



## Questions & Answers Session

Please type your questions in the Question Box. We will try our best to get to all your questions. If we don't, feel free to email Amber McCullum ([amberjean.mccullum@nasa.gov](mailto:amberjean.mccullum@nasa.gov)), Cole Krehbiel ([ckrehbiel@contractor.usgs.gov](mailto:ckrehbiel@contractor.usgs.gov)), Christine Lee ([christine.m.lee@jpl.nasa.gov](mailto:christine.m.lee@jpl.nasa.gov)), or Juan Torres-Peréz ([juan.l.torresperez@nasa.gov](mailto:juan.l.torresperez@nasa.gov)).

**Question 1:** What is PT-JPL and what is ALEXI?

**Answer 1:**

These are the two models ECOSTRESS uses to estimate evapotranspiration.

PT-JPL starts with potential evapotranspiration, which is defined as the amount of evaporation that would occur if a sufficient water source were available. PT-JPL applies ecophysiological constraint functions based on atmospheric moisture and vegetation indices to estimate ET.

ALEXI is a two-source energy balance model that partitions energy available at the land surface (net radiation and soil heat flux) into turbulent fluxes of sensible and latent heat flux. This has primarily been implemented over agricultural sites.

For additional information and explanation, please take a look at the ATBDs and follow up with the science leads.

The documents that describe how each of these algorithms are implemented are here: <https://ecostress.jpl.nasa.gov/data/atbds-summary-table>

**Question 2:** What is the temporal resolution?

**Answer 2:** The temporal resolution of ECOSTRESS is variable depending on your study location based on the instrument's orbital cycle aboard the ISS. ECOSTRESS generally acquires data over target areas every ~3-5 days, with a minimum of a weekly repeat for those target areas. ISS orbits can change due to unexpected circumstances (maneuvers, cargo resupply).



Additional information on temporal and spatial resolution:

<https://lpdaac.usgs.gov/data/get-started-data/collection-overview/missions/ecostress-overview/#ecostress-temporal-and-spatial-resolution>

**Question 3:** Does the dip in diurnal evapotranspiration curve depends upon any threshold of air temperature and humidity? If such thresholds exist please explain how?

**Answer 3:** This dip is caused or linked with stomatal closure, which depends on vegetation type and other environmental factors like soil moisture and atmospheric conditions. Please take a look at the ATBDs, and following up with the science team members who lead the development of those models.

**Question 4:** What is the ECOSTRESS spatial coverage over southern Africa?

**Answer 4:** The original ECOSTRESS priority data coverage includes the lower (48) continental United States (CONUS), twelve 1,000 x 1,000 km key climate zones and twelve Fluxnet sites, but coverage / acquired data is much greater. You can look for available data at <https://search.earthdata.nasa.gov/>. All data that have been acquired but not necessarily processed (your feedback here is key!) can be viewed here <https://ecostress.jpl.nasa.gov/gmap/>. If you see that data has been acquired over your region of interest, but is not available on Earthdata Search, contact the ECOSTRESS team at JPL and we can try to get those areas processed.

Additional Information on the ECOSTRESS FAQ page:

<https://lpdaac.usgs.gov/resources/faqs/#why-are-there-no-ecostress-observations-over-my-specific-study-site>

**Question 5:** When will the data be available with more global coverage?

**Answer 5:** Please feel free to follow up on specific sites / regions. We are latitude-limited because of the ISS orbit (53.6 °S to 53.6 °N), but there is some flexibility to submit requests for additional site acquisitions.

**Question 6:** Is there a size limit to the area shapefile that you submit to AppEEARS?

**Answer 6:** There is no specific limit to the size of an area shapefile that you submit to AppEEARS. However, there are specific limits to the total size of area requests. These include a **single file limit of 7.2 gb**, a **total output request size of 450 gb**, and the total number of output files is limited to **10,000 output files**. For point requests, we



limit users to **1,000 lat/lon points per request**, and a total of **1 million rows** in the output csv files.

The more data you request, the longer it will take to generate. The gridded ECOSTRESS products will be made available in AppEEARS once they are released in 2020, which will make the process quicker.

Question 7: Will ECOSTRESS products data be available in Google Earth Engine?

Answer 7: That decision is up to Google to decide whether or not they would like to ingest the ECOSTRESS data archive and add it to GEE. We have had some informal discussions with Google so stay tuned. The more interest we see, the easier it may be to include in GEE. Gridded products would be easiest for them to use, but those are not currently standard. There is some work on-going with the ECOSTRESS Science Team to develop a data product that is gridded.

Question 8: How do you get/derive the reference, for quantifying how much the plant temperature has risen particularly due to water stress? Is the reference based on energy balance computation?

Answer 8: A good question - I would direct this to Josh Fisher or Martha Anderson.

Question 9: Is there a way to query percent cloud cover?

Answer 9: This functionality is not currently available for ECOSTRESS in Earthdata Search Client. If you request ECOSTRESS data via AppEEARS, we provide the QA layers (including cloud mask) as outputs both in the visualizations and available for download. AppEEARS decodes the cloud mask and provides quality lookup tables, so you could download the QA data alongside your ECOSTRESS data, use AppEEARS quality services and perform a cloud/quality filtering mask on your own.

Resources:

Masking, Visualizing, and Plotting AppEEARS Output GeoTIFF Time Series in Python:

<https://lpdaac.usgs.gov/resources/e-learning/masking-visualizing-and-plotting-apppeears-output-geotiff-time-series-python/>

Using the AppEEARS API in a Landsat ARD Workflow - Getting Started:

<https://lpdaac.usgs.gov/resources/e-learning/using-the-apppeears-api-in-a-landsat-ard-workflow-getting-started/> (see section 5)

Question 10: Has anyone used the ECOSTRESS data to monitor algae bloom conditions?



Answer 10: Not that I know of, but could be a very interesting application of ECOSTRESS data.

Question 11: Did you have examples to the hydrologic topics with ECOSTRESS?

Answer 11: I am not certain I understand the question. This person is welcome to contact us to follow up.

Question 12: How can I relate deforestation with ECOSTRESS products particularly for tropical areas?

Answer 12: There are some colleagues who have done work relevant to this topic. If this person follows up with me, I can connect them.

Question 13: Could you share more information on the USDA program focused on irrigation?

Answer 13: Below are the DOI landing pages for the USDA-generated ECOSTRESS products:

- ECO3ETALEXIU v001: <https://lpdaac.usgs.gov/products/eco3etalexiov001/>
- ECO4ESIALEXIU v001: <https://lpdaac.usgs.gov/products/eco4esialexiov001/>

Question 14: Are the datasets applicable for any mangrove forest ecosystems?

Answer 14: I would imagine surface temperature and ET products. You might look into the literature to see how often each of these models have been applied in mangrove forests.

Question 15: Can we integrate ECOSTRESS data with Landsat data?

Answer 15: ECOSTRESS L2-L4 products can be requested alongside Landsat Analysis Ready Data (ARD) in AppEEARS. We have begun to do this in a number of projects. One example was shown where USDA used ECOSTRESS to bridge gaps in Landsat data records. There is also some discussion on how one can use GOES or FLUXNET / tower data to enable this further as well. Feel free to follow up.

Question 16: Is ECOSTRESS data (70m) suitable for modelling agricultural soil at local scale?

Answer 16: I am not sure about modeling soils explicitly or what aspect of soils you are interested in....but if you are interested in ET at field-scales, then to some degree this is dependent on the field size.