



## Questions & Answers Session 3

Please type your questions in the Question Box. We will try our best to get to all of your questions. If we don't, feel free to email Pawan Gupta ([pawan.gupta@nasa.gov](mailto:pawan.gupta@nasa.gov)) or Melanie Follette-Cook ([melanie.cook@nasa.gov](mailto:melanie.cook@nasa.gov)).

Question 1: Can we convert AOD to the mass concentration?

Answer 1: In CAMS, the mass concentration for aerosol species are included. It is better to download the mass concentration fields.

Question 2: Is it possible to run a model online at ECMWF website and acquire results to plot with other GIS software?

Answer 2: No. We are running the model operationally, midnight and midday UTC. We are planning to create a tool to plot the data on the website.

Question 3: How do CAMS reanalysis data simulate secondary organic aerosols (SOA)? Also, what is the aging scheme of organic aerosols in CAMS?

Answer 3: We will look into this further.

Question 4: What is the difference between GMAO and CAMS? Is there any connection between them?

Answer 4: They are two separate organizations, GMAO being a part of NASA and CAMS being a part of ECWMF.

There are no direct connection as far as the models.

Question 5: Is it possible to apply CAMS models to a specific local area (e.g. small city that is not covered by CAMS European air quality forecasts dataset) with in-situ measurements as input? Or is it too complex when applied to a small area?

Answer 5: This can be done in CAMS. We are running a European air quality model with 9 separate models.

Question 6: How can we use in-situ/other-satellites measurements to fill Sentinel-5P NO<sub>2</sub> raw data gaps that arise from applying  $qa\_value > 0.75$ ?

Answer 6: It doesn't make a lot of sense to do that due to gaps in coverage. Using a model framework would be the most optimal solution.



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Question 7: In the ECMWF website, what is the difference between CAMS near-real-time (6-hour resolution) and CAMS reanalysis data (3-hour resolution)? Both are the same?

Answer 7: CAMS near real time is based on the current version of the model system. Reanalysis allows you to use past data.

Question 8: How does climate change affect air quality?

Answer 8: This a very complex question and beyond the scope of this presentation.

Question 9: What are the main differences in the secondary organic aerosols scheme by MERRA-2 and CAMS?

Answer 9: We will look into this further.

Question 10: How accurate the data will come in comparison to ground level monitoring of pollutants?

Answer 10: Accuracy of the CAMs forecast, we have periodic validation outputs vs ground.

Question 11: CAMS global atmospheric composition forecast and CAMS global reanalysis (EAC4) are the same? Which product is better to conduct a validation study of aerosol mass?

Answer 11: In regards to validation study, it depends on the time. Refer to the previous questions.

Question 12: How are the PM 2.5 and PM 10 values estimated in ECMWF CAMS global data set? What satellite data is used for validation? Is it true that modal forecast data is assimilated after every few days for more accuracy? What is the methodology for forecasting?

Answer 12: All of the info about how we calculate PM2.5 and PM10 can be found on our user forum. There are products which derive satellite data differently. Many of these topics were covered previously in the webinar.

User Forum link:

Question 13: For the case of biomass burning (BB) and the comparison of the AOD (satellital data) and PM2.5 (CAMs data) between the BB period and non-BB period at a specific region, what would be the reason for no observed changes in AOD but observed increase in PM2.5 for the same year for example?



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Answer 13: In cases you see increases in PM2.5 but not AOD...

Question 14: Can you export the animation? Can we save the figure after plotting it using Jupyter?

Answer 14: You can save the figure but cannot export the animation in our example, but there is a way to be able to export the image by coding it into Jupyter Notebook using Python.

Question 15: Model performance wise, NASA GEOS vs. ECMWF CAMS?

Answer 15: Both systems have their advantages and disadvantages. Different systems are useful in their own right. GEOS is a research model, not an operational model. It depends on your own personal application as well.

Question 16: Without using jupyter notebook, can we directly download data with an animation of specific date like you can in the NASA portal/webtool 'giovanni'?

Answer 16: Yes. You can download data directly. One useful tool that we covered in Part 2 is NASA's Panoply software. For more advanced applications, Python is useful.

Question 17: Is CAMS reanalysis data going to be available on Google Earth Engine?

Answer 17: We are not sure. We will look into this further. ERA-5 is available on GEE.

Question 18: Are these data on ECWMF website available for AFRICA ?

Answer 18: Yes. ECWMF is a global dataset. The European dataset also includes North Africa as well.

Question 19: How do you validate organic and black aerosols? What are the main points that need studied in the near future for accurate estimation of black and organic carbon?

Answer 19: To improve the model of validation, we need to improve our measurements of certain things such as PM2.5.

Question 20: what does the term "single level" refer to? Does it stand for the surface?

Answer 20: There is the 3D data store. 2D data is referred to as "single level".

Question 21: Which data can be used to assess CO2 sequestration (urban vegetation) in relation to air pollution in urban areas?

Answer 21: We will look into this further (CO2 sequestration).  
We do have GHG reanalysis and CO2 forecasts.



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**Homework now available (Due October 14)**

Answers are submitted via Google Forms

URL for the assignment can be found on the training webpage under Part 3.

or direct link in the Chat.