EOSDIS
NASA'S EARTH OBSERVING SYSTEM
DATA AND INFORMATION SYSTEM

Data Are from Mars, Tools Are from Venus

H. Joe Lee (hyoklee@hdfgroup.org)
The HDF Group

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No “Earth” in title?

“Men Are from Mars, Women are from Venus”

- John Gray

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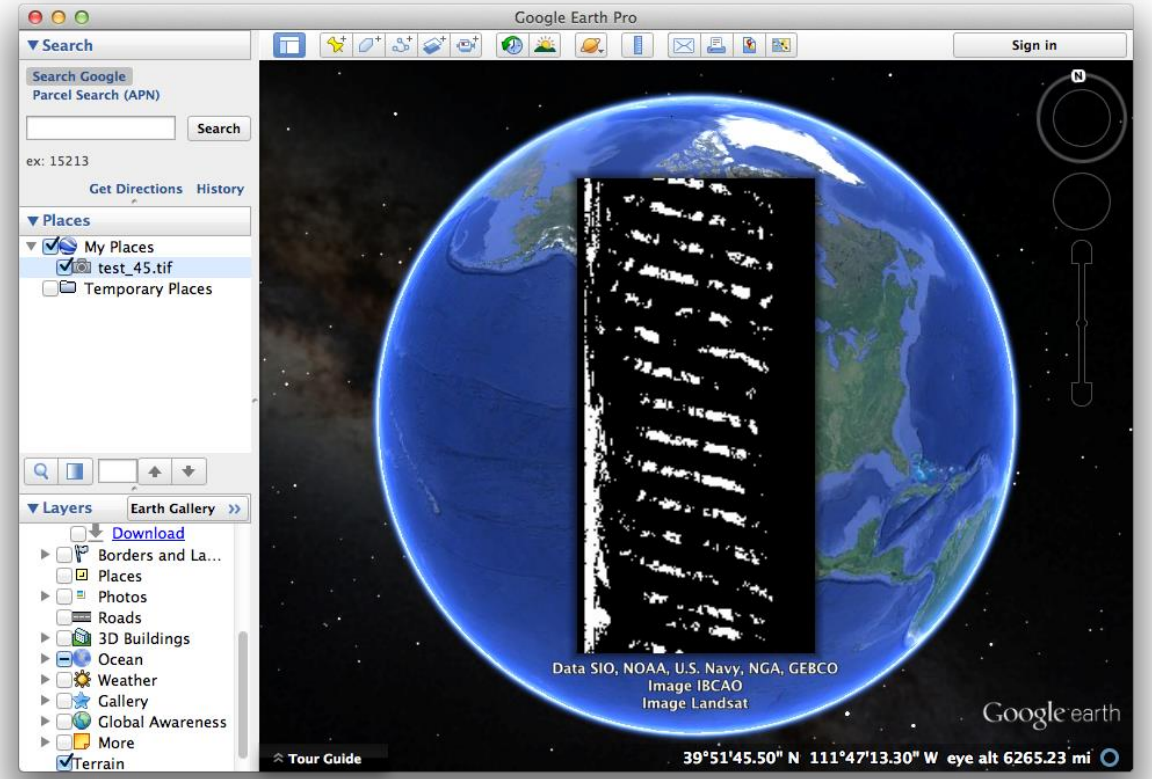
Are data from Mars?

Why can't I use Earth *tools*?



Correct geo-referencing

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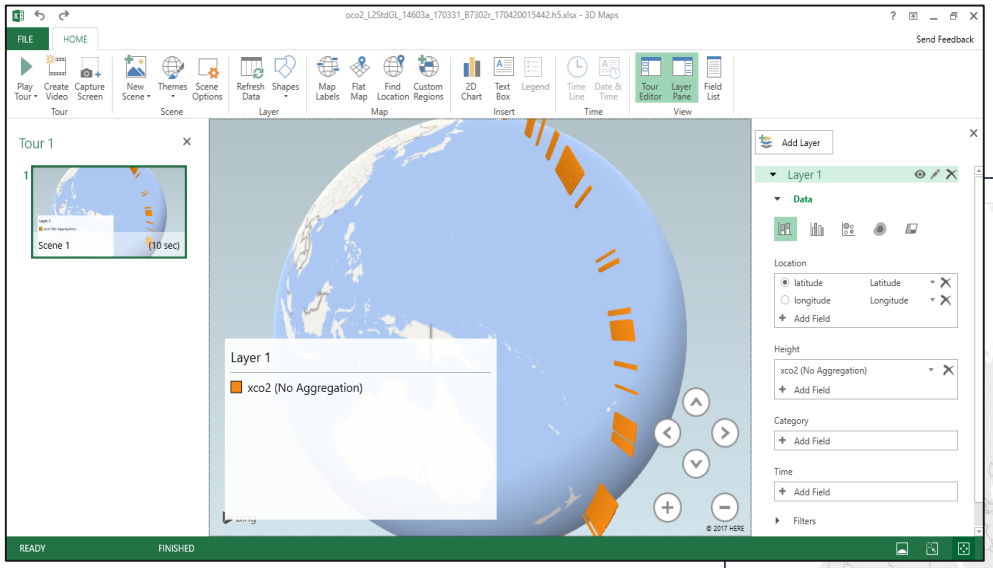
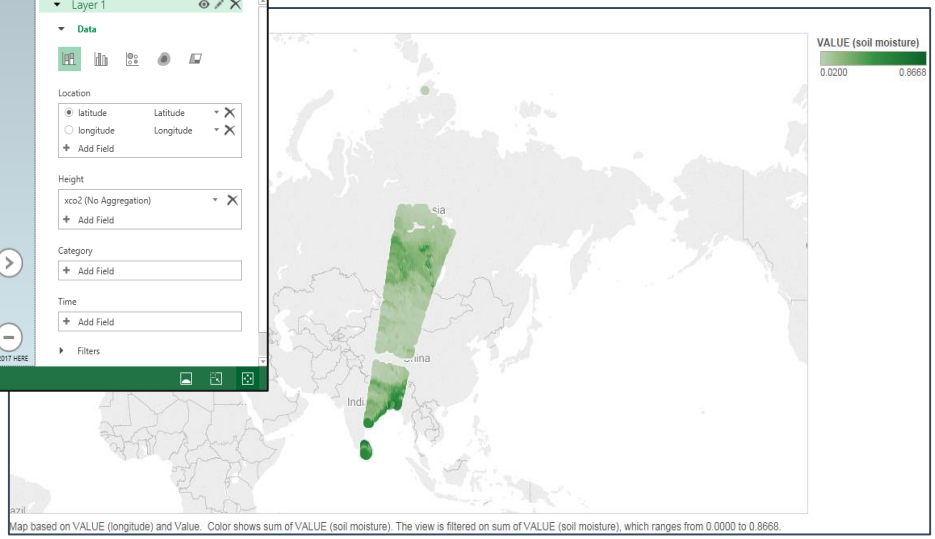
Are tools from Venus?

Why can't I open Earth *data*?



Microsoft® Excel

+ a b | e a u



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Data Producers from Mars

- I want my data slim and efficient.
- How can I save money in managing data?

Tool Developers from Venus

- I make my tool work for popular data first.
- Can I make money by supporting your data?

Result: Frustrated Users

We (HDFEOS.org) can help.

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We identify gaps in *File Formats*

- Hierarchical Data Format (HDF)
- Network Common Data Format (netCDF)
- Geospatial Tagged Image File Format (GeoTIFF)
- Keyhole Markup Language (KML) / zipped KML (KMZ)
- Comma-separated values (CSV)
- etc.

We identify gaps in *Libraries*

- hdf
- netcdf-C
- netcdf-Java
- HDF – Earth Observing System (hdf-eos)
- Climate and Forecast Metadata (CF) conventions
- Geospatial Data Abstraction Library (GDAL)
- etc.

We identify gaps in *Tools*

- Microsoft Excel
- Esri ArcGIS
- Google Earth
- MATLAB
- Python
- Interactive Data Language (IDL)
- Panoply
- Integrated Data Viewer (IDV)
- HDFView
- h5dump
- Etc.

We identify gaps in *Services*

- Open-source Project for a Network Data Access Protocol (OPeNDAP)
- Web Map Service (WMS)
- Web Map Tile Service (WMTS)
- Web Coverage Service (WCS)
- etc.

AND we provide *Solutions*…

- File conversion
- Libraries and tools usage
- NASA HDF product specific examples
- Demo services (e.g., Hyrax*, THREDDS**)

*Hyrax is the data server from OPeNDAP.
**Thematic Real-time Environmental Distributed Data Services

Suggestions for data producers

- Make HDF5 data work with
  - GDAL
  - netCDF
  - Hyrax/THREDDS
- Don’t forget a few key CF conventions.
- Follow DIWG* recommendations.

*Data Interoperability Working Group

Suggestions for tool developers

- Download and test NASA HDF products.
- Support them natively.
- Support augmentation.
  - VRT* in GDAL
  - NcML** in netCDF
- Support 3D visualization for data in the air.

*Virtual Dataset in XML format
**netCDF Markup Language

Suggestions for end-users

- Try OPeNDAP first. CSV may be enough.
- Try netCDF conversion / augmentation.
- Correct metadata with NcML / VRT.
- Try GEE* instead of GDAL.
- Use CMR** wisely.

*GDAL Enhancement for ESDIS project
** Core Metadata Repository

How about Big (fast) data?

- Hadoop / Spark (streaming) / Dask
- Parquet / Arrow
- Elastic Search / Kibana

Future: (Deep) Machine Learning?

- scikit-learn / keras / h2o.ai
- Please contact us at eoshelp@hdfgroup.org if you'd like to see examples on machine learning.

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