution of TRMM/GPM data format

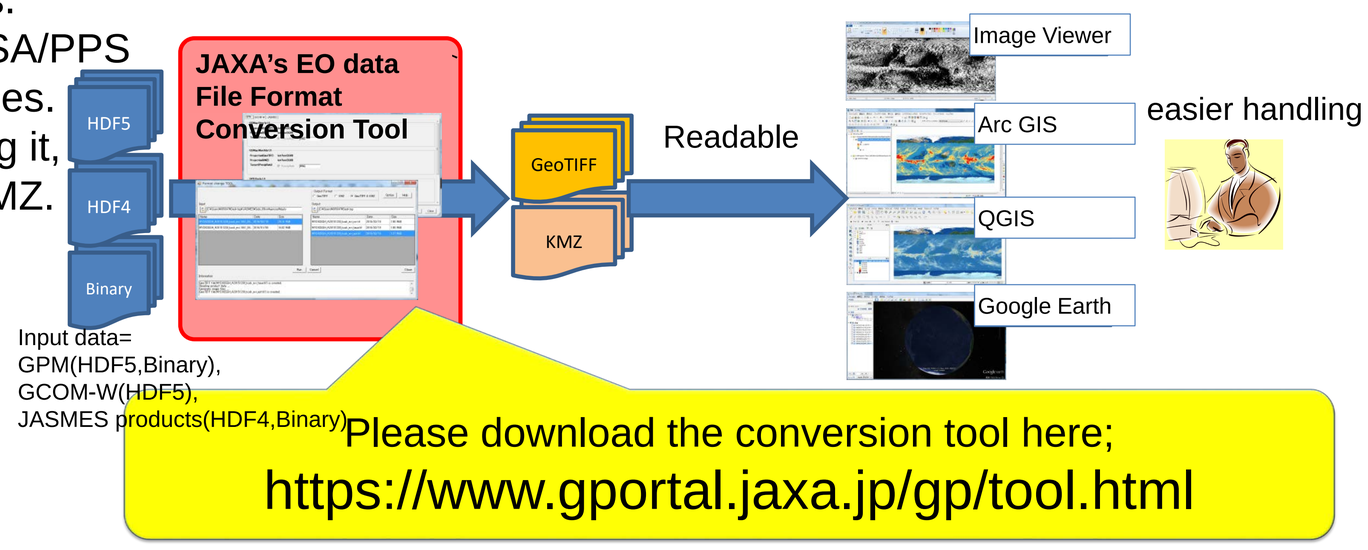
Although the TRMM data was in the HDF format from the beginning of the launch, it has been improved at the time of version-up in accordance with the evolution of the HDF itself.



Recently, many users archive data in a cloud, not localized server. So HDF community start to study the handling of HDF data over a cloud server

3. User Services

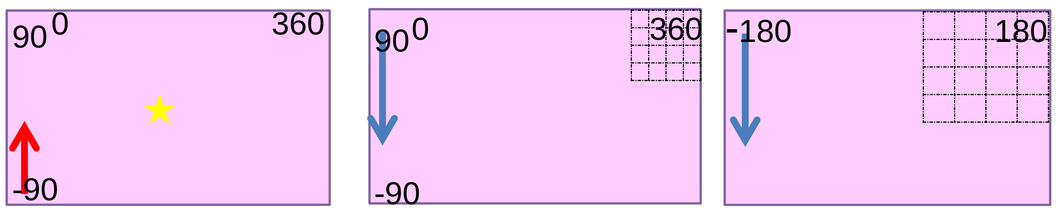
The type of format has also increased based on users' requests.
In GPM/TRMM, many data formats are available from both NASA/PPS and JAXA. The below table shows JAXA's GPM data format types.
We have developed EO data File Format Conversion Tool, using it, DPR L3 and GSMaP data can be converted to GeoTIFF and KMZ.



	Original /Archive	Using Format Conversion Tool
All GPM standard products	HDF5	N/A
DPR L3 GSMaP	**HDF5** Text GeoTIFF **Binary(*)** NetCDF4(*)	GeoTIFF KMZ (*for GSMaP only)

If the OpenDAP/Hyrax server is set-up, GPM and GSMaP products can be downloaded by area or parameter sub-set data using OpenDAP protocol. *Recently, new data handling technology or APIs have been developing. If the original data has enough information, new community user can handle EO data as one of big data.*

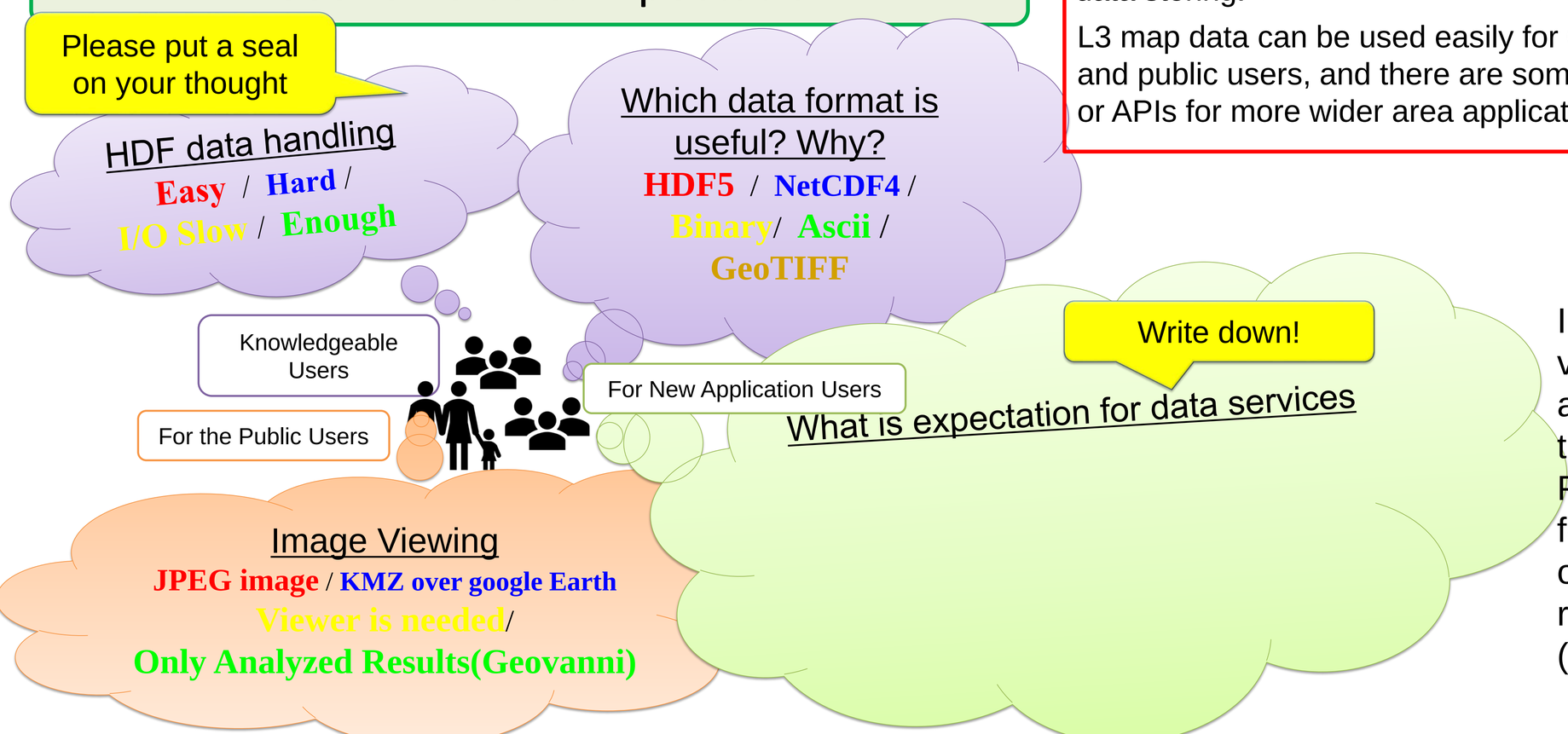
ATTENTION!
During the development of format conversion tool, the converted GeoTIFF image was swapped in north and south because there is no lat/lon in each pixel in product, the tool developer hasn't recognized the order of data storing.



L3 map data can be used easily for GIS users and public users, and there are some GIS tool or APIs for more wider area applications.

In creating new products,
→Need filling lat/lon information.
→Take standardized approach.

4. User's Voice & Expectation



5. Summary

In accordance with an increase in data volume and types and an increase in application usage, we need to review the user services such as formats.
Please send any comments about data format, user service, recommendation of the standardization to JAXA research & development group (rd-mos@ml.jaxa.jp).