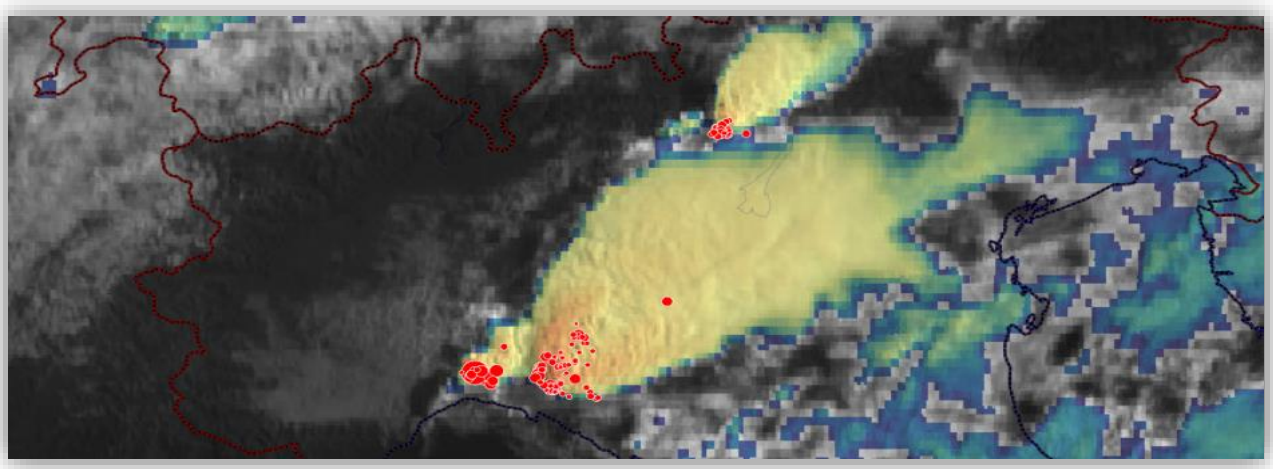

Lab - Exploring the MTG LI data

1. Open the ESSL viewer(username **IvanSmiljanic2509** and **password 8$)K1#,r**): https://displayer.essl.org/wx/login.html
2. Open the 'W-Alps' region and set the time to 12 July 2023 (enter '202307122355' to 'Date and Time (UTC)' in viewer.
    a. (In case not already showing) Under 'MTG LI – Initial Products' choose 'Flash area size' and move the time steps between 18:00 and 23:55 UTC (night time). **Can you draw (a very roughly!) cloud appearance/outline at eg 22:00 UTC** based on what you see form the lightning data**?**
    b. Try opening the rest of the lightning products under 'MTG LI – Initial Products' category – **can you outline the cloud appearance better now? Where are the updraft and anvil areas of the thunderstorm clouds? Can you assess the severity of these storms?** Focus on the number and size distribution of different lightning events, and lightning flash appearance.
    c. Now under 'SEVIRI' choose 'Enh. IR' imagery for the same period. **How does you cloud sketch overlap with IR imagery?**
    d. Look at the temperature distribution of the thunderstorm cloud tops, and compare with different lightning products. **Can you identify updraft vs more stratiform regions of the Cb clouds? Which product gives the best indication of updraft regions? Which product can tell you more about the storm dynamics (intensification, decay, propagation, advection)?**
    e. **Did you find any interesting shape distributions of lightning to report?**

3. Set the time now to '202307121800' and observe the storm initiation and development in the same domain (from 12:00 UTC till 18:00 UTC). Close the previous SEVIRI products and open 'HRV-Clouds RSS'
    a. Overlaying the LI 'Flash area size' product (or any other under the 'MTG LI – Initial Products') try to observe the earlies time you can notice the lightning events in the growing Cu/Cb clouds. **Does the number, or a size, or intensity of lightning tell you something about the storm growth and intensification? Does it help to identify 'more dangerous' towering cumulus clouds (from all the clouds**

that grow respectable in size)? Which LI product (out of four) do you find most useful at this early stage of thunderstorm development?

b. Now open the 'Sev Storms (RSS)' form the SEVIRI suit of products. Please compare the areas of the smallest particles (more intense orange to yellow shades) in respect to lightning data. **Is there an overlap between intensity and updraft area suggested by Severe Storms RGB and LI data?** Do the same comparison now with temperature distribution and cloud-top shapes (selecting 'Sandwich (RSS)' from SEVIRI suite) – **is the overlap with some of the cloud-top features apparent (overshooting tops, cold rings, gravity waves, AACPs)?**

c. Now open the radar data (under 'Radar Composites' you can choose 'OPERA') – do you find an **overlap between the lightning data and intense radar reflectivity**?

4. Does the **lighting position in general has a good overlap** with the cloud position from SEVIRI and radar data?
5. **What is the phase of the clouds that start exhibiting the lightning – water or ice?** (you have Day Microphysics RGB to assist you with that)
6. In general, **how do the colour pallets of the LI data overlap with different SEVIRI products** – something to point out or comment?

7. Now move forward to next day, choose '202307131200' (6-12 UTC), and follow the storm over the N Romania (select region 'Ukraine'). Choose SEVIRI IR10.8.
    a. **Can you determine the flavour of the storm (eg MCS, supercell, squall line, multicell) just looking at the LI data? What is the distribution of lighting within the storm? Where is/are the updraft areas?**
    b. You can open other SEVIRI products and confirm your findings under last step.
    c. Now open the radar data and again revise your findings under step a)