# NWCSAF CDOP3 Users' Workshop 2020

## NWC/GEO application for Georgia

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**Abstract.** Georgia's geographical location and it's complex orography cause diversity and extremity of weather conditions. Convective storms, with attendant phenomena; fog and low clouds; locally forced precipitation events; wintertime weather (snow, ice, glazed frost, avalanches) this is a short list of synoptic processes nowcasting (NWC) and very short range forecast (VSRF) of which has a great importance for Georgia. Currently, nowcasting system from NWCSAF GEO v2016 is operates in Georgia's NHMS using via EUMETCast: Second Generation Meteosat - High Rate SEVIRI Image Data (every 15 minutes) and First Generation Meteosat – Indian Ocean Data Coverage (IODC) (every 30 minutes). As the Country territory is prone to flash floods and mudflows, Quantitative Precipitation Estimation (QPE) and Quantitative Precipitation Forecast (QPF) on any leading time is very valuable we mostly emphasis on precipitation and convention products. Products validation and intercomparison is continuing. We are working on preparation of HRW products for assimilation in WRF model and looking to further development of local nowcasting system by blending opportunities from different software and **SAF NWC now casting products**. For nowcasting we use SAF NWC GEO v2016 software which generates about 15 type of cloud, precipitation, high resolution wind (HRW) and Rapidly Developing Thunderstorms (RDT). Main input data comes from SEVIRI channels via local antenna. Also short range NWP output fields, as well as auxiliary data are necessary.

We use MSG1 satellate data (channels: HRV, IR - 016, 039, 087, 097, 108, 120, 134, VIS006, VIS008, WV_062, WV_073) for the region of Georgia (centre 42.19 44.01 and size 100 240). Data from satellite comes every 15 mnutes. For NWP data we use 0.25 Degree GFS data.

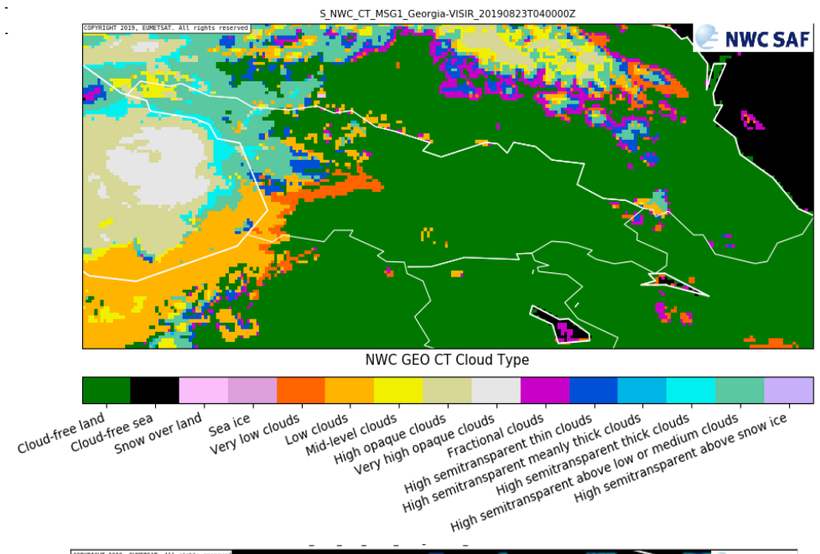
Due to some technical and infrastructural problems nowadays we are focused on generation on following products from

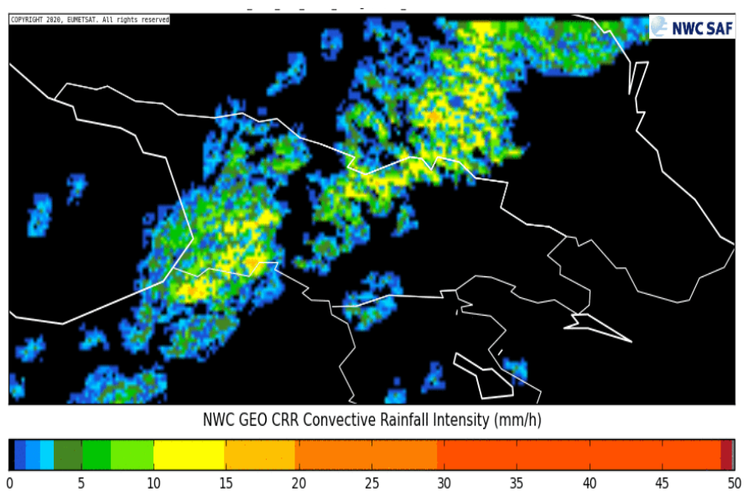
Cloud products: The cloud mask **(CMA)**, Product delineates all cloud-free pixels in a satellite scene with a high confidence with different algorithm day and night time. The cloud type **(CT**) provide a detailed cloud analysis. The CT product is essential for the generation of the cloud top temperature and height product and for the identification of precipitation clouds. Cloud Top Temperature & Height **(CTTH)** Contains information on the cloud top temperature, pressure and height for all pixels identified as cloudy in the satellite scene.

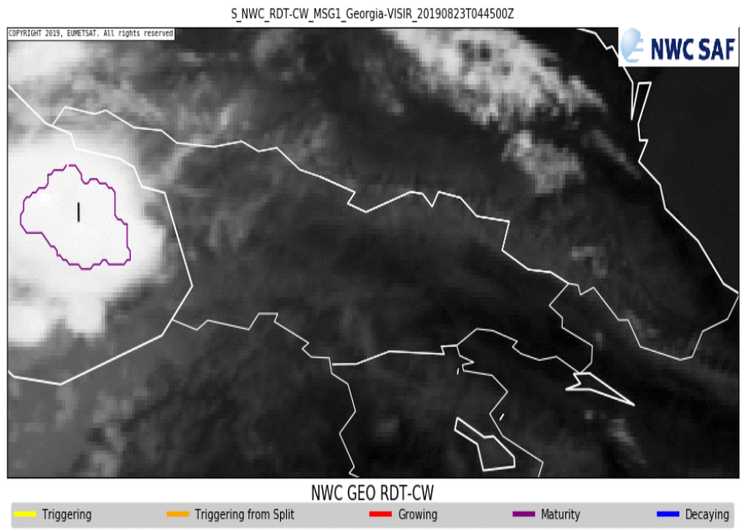
Precipitating Clouds (PC) Probability of precipitation intensities in pre-defined intensity intervals. Calculated with different algorithms for day and night situations and for different cloud type groups using the Cloud Type product as input. Convective Rainfall Rate (CRR) goal is to estimate rainfall rates from convective systems, using IR, WV and VIS MSG SEVIRI channels and lightning information (as optional input).

The **RDT-CW** product has been developed by Météo-France in the framework of the EUMETSAT SAF in support to Nowcasting. Using mainly geostationnary satellite data, it provides information on clouds related to significant convective systems, from meso scale (200 to 2000 km) down to smaller scales (tenth of km). We use RTD-CW product forecast, up to 1 h with 15 min time step.

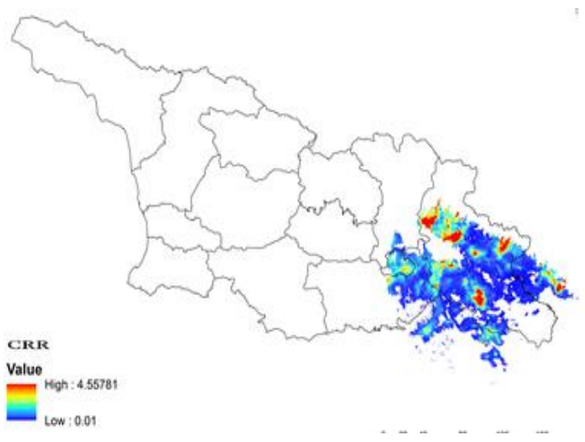
Product validation has mainly been used only for rainfall intensity, as NEA's AWS are not equipped with sensors to measure radiation and cloud parameters and from the other hand Quantitative Precipitation Estimation (QPE) and Quantitative Precipitation Forecast (QPF) on any leading time are very important for Georgia.

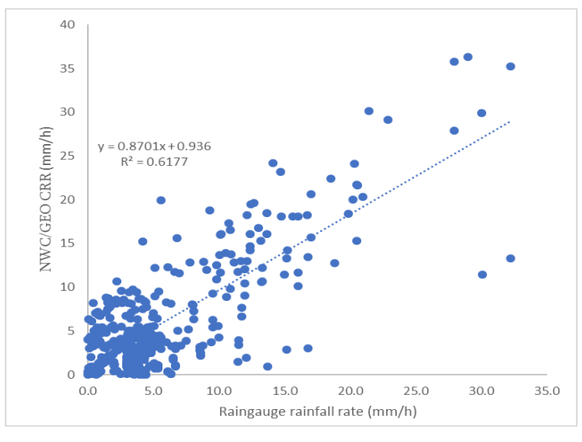



Weather ground radar is very important tool for nowcasting and very short-range forecast, but National Environmental Agency hasn't its weather Radar today, only uses weather radar data officially shared from other organization partially covering the country's territory.




Nowadays two LAMS (local area models) - COSMO with 7 km resolution and Weather Research and Forecasting (WRF) Model over south Caucasus domain (with 10 min (18 km) horizontal grid size) with double nesting option – with 10 km and 3 km resolutions are operating at NEA. COSMO takes initial and boundary conditions from ICON - global numerical weather prediction (NWP) model and WRF from GFS. Both Models are trained over local conditions and main physical options are determined, but for further development we are looking for to assimilate HRW and cloud products.

**Acknowledgements**: The research is funded by the Shota Rustaveli National Science Foundation of Georgia, Grant FR17_529