CALIPSO's New 5km Merged Layer Product for Version 4 Level 2 Data Products

R. Ryan[1], B. Getzewich[1], C. Trepte[2], M. Vaughan[2], D. Winker[2]

(1) Science Systems and Applications, Inc., Hampton, VA
(2) NASA Langley Research Center, Hampton, VA

http://www-calipso.larc.nasa.gov
Author POC:
robert.a.ryan@nasa.gov

Overview

In response to numerous end-user requests, the V4 release will include a new 5-km merged layer product that aggregates all of the information found in the existing 5-km cloud layer product and 5-km aerosol layer product into one convenient file.

The new merged product will be made available alongside the same cloud and aerosol layer products that are currently being distributed, so the V4 user community will have additional options for ordering data. This poster summarizes the contents of the new 5-km merged layer product.

Like the version 4 updates to the 5-km cloud and aerosol layer products, the 5-km merged layer product will contain a comprehensive subset of the data reported in the single shot layer product, so that unambiguous cloud clearing information will always be immediately available.

This new product offers several advantages to users of the CALIPSO layer products. In particular, (a) the spatial relationships between clouds and aerosols detected at varying averaging resolution in any column are fully specified and (b) the optical influences between layers of different types (e.g., the uncertainties in cloud optical depth retrievals for cirrus clouds lying above aerosol layers) can be readily appreciated and fully characterized.

Interwoven Aerosol and Cloud Layers

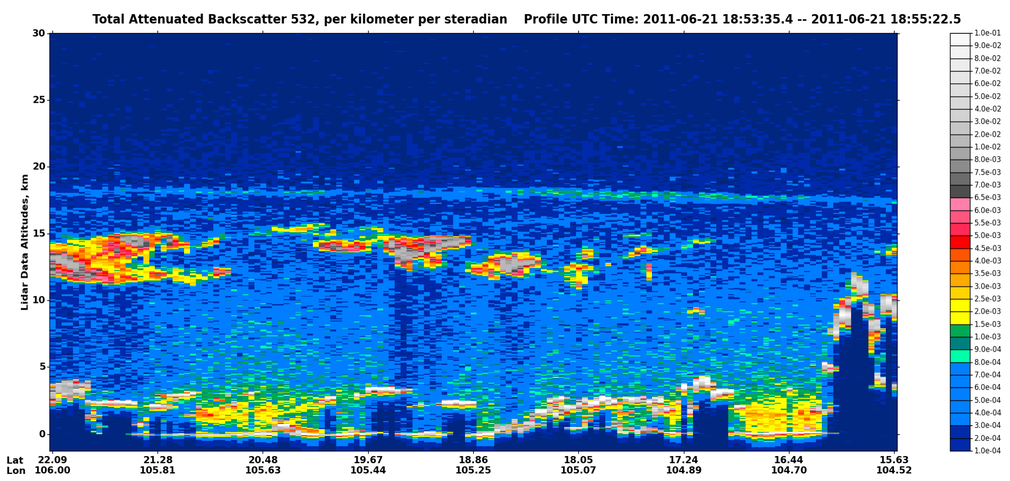

Figure 1: 532nm total attenuated backscatter 2011-06-21T18 Night.

VFM Shows the Full Scene

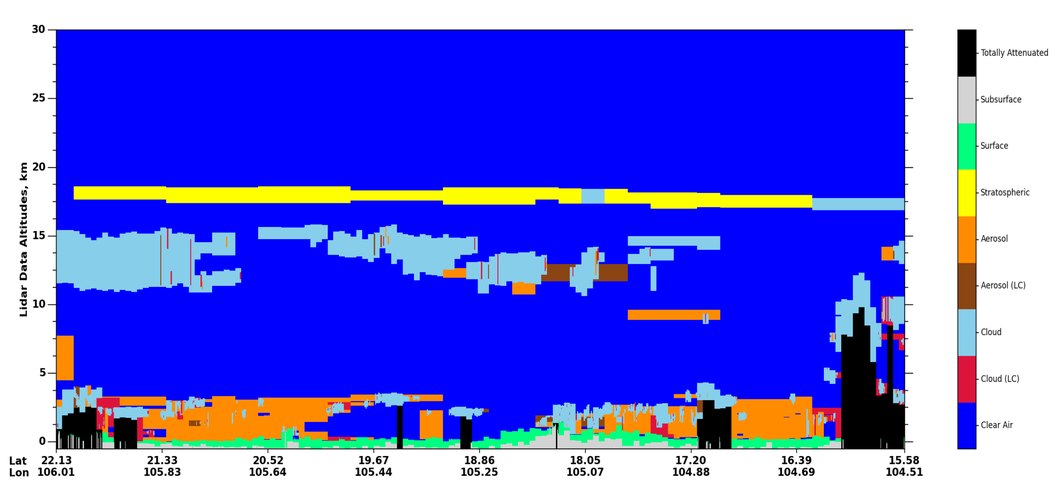

Figure 2: The Vertical Feature Mask for the same scene as Figure 1

Incomplete Data Can Lead to Misinterpretations

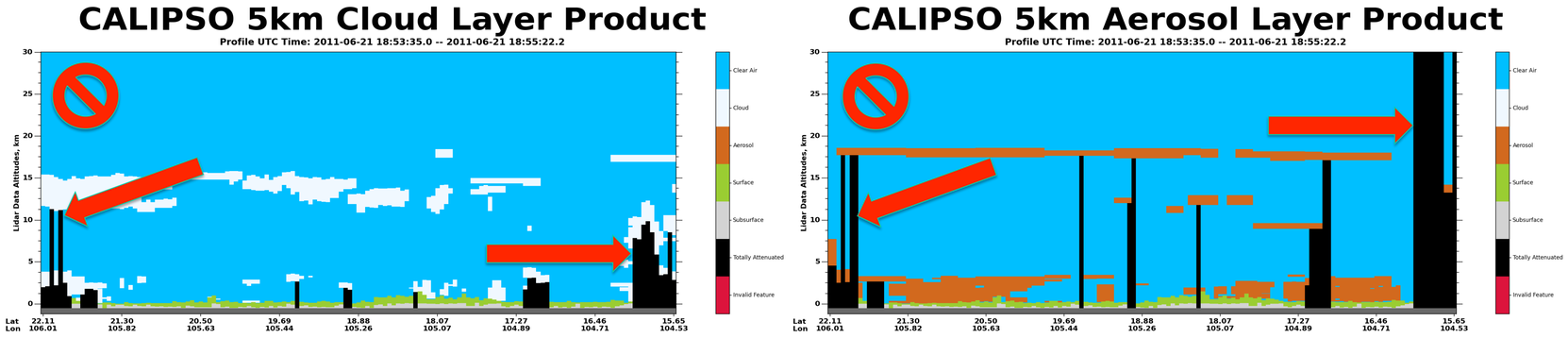

Figure 3 & 4: Cloud and aerosol layer product plots of 2011-06-21T18 Night showing how using only one layer product can lead to incorrect assumptions about total attenuation.

Figures 3 and 4 show how, when viewing the cloud or aerosol layer products by themselves, incomplete data can lead one to make incorrect assumptions about the scene. For example, when no backscatter is detected from the Earth's surface, the signal is assumed to be totally attenuated by the lowest atmospheric feature in the vertical profile. This lowest feature is designated as being opaque. However, because clouds and aerosols are reported in separate files in the V3 5-km layer products, immediate identification of the opaque layer in any column may be impossible without first downloading and examining the other, matching 5-km layer product.

The New Merged Layer Product

By combining the cloud and aerosol layer products, all of the data necessary to understand the full scene is at your fingertips and readily available as well as some information which can only be found in the merged layer product such as "invalid features." To make it easier to know what type of feature each layer is, layer type has been added to the merged layer product as well. Layer type is the same information that is stored in the Feature Classification Flag's first 7 bits, just pulled out and stored as an integer for easier access.

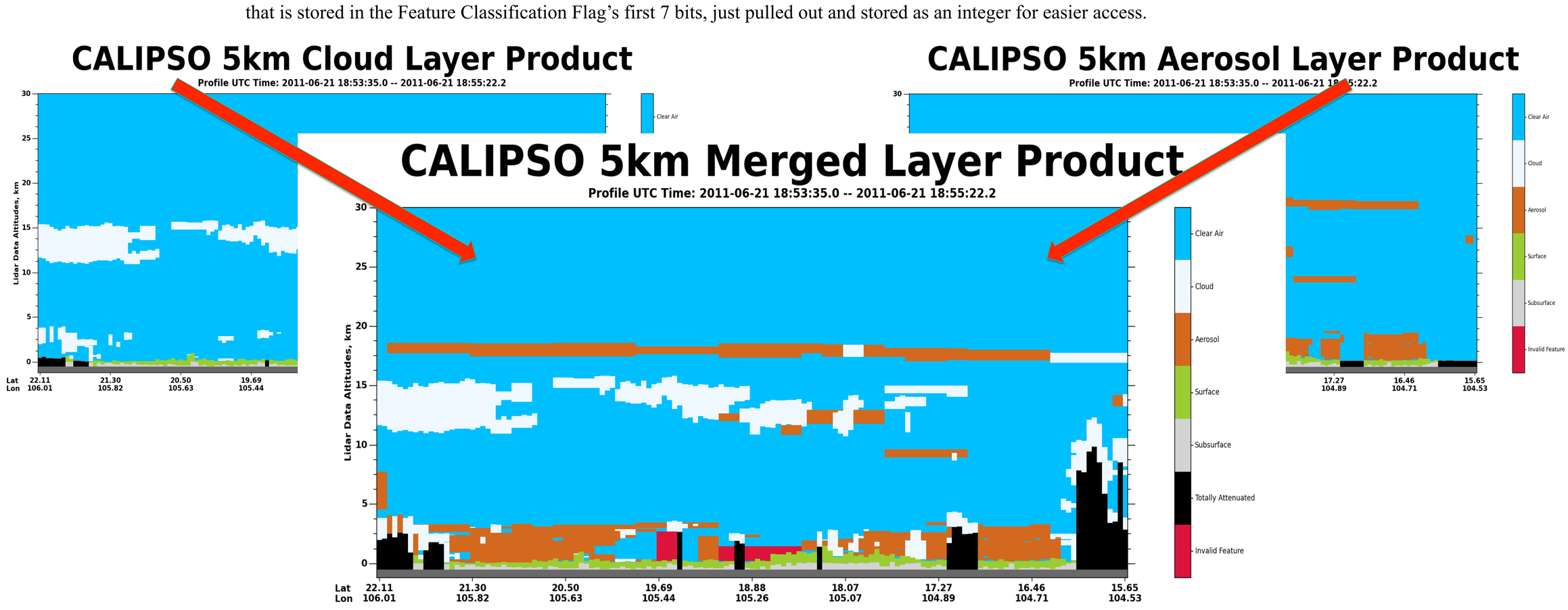

Figure 5: Shows how cloud and aerosol layer products have been combined to make the new merged layer product