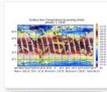


Understanding AIRS Data Usage in Applied Research

- NASA GES DISC archives and provides services for Aqua/AIRS data: OPeNDAP, subsetting and analysis/visualization (Giovanni).
- To learn about how AIRS data are used in research as well as to educate potential users on the prior usage of the data, GES DISC harvests research publications and attributes them to the datasets. These publications can be accessed from the individual Aqua/AIRS datasets landing pages, for example

https://disc.gsfc.nasa.gov/datasets/AIRS3STD_7.0/summary:

Aqua/AIRS L3 Daily Standard Physical Retrieval (AIRS-only) 1 degree x 1 degree V7.0 (AIRS3STD)



The Atmospheric Infrared Sounder (AIRS) is a grating spectrometer (R = 1200) aboard the second Earth Observing System (EOS) polar-orbiting platform, EOS Aqua. The AIRS Level 3 Daily Gridded Product contains standard retrieval means, standard deviations and input counts. Each file covers a temporal period of 24 hours for either the descending (equatorial crossing North to South at 1:30 AM local time) or ascending (equatorial crossing South to North at 1:30 PM local time) orbit. The data starts at the international dateline and progresses westward (as do the subsequent orbits of the satellite) so that neighboring gridded cells of data are no more than a swath of time apart (about 30 minutes). The two parts of a scan line crossing the dateline are included in separate L3 files, according to the date, so that data points in a grid box are alw...more

Data Access

- Online Archive
- Earthdata Search
- OPeNDAP
- Subset / Get Data

Product Summary Data Citation Documentation **References**

Data Collection References

2014

Kahn, B. H., Irton, F. W., Dang, V. T., Manning, E. M., Nasiri, S. L., Naud, C. M., Blaisdel, J. M., Schreier, M. M., Yue, Q., Bowman, K. W., Fetzer, E. J., Hulley, G. C., Liu, K. N., Lubin, D., Ou, S. C., Susskind, J., Takano, Y., Tian, B., Worden, J. R. 2014. *The Atmospheric Infrared Sounder version 6 cloud products*. *Atmos. Chem. Phys.* Vol. 14, No. 1, pp. 399-426. DOI: 10.5194/acp-14-399-2014. ISSN: 1996-7324

Susskind, Joel, Blaisdel, John M., Iredell, Lena. 2014. *Improved methodology for surface and atmospheric soundings, error estimates, and quality control procedures: the atmospheric infrared sounder science team version-6 retrieval algorithm*. *J. Appl. Remote Sens.* Vol. 8, No. 1, pp. 084994. DOI: 10.1117/JRS.8.084994. ISSN: 1931-3195

Related Publications

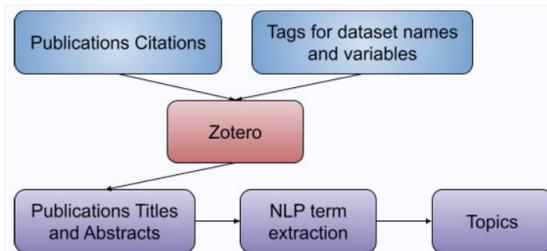
Disclaimer: The majority of publications using GES DISC data do NOT include the data version id. As such, publications below may not use the most recent processing version of the data.

2022

Sati, Muhammad Sibain, Ehsan, Muhsan, Abbas, Ayesha, Shah, Munawar, de Oliveira-Junior, José Francisco, Naqvi, Najam Abbas. 2022. *Atmospheric and ionospheric precursors associated with Mw ≥ 6.5 earthquakes from multiple satellites*. *Journal of Atmospheric and Solar-Terrestrial Physics*. Vol. 227, pp. 105802. DOI: 10.1016/j.jastp.2021.105802. ISSN: 1364-8628

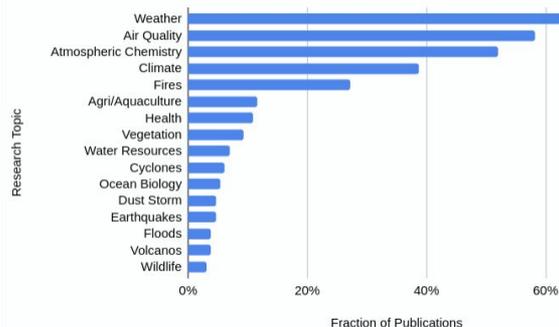
- Over 200 research publications that use variables from Giovanni service are published each year, among them ~10% use variables from Aqua/AIRS datasets.
- GES DISC processes content of these publications to extract dataset and variable names and applied research areas to evaluate the diversity of data usage and popularity of the datasets and variables.
- Based on data collected from 130 research publications from 2016 to 2022 that used Aqua/AIRS datasets through Giovanni service this study presents analysis of the most popular research topics and variables.

Publications Collection and Processing



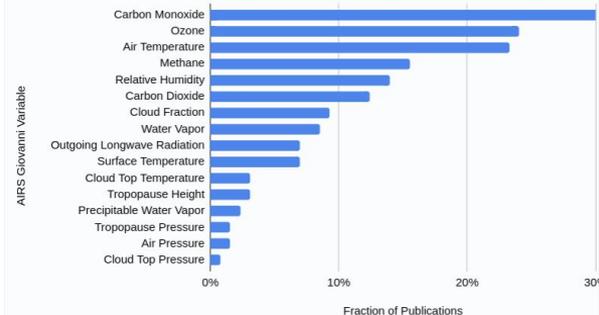
- Publication citations are stored in a citation management system, [Zotero](#).
- Citations are tagged with the dataset and Giovanni variable names.
- The publication titles and abstracts are pulled from Zotero via API and undergo Natural Language Processing (NLP) to extract terms characterizing research topics, e.g.:
 - Weather: *weather and extreme events ...*
 - Air quality: *aerosol, air quality, air pollution, carbon monoxide, haze, ...*
 - Atmospheric Chemistry: *carbon dioxide, methane, ozone, ...*
 - Climate: *climate, global change, global warming, ENSO, QBO, ...*
 - Health: *COVID-19, malaria, cholera, UV dose, vitamin D, ...*
- Topics are assigned to publications based on appearance of extracted terms in titles and abstracts.

Publications Research Topics



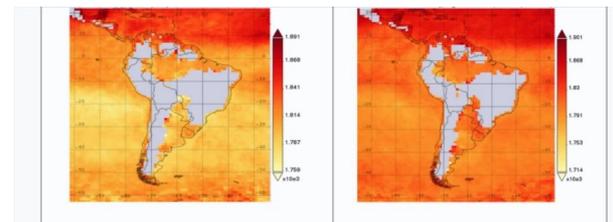
AIRS Giovanni Variables Usage in Research Publications

Usage of AIRS Giovanni Variables in Research Publications



Use Case: AIRS variables in "Health" related studies

Among 130 publications that used AIRS data through Giovanni, 16 papers are related to "Health" topic, with the majority of publications mentioning COVID-19. Below is an image from one of these papers:



(Source: Giovanni online data system, established and maintained by the NASA GES DISC)
Time average map of methane, mole fraction in air (Daytime/Ascending, AIRS-only) in ppbv over different parts of the world—the left-side images are from March, 2019 to May, 2019 while the right-side images are from March, 2020 to May, 2020

From: Dutta, V., Kumar, S., & Dubey, D. (2021). *Recent advances in satellite mapping of global air quality: Evidences during COVID-19 pandemic*. *Environmental Sustainability*. <https://doi.org/10.1007/s42398-021-00166-w>.