1st International Summer Snowfall Workshop

An Application Programming Interface for Synthetic Snowflake Particle Structure and Scattering Data

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- Motivations for Development

- Navigating the Interface from Registration to Data Acquisition

- Live Demo
- Dr. Kwo-Sen Kuo’s OpenSSP Database contains statistical data for over 9000 synthetic snowflakes and scattering information for each at 15 representative frequencies.

- Researchers only need segments of the data to test its usefulness and integrate it into models.

- The OpenSSP API and Query Builder enable the acquisition of targeted subsets of the database, both by particle size and family, and by binned particle size distribution.

- The Query Builder page also offers access to raw data archives and particle structure files.
The website is located at the following URL: https://storm.pps.eosdis.nasa.gov/storm/OpenSSP.jsp

Using the interface requires an email registered at https://registration.pps.eosdis.nasa.gov. Once complete, entering the email and pressing “Submit” takes you to the Query Builder interface.
There are five available tabs upon inputting a registered email. The first three are for API queries, the last two for raw data.
In Pristine (or Aggregate):

- Select one or more types
- Select up to 20 discrete sizes (or all sizes) from the list
- Select one or more frequencies (or all).
- Press “Submit API Query” or “Email Data”
Upon pressing the “Submit API Query” button, the API response will open up in a new tab. Variable explanations are listed below the data.
If instead you press the “Email Data” button, an email is sent to the registered email address containing the query request string and an attached comma-separated value/tab-separated value file. This can be extremely useful for large queries where waiting for the data to load in a new tab in browser could be tedious.
import urllib
import numpy as np
import matplotlib as m

m.use('Agg') #Because I am doing this on a server with no video drivers
import matplotlib.pyplot as plt

urlObject = urllib.urlopen('https://storm.pps.eosdis.nasa.gov/storm'+' /OpenSSPAPI?email=matthew.r.lammers@nasa.gov'+'&frequency=089.062GHz&size=p-40/all&text=true')

"""Looking at the relationship between maximum dimension and scattering/absorption efficiency."""
osspArray = np.loadtxt(urlObject,comments='#', unpack=True, skiprows=2, usecols=(4,8,9))

plt.plot(osspArray[0], osspArray[1], 'ro', label='Scattering Efficiency')
plt.plot(osspArray[0], osspArray[2], 'bo', label='Extinction Efficiency')
plt.legend()
plt.xlabel('Maximum Dimension[um]')
plt.ylabel('Efficiency')
plt.savefig('ScattAbs.png')

Here is an example of how the OpenSSP API can be utilized without the Query Builder interface. I used Python to grab data from the API in tsv format, parsed it using the NumPy library, and then generated a basic plot using Matplotlib.
LIVE DEMO...