# Welcome to the 2022 Online HYSPLIT Workshop (DAY 4 of 4)

The broadcast is scheduled to start at:
09:00 Eastern Daylight Time (EDT) = 13:00 UTC

**Workshop Web Page:**

**https://www.ready.noaa.gov/register/HYSPLIT_hyagenda.php**

NOAA Air Resources Laboratory
June 14-17, 2022

HYSPLIT
AIR RESOURCES LAB

**Workshop guidance**

**and resources posted at**

**Workshop Web Page**

**https://www.ready.noaa.gov/register/HYSPLIT_hyagenda.php**

***We will update this page each day to include any new materials or links that are relevant to the Workshop***

**https://www.ready.noaa.gov/register/HYSPLIT_hyagenda.php**

- **Workshop Day 3 (Thr, June 16)**

  The exec/statmain executable in HYSPLIT v5.2.1 does not work correctly. Please update it by downlo statmain to your HYSPLIT exec directory.

  - Windows users - fix_win10.zip (zip, 0.5 MB). Three executable files (including txt2dbf.exe and dbf2 HYSPLIT v5.2.1 distribution for Windows are found to be defective.
  - macOS users - fix_macOS.zip (zip, 0.3 MB).
  - Ubuntu 20.04 users - fix_UbuntuOS20.04.zip (zip, 29 KB).
  - Red Hat Enterprise Linux 8 / CentOS 8 users - fix_RHEL8.5.zip (zip, 29 KB).
  - Red Hat Enterprise Linux 7 / CentOS 7 users - fix_CentOS7.9.zip (zip, 28 KB).
  - Day 3 handout (pdf, 1.0 MB).
  - Day 3 wrap-up (pdf, 1.3 MB) or Day 3 wrap-up (pptx, 1.0 MB).
  - Transformation and deposition slides (pdf, 1.1 MB).
  - HYSPLIT Simulation Parameters for ALOHA Chemicals (pdf, 7.8 MB).
  - Wildfire applications (pdf, 0.8 MB).
  - Source attribution methods (pdf, 1.2 MB).
  - Workshop video recording for day 3 (mp4, 1.4 GB) and unfinished transcript (txt, 228 KB). The tran captions. See the above on how to download the video file.

# 2022 HYSPLIT Workshop Schedule

*Subject to change, depending on the progression of the course and at the discretion of the instructors*

| UTC | Eastern Daylight Time | Monday June 13, 2022 | Tuesday June 14, 2022 | Wednesday June 15, 2022 | Thursday June 16, 2021 | Friday June 17, 2021 |
|---|---|---|---|---|---|---|
| 13:00 - 14:00 | 9:00 - 10:00 | *OPTIONAL** 1a. Installing HYSPLIT on Windows PC | Introduction | Introduction | Introduction | Introduction |
| | | Break | 3. Gridded Meteorological Data Files | 7. Air Concentration calculations | 11. Pollutant transformations and deposition | 15. Radioactive pollutants and dose |
| 14:00 - 15:00 | 10:00 - 11:00 | *OPTIONAL** 1b. Installing HYSPLIT on MAC | Break | | Break | |
| | | Break | 4. Trajectory Calculations | Break | 12. Air Concentration Uncertainty | Break |
| 15:00 - 16:00 | 11:00 - 12:00 | *One-on-one virtual installation sessions, by appointment* | | 8. Configuring the CAPTEX simulation | | 16. Volcanic eruptions with gravitational settling |
| 16:00 - 17:00 | 12:00 - 13:00 | *One-on-one virtual installation sessions, by appointment* | Break | Break | Break | Break |
| 17:00 - 18:00 | 13:00 - 14:00 | *One-on-one virtual installation sessions, by appointment* | 5. Trajectory Options | 9. Air concentration parameter sensitivity | 13. Source Attribution Methods | 17. Custom Simulations |
| 18:00 - 19:00 | 14:00 - 15:00 | *One-on-one virtual installation sessions, by appointment* | Break | | Break | Break |
| 19:00 - 20:00 | 15:00 - 16:00 | *One-on-one virtual installation sessions, by appointment* | 6. Trajectory Statistics | Break | 14a. Wildfire Smoke | Final Questions and Course Wrap-Up |
| | | | | 10. Alternate display options | | |
| **20:00 - 21:00** | **16:00 - 17:00** | *One-on-one virtual installation sessions, by appointment* | Day 1 Wrap-Up | Day 2 Wrap Up | 14b. Dust Storms | |
| | | | | | Day 3 Wrap Up | |

# Agenda – Day 4

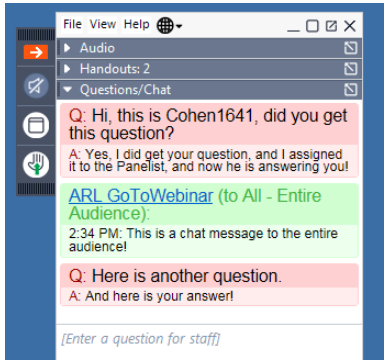
| UTC | EDT | Agenda Item |
|---|---|---|
| 13:00 – 13:15 | 09:00 – 09:15 | Introduction to Day 4 |
| 13:15 – 14:45 | 09:15 – 10:45 | 15. Radioactive Pollutants and Dose |
| 14:45 – 15:00 | 10:45 – 11:00 | Break |
| 15:00 – 16:30 | 11:00 – 12:30 | 16. Volcanic Eruptions with Gravitational Settling |
| 16:30 – 17:30 | 12:30 – 13:30 | Break |
| 17:30 – 18:30 | 13:30 – 14:30 | 17. Custom Simulations |
| 18:30 – 18:45 | 14:30 – 14:45 | Break |
| 18:45 – 19:45 | 14:45 – 15:45 | Question and answer session with course instructors |
| 19:45 – 20:00 | 15:45 – 16:00 | Final course wrap-up |

Note: all times are approximate

# Asking Questions

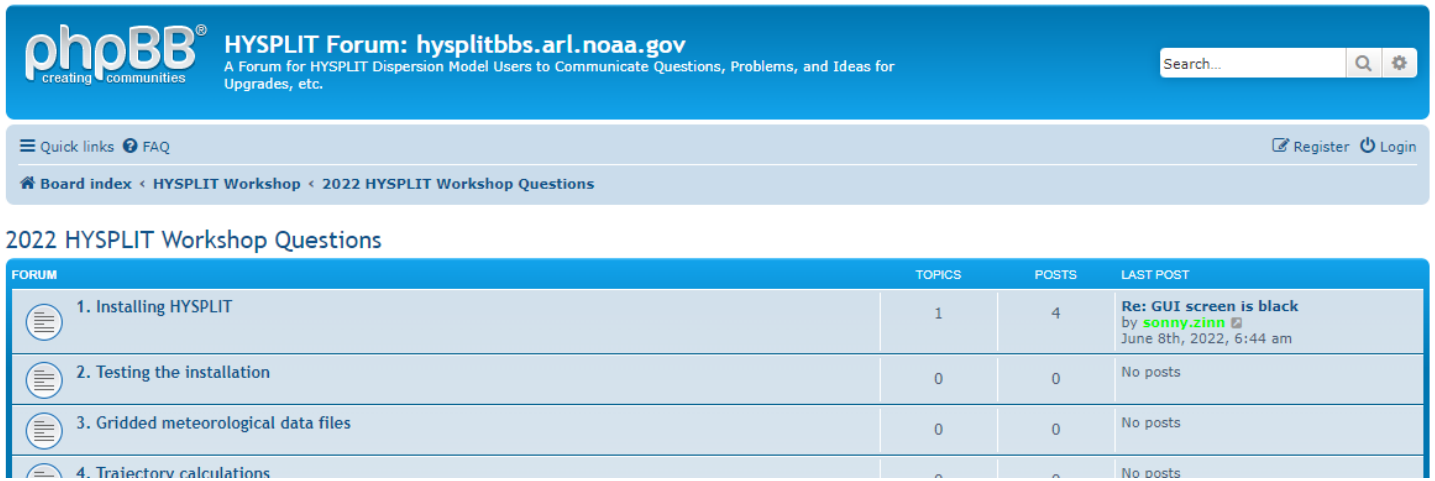
- Ask general or logistical questions about the Webinar or Go-to-Webinar in the Control Panel that was just discussed

*...if viewing a recording, can ask general questions by emailing* **arl.webmaster@noaa.gov**




- Whether *viewing a recording* or *participating in the Workshop live*, ask questions about HYSPLIT and the Tutorial in the HYSPLIT Forum

https://hysplitbbs.arl.noaa.gov/viewforum.php?f=76



https://hysplitbbs.arl.noaa.gov/viewforum.php?f=76

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## 2022 HYSPLIT Workshop Questions

| FORUM | TOPICS | POSTS | LAST POST |
|---|---|---|---|
| 1. Installing HYSPLIT | 3 | 9 | **Re: Error in installation** by sonny.zinn June 15th, 2022, 12:03 pm |
| 2. Testing the installation | 1 | 2 | **Re: error in renaming while c...** by Fantine June 16th, 2022, 11:04 am |
| 3. Gridded meteorological data files | 1 | 22 | **Re: SVG to Image Issue** by WhirlyWinds June 16th, 2022, 10:07 am |
| 4. Trajectory calculations | 0 | 0 | No posts |
| 5. Trajectory options | 2 | 7 | **Re: Changing density of MATRI...** by sahil.bhandari June 15th, 2022, 9:07 am |
| 6. Trajectory statistics | 0 | 0 | No posts |
| 7. Air concentration calculations | 5 | 13 | **Re: Spacing Lat, Lon** by christopher.loughner June 16th, 2022, 10:03 am |
| 8. Configuring the CAPTEX simulation | 0 | 0 | No posts |
| 9. Air concentration parameter sensitivity | 3 | 7 | **Re: Velocity deformation for ...** by alicec June 15th, 2022, 4:45 pm |
| 10. Alternate display options | 0 | 0 | No posts |
| 11. Pollutant transformations and deposition | 3 | 11 | **Re: Number of reactions in on...** by sahil.bhandari June 16th, 2022, 1:57 pm |
| 12. Air concentration uncertainty | 1 | 2 | **Re: Using Ensemble tools for ...** by alicec June 16th, 2022, 1:26 pm |
| 13. Source attribution methods | 2 | 4 | **Re: Solutions for Section 13.5** by Tianfeng.Chai June 16th, 2022, 3:27 pm |

# Quick Recap of Logistics

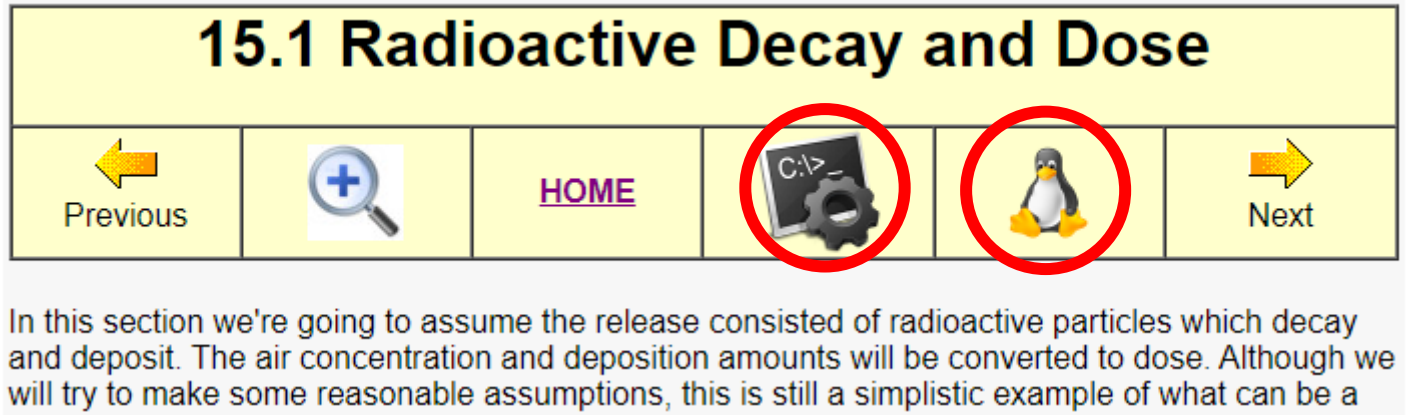
- **General questions:**
  - use Go-to-Webinar Question box and we will do our best to answer
  - We are not using the "raise hand" feature for questions
- **Detailed questions, e.g., about the model:**
  - use the HYSPLIT Forum
  - if haven't already, "register" in upper right corner of Forum web page
- **Handouts:**
  - Other documents – e.g., this presentation – provided as Handouts in Go-to-Webinar and also on the Workshop Web Page
- **Recordings:**
  - Each day's recording will be posted to the Workshop Web Page as soon as it is ready, generally ~4 hours after the day's session ends.
- **If not installed, or if get too far behind:**
  - Perfectly ok to view one or more sessions as "demonstrations" and then go back and do the sessions on your own. The Tutorial is designed to be done on one's own in self-paced environment.

# Scripting

- We are not really covering scripting in this Workshop, but it may be the next step that some of you will take with HYSPLIT
- All of the programs in HYSPLIT can be run from the Command Line – and hence, from Scripts.
- In fact, there are generally more features available with scripting than from the Graphical User Interface (GUI). Not every option is programmed into the GUI.
- The advantage of using the GUI, like we are doing in this Workshop, is that you can clearly see the context of what entries you are making. However, you can see that even for us, it is possible to "forget to do something", and the simulation will not go as intended.
- The advantage of using a script is that once you get it working, it will work every time. You don't have to keep remembering to do each thing in the script every time you run it – the script remembers for you.

# Scripting

- Some of you are no doubt familiar with scripts and use them in your own work.
- The GUI is actually a “script”, written in the Tcl/Tk language, with the additional “point and click” functionality
- There are many other scripting languages, including DOS Batch, Linux Shell (bash, korn shell, etc.), Python, R, and others.
- Script examples are available on most pages of the Tutorial, that show a script that carries out the actions on that page – click on the “gear” for a DOS Batch script and the “penguin” for a Linux shell script



# Scripting

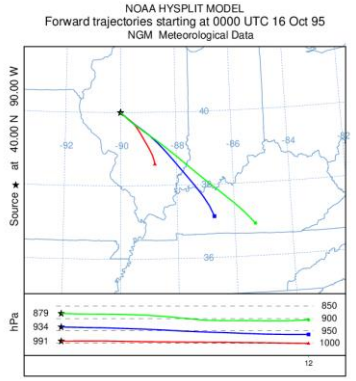
- HYSPLIT Scripts generally follow this type of order:
  - ✓ Define the parameters for the simulation
  - ✓ Write the CONTROL file and the SETUP.CFG file
  - ✓ Run HYSPLIT
  - ✓ Run any post-processing programs (CONCPLOT, TRAJPLOT, etc.)

# Scripting

```
#!/bin/sh

#-----------------------------------------------------------

  WEB=""
  if [ -f /usr/bin/firefox ];then WEB="/usr/bin";fi
  if [ -f /usr/local/bin/firefox ];then WEB="/usr/local/bin";fi
  MDL="${HOME}/hysplit"
  OUT="${MDL}/working"
  MET="${HOME}/Tutorial/captex"
  cd $OUT

  if [ ! -f ASCDATA.CFG ]; then
     echo "-90.0  -180.0"     >ASCDATA.CFG
     echo "1.0     1.0"      >>ASCDATA.CFG
     echo "180     360"      >>ASCDATA.CFG
     echo "2"                >>ASCDATA.CFG
     echo "0.2"              >>ASCDATA.CFG
     echo "'$MDL/bdyfiles/'" >>ASCDATA.CFG
  fi
  echo "### $0 ###"

#-----------------------------------------------------------
```

```
#----------------------------------------

  syr=83
  smo=09
  sda=25
  shr=17

  olat=39.90
  olon=-84.22
  lvl1=10.0

  run=25
  ztop=10000.0
  data="captex2_wrf27uw.bin"

#----------------------------------------

  echo "$syr $smo $sda $shr    " >CONTROL
  echo "1                      ">>CONTROL
  echo "$olat $olon $lvl1      ">>CONTROL
  echo "$run                   ">>CONTROL
  echo "0                      ">>CONTROL
  echo "$ztop                  ">>CONTROL
```

# Workflow associated with a typical HYSPLIT Trajectory simulation

| Command Line or Script | write CONTROL file | write SETUP.CFG file | hysplit\exec\ hyts-std | | hysplit\exec\ trajplot | additional scripts |
|---|---|---|---|---|---|---|
| **GUI** | Trajectory → Setup Run | Advanced → Config. Setup → Trajectory | Trajectory → Run Model | Advanced → View Messages | Trajectory → Display → Trajectory | Trajectory → Special Runs |
| | CONTROL file (required) | SETUP.CFG file (optional) | HYSPLIT Trajectory model (hyts_std) | trajectory dump output file (tdump.txt) | Trajectory Plotting program (trajplot) | Additional post-processing programs, e.g. trajectory clustering, trajectory frequency |
| | Met Data File(s) | | | MESSAGE file |  | |

# Workflow associated with a typical HYSPLIT Concentration simulation

| Command Line or Script | write CONTROL file | write SETUP.CFG file | hysplit\exec\ hycs-std | | hysplit\exec\ concplot | hysplit\exec\con2asc<br>hysplit\exec\con2stn |
|---|---|---|---|---|---|---|
| **GUI** | Concentration → Setup Run | Advanced → Config. Setup → Concentration | Concentration → Run Model | Advanced → View Messages | Concentration → Display → Contours | Concentration → Utilities → Convert to → Ascii (or Station) |

CONTROL file (required), ...including Pollutant, Deposition, and Grids Setup...

Met Data File(s)

SETUP.CFG file (optional)

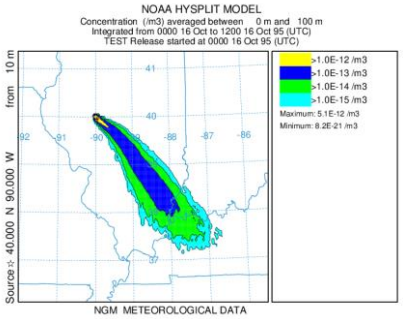
***If a SETUP.CFG file is present, HYSPLIT will use it, even if its not how you wanted to do the run!***

HYSPLIT Concentration model (hycs_std.exe)

binary output file for each concentration grid defined (cdump_1, cdump_2, cdump_3, ...)

MESSAGE file

Concentration Plotting program (concplot)




Additional post-processing programs, e.g.

con2asc
create ascii text file with concentration values at each grid point

con2stn
create ascii text file with concentration values at a particular location

Many programs in the HYSPLIT exec directory (e.g., met data analysis programs); some in GUI, but not all

```
C:\Users\Mark\hysplit\working>dir ..\exec /w
 Volume in drive C is OS
 Volume Serial Number is 74AE-B69A

 Directory of C:\Users\Mark\hysplit\exec

[.]                 [..]                accudiv.exe         add_data.exe        add_grid.exe        add_miss.exe
add_time.exe        add_velv.exe        afwa2arl.exe        amps2arl.exe        arl2grad.exe        arl2meds.exe
arw2arl.exe         asc2par.exe         ascii2shp.exe       autoview.exe        avn2arl.exe         avn2gbl.exe
boxplots.exe        c2array.exe         c2datem.exe         catps2ps.exe        chk_data.exe        chk_file.exe
chk_index.exe       chk_rec.exe         chk_times.exe       clusend.exe         cluslist.exe        clusmem.exe
clusplot.exe        cluster.exe         cmp3arl.exe         con2arcv.exe        con2asc.exe         con2ctbt.exe
con2dose.exe        con2grad.exe        con2rem.exe         con2srs.exe         con2stn.exe         conappend.exe
conavgpd.exe        conc2cdf.exe        concacc.exe         concadd.exe         concplot.exe        concplot.py
concrop.exe         concsum.exe         condecay.exe        conedit.exe         conhavrg.exe        coninfo.exe
conlight.exe        conmask.exe         conmaxpd.exe        conmaxv.exe         conmerge.exe        conprob.exe
conpuff.exe         conread.exe         constats.exe        content.exe         contour.exe         coversheet.exe
dat2arl.exe         dat2cntl.exe        data_avrg.exe       data_del.exe        data_year.exe       datecol.exe
datesmry.exe        dbf2txt.exe         display.exe         dustbdy.exe         dustedit.exe        ecm2arl.exe
edit_flux.exe       edit_head.exe       edit_index.exe      edit_miss.exe       edit_null.exe       ensperc.exe
ensplots.exe        eta04arl.exe        eta12arl.exe        eta40arl.exe        filedates.exe       file_copy.exe
file_merge.exe      findgrib.exe        fires.exe           firew.exe           gelabel.exe         gen2xml.exe
gfs2arl.exe         goes2ems.exe        grad2arl.exe        grib2arl.exe        gridplot.exe        gridxy2ll.exe
hur2arl.exe         hycs_ens.exe        hycs_gem.exe        hycs_grs.exe        hycs_ier.exe        hycs_so2.exe
hycs_std.exe        hycs_var.exe        hysptest.exe        hyts_ens.exe        hyts_std.exe        inventory.exe
isochron.exe        jma2arl.exe         kma2arl.exe         latlon.exe          lbfgsb.exe          macc2date.exe
matrix.exe          meds2arl.exe        mergextr.exe        merglist.exe        metdates.exe        metlatlon.exe
metpoint.exe        mm5toarl.exe        nam12arl.exe        nam40arl.exe        nams2arl.exe        narr2arl.exe
ncr2arl.exe         nuctree.exe         par2asc.exe         par2conc.exe        parhplot.exe        parmerge.exe
paro2n.exe          parshift.exe        parsplot.exe        parvplot.exe        parxplot.exe        pNA05.exe
pNA15.exe           pNA45.exe           pole2merc.exe       poleplot.exe        profile.exe         profile_orig.exe
Readme_exec.txt     rec_copy.exe        rec_insert.exe      rec_merge.exe       rsmp2arl.exe        rsms2arl.exe
run_mpi.sh          scatter.exe         setpoint.exe        showgrid.exe        snd2arl.exe         stabplot.exe
stat2grid.exe       statmain.exe        stn2arl.exe         stn2ge.exe          stn2par.exe         tcmsum.exe
tcsolve.exe         testnuc.exe         timeplot.exe        timeplus.exe        toaplot.py          trajfind.exe
trajfreq.exe        trajfrmt.exe        trajgrad.exe        trajmean.exe        trajmerg.exe        trajplot.exe
trajplot.py         txt2dbf.exe         unpacker.exe        unpacker.txt        var2datem.exe       velvar.exe
viewer.exe          vmixing.exe         vmsmerge.exe        vmsread.exe         volcplot.exe        wget.exe
win3plot.exe        wincpick.exe        wincplot(1).exe     wincplot.exe        wintplot(1).exe     wintplot.exe
xtrct_grid.exe      xtrct_stn.exe       xtrct_time.exe      zcoord.exe          zip.exe
             201 File(s)    195,372,732 bytes
```

```
C:\Users\Mark\hysplit\working>..\exec\trajplot
 USAGE: trajplot -[options (default)]
   -a[GIS output: (0)-none 1-GENERATE_points 3-KML 4-partial_KML 5-GENERATE_lines]
   -A[KML options: 0-none 1-no extra overlays 2-no endpoints 3-Both 1&2]
   -e[End hour to plot: #, (all) ]
   -f[Frames: (0)-all files on one  1-one per file]
   -g[Circle overlay: ( )-auto, #circ(4), #circ:dist_km]
   -h[Hold map at center lat-lon: (source point), lat:lon]
   -i[Input files: name1+name2+... or +listfile or (tdump)]
   -j[Map background file: (arlmap) or shapefiles.<(txt)|process suffix>]
   -k[Kolor: 0-B&W, (1)-Color, N:colortraj1,...colortrajN]
      1=red,2=blue,3=green,4=cyan,5=magenta,6=yellow,7=olive
   -l[Label interval: ... -12, -6, 0, (6), 12, ... hrs
      <0=with respect to traj start, >0=synoptic times)]
   -L[LatLonLabels: none=0 auto=(1) set=2:value(tenths)]
   -m[Map proj: (0)-Auto 1-Polar 2-Lambert 3-Merc 4-CylEqu]
   -o[Output file name: (trajplot.ps)]
   -p[Process file name suffix: (ps) or process ID]
   -s[Symbol at trajectory origin: 0-no (1)-yes]
   -v[Vertical: 0-pressure (1)-agl, 2-theta 3-meteo 4-none]
   -z[Zoom factor:  0-least zoom, (50), 100-most zoom]

 NOTE: leave no space between option and value
```

EXAMPLE: **trajplot -itdump.txt -oFIRE -a3 -A3**

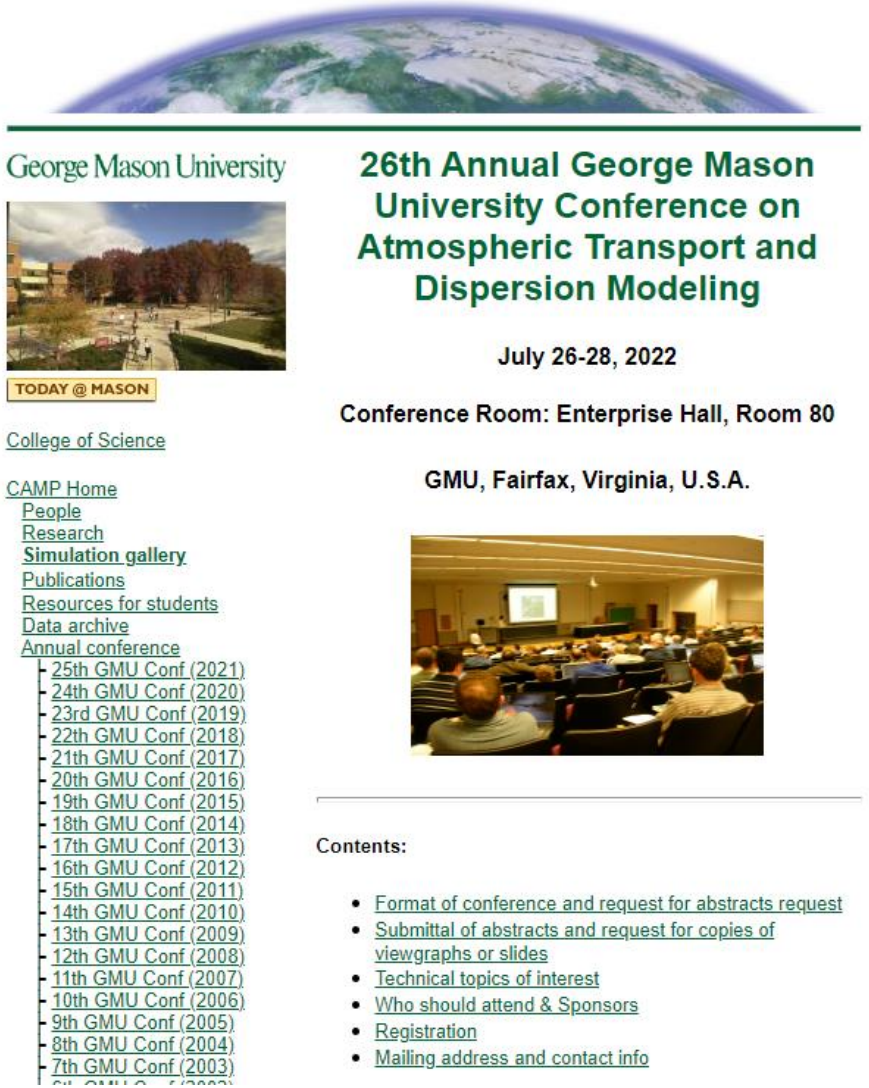
- Not all program options available from GUI
- More options from scripts
- Type executable name from command line to see options
- At left: trajplot (the program that plots trajectories)

The 26th Annual George Mason University Conference on Atmospheric Transport and Dispersion Modeling will be held on July 26-28, 2022.

The deadline for submitting abstracts is **July 16, 2022**. Please send your abstracts to Joe Chang (gmu.atd.conference@gmail.com) and Zafer Boybeyi (zboybeyi@gmu.edu).

If there are enough HYSPLIT-related abstracts submitted, there will be special section on HYSPLIT applications

http://camp.cos.gmu.edu/26th-announcement.html



George Mason University

TODAY @ MASON

College of Science

CAMP Home
- People
- Research
- **Simulation gallery**
- Publications
- Resources for students
- Data archive
- Annual conference
  - 25th GMU Conf (2021)
  - 24th GMU Conf (2020)
  - 23rd GMU Conf (2019)
  - 22th GMU Conf (2018)
  - 21th GMU Conf (2017)
  - 20th GMU Conf (2016)
  - 19th GMU Conf (2015)
  - 18th GMU Conf (2014)
  - 17th GMU Conf (2013)
  - 16th GMU Conf (2012)
  - 15th GMU Conf (2011)
  - 14th GMU Conf (2010)
  - 13th GMU Conf (2009)
  - 12th GMU Conf (2008)
  - 11th GMU Conf (2007)
  - 10th GMU Conf (2006)
  - 9th GMU Conf (2005)
  - 8th GMU Conf (2004)
  - 7th GMU Conf (2003)

**26th Annual George Mason University Conference on Atmospheric Transport and Dispersion Modeling**

**July 26-28, 2022**

**Conference Room: Enterprise Hall, Room 80**

**GMU, Fairfax, Virginia, U.S.A.**

**Contents:**

- Format of conference and request for abstracts request
- Submittal of abstracts and request for copies of viewgraphs or slides
- Technical topics of interest
- Who should attend & Sponsors
- Registration
- Mailing address and contact info

# Agenda – Day 4

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