



Questions & Answers Session 4

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).

Question 1: Besides USA, ESA, Japan and India, do any other countries operate satellite platforms and instruments and share data? In particular, Russia and PRC?

Answer 1: Know about US & Japan and geosats observation of ESA - about Russia and China - not sure. (Pawan) They have a geostationary satellite and other satellites but we are not aware about their data availability.

Question 2: could the satellite measure the quantity of transported dust from place to another place , for example: from Africa to America continent ?

Answer 2: Yes! There are a lot of papers on dust transport from african sahara to eastern part of the U.S. and primarily done through observation. But with geostationary satellites, you can also attempt that with geostationary data simply because you can quantify aerosol data and distribution can be estimated from satellite dataset. There's other data where you can watch aerosols - based on these datasets people have tried to quantify amount of dust in atmosphere and how much goes over the atlantic, so some of this has been done.

Question 3: Peru has launched its own satellite so following the same data process I will be able to obtain AOD information?

Answer 3: Not sure - but if it is geostationary or polar satellite - however, if any satellite has 3-4 channels in visible and IR, I'm sure you will be able to obtain aerosol information using satellite data. But not sure about technical specs of this satellite.

Question 4: When AOD is obtained only at one wavelength using INSAT-3D how AOD is obtained at 550 nm for validation? and if is obtained using MODIS and AERONET data Bias will be more or less?

Answer 4: Yes - have only one channel from 500-700 nm, however, we are rescaling and gridding AOD. Using models, you can convert AOD around 670nm-550 nm this is possible. Other satellites are using AOD at 550 nm - this is the wavelength that has the maximum reflectivity. The AOD products are available at 550 nm so many retrieval



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people try and normalize their observations by this channel. Some biases of course will be there, since we're converting central wavelengths so one can expect some normalization errors and we need to quantify them.

Question 5: Which satellite data and the relevant website will I be able to get CO2 data in GIS software compatibility format for Nigeria over 10 years

Answer 5: CO2 data - not sure - maybe from OCO some data is coming now - orbiting carbon observing satellite from NASA. (Pawan) that's right - some CO2 data on giovanni (<https://giovanni.gsfc.nasa.gov/giovanni/>) website. Those are from model reanalyses.

Question 6: Which data (MODIS or INSAT) would be recommended for more accurate daily and monthly average AOD estimation for Mumbai city in India?

Answer 6: You can also look at INSAT data there since there are large observations over Mumbai. Comparison to MODIS AOD it's relatively better, but MODIS has a very long-term time series. If you're looking for long-term datasets, MODIS are available in different websites. But for more recent observations, look into INSAT.

Question 7: Is there a difference in the information provided between AOD data and Dust RGB images?

Answer 7: Yes - dust RGB is basically a composite of data that is basically in terms of digital count or radiances there is no retrieval process. Processing is applied to convert that info into AOD. What you see in an RGB image - you can see many features, vegetation, water bodies, oceans, and you can see dust or aerosols. If you need to quantify, you convert into AOD.

Question 8: Does the portal allow the INSAT data to be downloaded or is it mainly for visualization?

Answer 8: The data portal is mainly for visualization, but the data can be obtained via a link in the presentation.

<https://vedas.sac.gov.in/vedas/>

To download data - www.mosdac.gov.in

Question 9: How can we verify that the atmospheric dust in the atmosphere or after deposition over the ocean is not interfering with the chlorophyll remote sensing via MODIS?



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Answer 9: Think you are asking “how does the dust - when it gets deposited in the ocean - help with chlorophyll blooming?” People have made in situ ocean measurements during dust storms and made observations of aerosols as well as ocean nutrients and hydroplankton concentration as well. So, they’ve found there’s a time lag relationship between dust observations and chlorophyll blooming. The dust particles contain {} that gets dissolved in ocean water and provides nutrients for plankton to grow.

Question 10: What wavelength AOD is more suitable to get a sense of PM2.5 for AQ purposes?

Answer 10: PM2.5 is a unit of microgram/m³. AOD extinction of light - what people are trying to derive is using AOD and the in situ measure for PM2.5 - two statistical or non statistical means a correlation. Direct sensing of PM2.5 using satellite data is not possible. It’s an indirect inference through AOD. Can’t tell you which wavelength, but of course for AOD estimation, you need a wavelength component.

Question 11: With on the onslaught of local, low cost air sensor data coming online, have there been any efforts to blend said data with satellite data for validation/further understand of the local level data when combined with larger scale analyses based on said imagery?

Answer 11: Really about in situ measurement - a lot on the market and also to measure PM2.5 and PM10 now sensors are in the market where you can measure those as well.

Question 12: How different is the INSAT-3D retrieval algorithm in comparison to the GOES algorithm?

Answer 12: You see it’s similar to old GOES (not GOES R - with GOES R you have ABI) but the previous GOES algorithm was very similar, which was a single channel algorithm.

Question 13: As mentioned by you, AOD is currently retrieved at the central wavelength from a broadband channel. Where can we obtain the filter function of this band for INSAT-3D?

Answer 13: You can contact email on presentation - will be able to provide info on spectral response.



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Question 14: How do you discriminate the smoke, dust from the urban anthropogenic aerosols?

Answer 14: You need to have multispectral observation - especially for instruments like MODIS. Very useful for classifying aerosols. You have dust - which basically resolves in the blue part of the EM spectrum. If you can reconstruct you can find out the dust and smoke, which has different spectral patterns. The different values are there for smoke and well as dust. Using multispectral data - you can distinguish between aerosol types.

Question 15: Will Giovanni will include INSAT-3D AOD retrieval data in near Future?

Answer 15: Can't say.

Question 16: How much difference should be there for ground-level monitoring and satellite data?

Answer 16: There are issues because ground-level monitoring is done at one point and satellites give you average information at the pixel resolution of the product. In this case, 10 km, the info you get from satellites has a 10 km by 10 km. The variability will be large in satellite information compared to point info. When you compare in situ/point info, you can expect some biases. As well as the errors that are there in tensors and retrievals.

Question 17: how reliable are the AOD retrievals of INSAT-3D on bright surfaces I.e., snow and urban surfaces?

Answer 17: We have not validated over snow because most of the snow-region we are masking because it has a lot of clouds. We aren't doing retrievals over snow. But for urban surfaces, we haven't yet done validation. At 10 km spatial resolution, don't see you will get urban features.