GESDISC

Synthesis of Aqua/AIRS Variables Usage Through Research Publications

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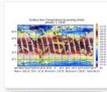
Understanding AIRS Data Usage in Applied Research

- 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:

- 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
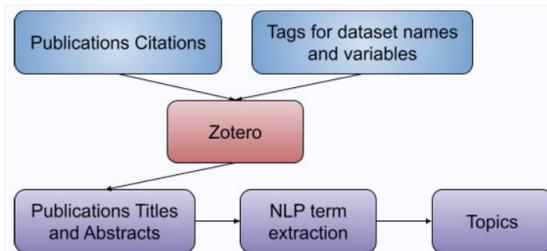
- Publication citations are stored in a citation management system, Zotero.
- Citations are tagged with the dataset and Giovanni variable names.
- The publication titles and abstracts are pulled from Zotero via API and undergo Natural Language Processing (NLP) to extract terms characterizing research 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
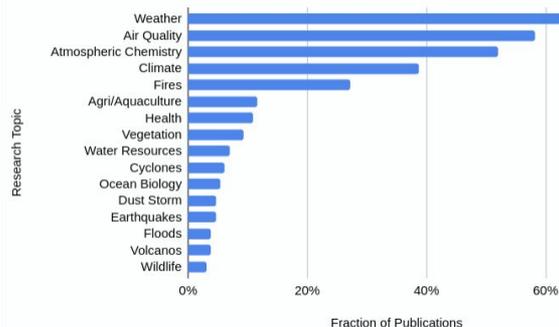
AIRS Giovanni Variables Usage in Research Publications

Usage of AIRS Giovanni Variables in Research Publications
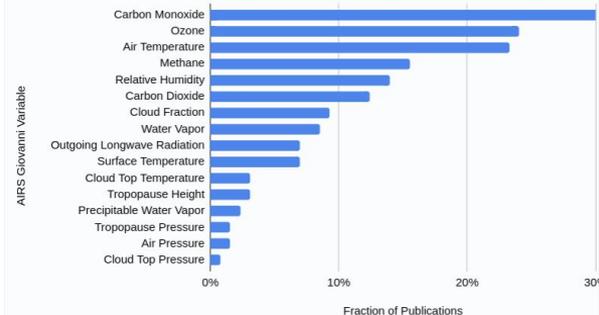
Use Case: AIRS variables in "Health" related studies

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:
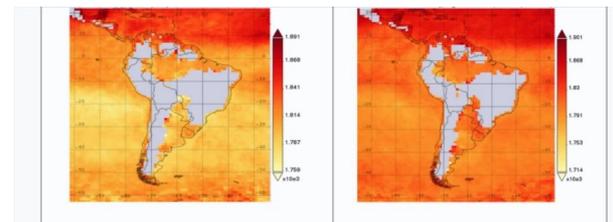
(Source: Giovanni online data system, established and maintained by the NASA GES DISC)

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.